CITY OF ONTARIO
PLANNING COMMISSION/
HISTORIC PRESERVATION
MEETING AGENDA

March 22, 2022

Ontario City Hall
303 East "B" Street, Ontario, California 91764

6:30 PM

WELCOME to a meeting of the Ontario Planning/Historic Preservation Commission.

All documents for public review are on file in the Planning Department located at 303 E. B Street, Ontario, CA 91764 and on the City website at www.ontarioca.gov/Agendas/PlanningCommission.

- ***Anyone wishing to speak during public comment or on a particular item should fill out a green slip and submit it to the Secretary.***
- ***Comments will be limited to 5 minutes. Speakers will be alerted when their time is up. Speakers are then to return to their seats and no further comments will be permitted.***
- ***In accordance with State Law, remarks during public comment are to be limited to subjects within the Commission's jurisdiction. Remarks on other agenda items will be limited to those items.***
- ***Remarks from those seated or standing in the back of the chambers will not be permitted. All those wishing to speak including Commissioners and Staff need to be recognized by the Chair before speaking.***
- ***The City of Ontario will gladly accommodate disabled persons wishing to communicate at a public meeting. Should you need any type of special equipment or assistance in order to communicate at a public meeting, please inform the Planning Department at (909) 395-2036, a minimum of 72 hours prior to the scheduled meeting.***
- ***Please turn off all communication devices (phones and beepers) or put them on non-audible mode (vibrate) so as not to cause a disruption in the Commission proceedings.***

ROLL CALL

Anderson __ Dean __ DeDiemar __ Gage __ Lampkin __ Ricci __ Willoughby __

PLEDGE OF ALLEGIANCE TO THE FLAG

ANNOUNCEMENTS

1) Agenda Items

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2) Commissioner Items

PUBLIC COMMENTS

Citizens wishing to address the Planning/Historic Preservation Commission on any matter that is not on the agenda may do so at this time. Please state your name and address clearly for the record and limit your remarks to five minutes.

Please note that while the Planning/Historic Preservation Commission values your comments, the Commission cannot respond nor take action until such time as the matter may appear on the forthcoming agenda.

CONSENT CALENDAR ITEMS

All matters listed under CONSENT CALENDAR will be enacted by one summary motion in the order listed below. There will be no separate discussion on these items prior to the time the Commission votes on them, unless a member of the Commission or public requests a specific item be removed from the Consent Calendar for a separate vote. In that case, the balance of the items on the Consent Calendar will be voted on in summary motion and then those items removed for separate vote will be heard.

A-01. MINUTES APPROVAL

Planning/Historic Preservation Commission Minutes of February 22, 2022, approved as written.

A-02. GENERAL PLAN CONSISTENCY FINDING PURSUANT TO GOVERNMENT CODE SECTION 65402: A request for a determination of General Plan consistency pursuant to Government Code Section 65402, for the transfer of real property ownership from the City of Ontario to The University of La Verne, for properties located at 425 E B Street, 208 and 228 West Emporia Street, 200, 211 and 221 South Laurel 3995 and 4040 Inland Empire Boulevard and 320 East D Street; (APNS: Portion of 1048-454-16, 1049-056-05, 1049-056-06, 1049-056-01, 1049-056-02, 1049-056-03, 1049-056-04, 0210-205-03, 0210-211-23 and portion of 1048-541-15). **City Initiated**

PUBLIC HEARING ITEMS

For each of the items listed under PUBLIC HEARING ITEMS, the public will be provided an opportunity to speak. After a staff report is provided, the chairperson will open the public hearing. At that time the applicant will be allowed five (5) minutes to make a presentation on the case. Members of the public will then be allowed five (5) minutes each to speak, unless there are a number of person's wishing to speak and then the Chairperson will allow only three (3) minutes, to accommodate for more persons. The Planning/Historic Preservation Commission may ask the speakers questions relative to the case and the testimony provided. The question period will not count against your time limit. After all persons have spoken, the applicant will be allowed three minutes to summarize or rebut any public testimony. The chairperson will then close the public hearing portion of the hearing and deliberate the matter.

B. ENVIRONMENTAL ASSESSMENT AND DEVELOPMENT AGREEMENT REVIEW FOR FILE NO. PDA22-003: A public hearing to consider a Development Agreement between the City of Ontario and American General Design, Inc (dba Adept Development), to establish the terms and conditions for 11.47 acres of land to develop a future mixed use development consisting of approximately 691 residential units and up to 71,200 square feet of commercial retail uses, on three parcels of land located at the southwest corner of Via Villaggio and Via Piemonte, southeast corner of Via Villaggio and Via Piemonte, and on the southwest corner of

Ontario Center Parkway and Concours Street within the proposed mixed-use Subareas 8, 11, 16 and 17 of the Piemonte Overlay of the Ontario Center Specific. An Addendum to the Ontario Center Specific Plan Environmental Impact Report (State Clearing House No. 89041009) has been prepared. This application introduces no new significant environmental impacts. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APNs: 0210-204-38, 0218-204-39 and a Portion of 0210-205-01) **submitted by OTC Owner, LLC. City Council action is required.**

1. **CEQA Determination**

   Motion to recommend Approval/Denial of an Addendum to a previous EIR

2. **File No. PDA22-003** (Development Agreement)

   Motion to recommend Approval/Denial

C. ENVIRONMENTAL ASSESSMENT AND SPECIFIC PLAN AMENDMENT REVIEW FOR FILE NO. PSPA21-001: A public hearing to consider an Amendment to the Piemonte Overlay at Ontario Center Specific Plan, including [1] revising the overlay boundary to add approximately 24.9 acres, comprising of the property located at 4000 Ontario Center Parkway, to the overlay area, [2] changing the land use designation on approximately 4.9 acres of land from Office and Entertainment/Retail to Mixed Use, in an area bounded by Fourth Street to the north, Concours Street and Ontario Center Parkway to the south, Via Alba to the east, and the Camden Landmark Apartment and vacant land to the west, and [3] establishing development standards and design guidelines for the Mixed Use land use area within the Piemonte Overlay at Ontario Center Specific Plan. An Addendum to the Ontario Center Specific Plan Environmental Impact Report (State Clearing House No. 89041009) has been prepared. This application introduces no new significant environmental impacts. The proposed project is located within the Airport Influence Area of Ontario International Airport, and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APNs: 0210-204-12, 0210-204-13, 0210-204-14, 0210-204-15, 0210-204-17, 0210-204-18, 0210-204-20, 0210-204-21, 0210-204-22, 0210-204-23, 0210-204-23, 0210-204-24, 0210-204-25, 0210-204-26, 0210-204-28, 0210-204-36, 0210-204-37, 0210-204-37, 0210-204-38, 0210-204-39, 0210-204-40, 0210-204-41, 0210-531-06, 0210-531-07, 0210-531-08, 0210-531-09, 0210-531-10, 0210-231-11, 0210-231-12, 0210-231-13, 0210-231-14, 0210-231-15, 0210-231-16, and 0210-205-01); **City initiated. City Council action is required.**

1. **CEQA Determination**

   Motion to recommend Approval/Denial of an Addendum to a previous EIR

2. **File No. PSPA21-001** (Specific Plan Amendment)

   Motion to recommend Approval/Denial

MATTERS FROM THE PLANNING/HISTORIC PRESERVATION COMMISSION

1) Old Business

- Reports From Subcommittees
  - Historic Preservation (Standing): Did not meet.

2) New Business

- Chairperson and Vice-Chairperson appointments for April 2022 to March 2023

3) Nominations for Special Recognition

DIRECTOR'S REPORT

1) Monthly Activity Report

If you wish to appeal any decision of the Planning/Historic Preservation Commission, you must do so within ten (10) days of the Commission action. Please contact the Planning Department for information regarding the appeal process.

If you challenge any action of the Planning/Historic Preservation Commission in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the Planning/Historic Preservation Commission at, or prior to, the public hearing.

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I, Gwen Berendsen, Administrative Assistant, of the City of Ontario, or my designee, hereby certify that a true, accurate copy of the foregoing agenda was posted on **Friday, March 18, 2022**, at least 72 hours prior to the meeting per Government Code Section 54954.2 at 303 East "B" Street, Ontario.

Gwen Berendsen, Secretary Pro Tempore

Rudy Zeledon, Planning Director
Planning/Historic Preservation
Commission Secretary

CITY OF ONTARIO PLANNING COMMISSION/ HISTORIC PRESERVATION MEETING

MINUTES

February 22, 2022

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CITY OF ONTARIO PLANNING COMMISSION/ HISTORIC PRESERVATION MEETING

MINUTES

February 22, 2022

REGULAR MEETING: City Hall, 303 East B Street
Called to order by Chairman Gage at 6:36 PM

COMMISSIONERS Present: Chairman Gage**,** Vice-Chairman Willoughby, Anderson, Dean, DeDiemar, Lampkin, and Ricci

Absent: None

OTHERS PRESENT: Planning Director Zeledon, City Attorney Maldanado, Principal Planner Ruddins, Senior Planner Mejia, Associate Planner Aguilo, Transportation Manager Bautista and Planning Secretary Berendsen

PLEDGE OF ALLEGIANCE TO THE FLAG

The Pledge of Allegiance was led by Commissioner Willoughby.

ANNOUNCEMENTS

Mr. Zeledon stated that there were public comments for Item B, before the Commissioners.

Mr. Gage talked about the first Pro Bowl Game in 1966 and Chaffey High School did half time and it is on You Tube. He also stated he would like to close tonight's meeting in honor of Black History Month.

Lampkin arrived at 6:41 PM.

PUBLIC COMMENTS

No one responded from the audience.

CONSENT CALENDAR ITEMS

A-01. MINUTES APPROVAL

Planning/Historic Preservation Commission Minutes of January 25, 2022, approved as written.

It was moved by DeDiemar, seconded by Willoughby, to approve the Planning Commission Minutes of January 25, 2022, as written. Anderson abstained as she was not at that meeting. The motion was carried 6 to 0.

PUBLIC HEARING ITEMS

B. **ENVIRONMENTAL ASSESSMENT, PLANNED UNIT DEVELOPMENT, TENTATIVE PARCEL MAP, DEVELOPMENT PLAN, AND CERTIFICATE OF APPROPRIATENESS REVIEW FOR FILE NOS. PUD22-001, PMTT21-009, PDEV21-017, AND PHP21-021:** A request for the following entitlements: [1] a Planned Unit Development (File No. PUD22-001) to establish development standards, design guidelines, and infrastructure requirements for the Project site; [2] a Tentative Parcel Map (File No. PMTT21-009 (TPM 20394)) to subdivide a 0.86-acre property into a single lot to establish 22 commercial airspace condominium units; [3] a Development Plan (File No. PDEV21-017) to construct two commercial buildings totaling 33,787 square feet; and [4] a Certificate of Appropriateness (File No. PHP21-021) to allow for the construction of the proposed Project within the Euclid Avenue Overlay Zoning District. The Project Site is located at 125 West Emporia Street, within the MU-1/LUA-2N (Downtown Mixed-Use/Arts District – North) and EA (Euclid Avenue Overlay) zoning districts. The project is categorically exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15332 (Class 32, In-Fill Development Projects) of the CEQA Guidelines. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 1049-059-14) **submitted by RWSS Development LLC. City Council action is required.**

Associate Planner Aguilo, presented the staff report. She stated that staff is recommending the Planning Commission recommend approval for File No. PUD22-001 and approve, File Nos. PHP21-021, PMTT21-009 and PDEV21-017, pursuant to the facts and reasons contained in the staff report and attached resolutions, and subject to the conditions of approval.

Mr. Lampkin wanted to know how often the parking lot is utilized.

Mr. Zeledon stated a couple times a month and sometimes throughout the year for events. He explained the Downtown area parking model.

Mr. Lampkin wanted to know the percentage within the year.

Mr. Zeledon stated about 15% percent.

Mr. Lampkin wanted to know if handicap stalls are required.

Mr. Zeledon stated that 2 handicap stalls are needed for the Tap room and to access the flex space, and that the Building department will regulate the parking.

Mr. Lampkin wanted clarification regarding a public comment about there being art space.

Mr. Zeledon stated the flex space will belong to the City and the Community, Life and Culture agency will run it and the space will be programmed with art interests ranging from retail art, art supply store and art classes being done. He stated the Tap room will be run independently but will bring people to the area to gather.

Mr. Lampkin wanted to know the thought behind the corner tower design.

Mr. Zeledon stated that the historic downtown the fronts have had a focal element and this is a dominant corner, so it was designed as a grain silo that compliments what is already there.

Mr. Lampkin wanted clarification on the architectural design and if they would place murals on the building.

Mr. Zeledon stated opportunities are available and currently we are working on mural program and art program.

Mr. Lampkin wanted clarification on examples of car condo and what would the rules be.

Mr. Zeledon responded.

Mr. Willoughby wanted to know how tall is building A.

Ms. Aguilo stated that 30 feet is the highest point.

Mr. Willoughby wanted clarification on how that compared to other structures in the area.

Mr. Zeledon stated it is close to the scale and massing so they are all consistent.

Mr. Willoughby wanted to know the tap room required parking.

Mr. Zeledon stated 25 spaces are required for the tap room.

Mr. Willoughby wanted clarification regarding surrounding area parking use.

Mr. Zeledon explained the Downtown parking model and what is happening in the surrounding area currently.

Mr. Willoughby wanted to know if the tap room would have food items.

Mr. Zeledon stated it would have brews, but you could bring in your own food.

Mr. Ricci wanted to know if the rock curbs would be repaired.

Mr. Zeledon stated that Emporia does have rock curbs and the City has an inventory of rock curbs and this will be replaced with regular curbing, as it is so dilapidated.

Mr. Ricci wanted to clarify if parking would be allowed on that portion of the street.

Mr. Zeledon stated yes, and it would be limited to 5 spaces.

PUBLIC TESTIMONY

Richard Tipping representing RWS and Ryan Wynes the applicant appeared and spoke in favor of the project.

Mr. Lampkin wanted to know about artwork on the walls.

Mr. Tipping stated he will work with staff on that and is open to that.

Mr. Willoughby wanted to know if taproom would serve appetizers or food.

Mr. Tipping stated it would likely be a Taproom with light appetizers and people bring their own food.

Mr. Gage wanted clarification on the use of the condos, and how do you regulate its use.

Mr. Tipping stated these are for sale buy as an investment, cameras on the site and rule breaking and letters can be sent and notify the city to help enforce.

Mr. Gage wanted to know what type of vehicles can be stored.

Mr. Tipping stated it can be for cars, recreational vehicles, and/or boats.

Mr. Dean wanted to know if this is their first attempt at this sort of project.

Mr. Tipping stated yes and they have done some research on existing ones.

Mr. Lampkin wanted to know if there would be a property manager or company would regulate and do inspections.

Mr. Tipping stated there would be an HOA company and a Board made-up of condo owners.

Catherine Tessier spoke in opposition to the project.

Mr. DeDiemar asked Ms. Tessier of the loft's 40 tenants how many are artists.

Ms. Tessier responded to the answers stating it is a broad area of arts.

Ms. Dediemar talked regarding the art walks and stated that the arts walk on Feb 19, that none of the lofts were open.

Ms. Tessier responded.

Mr. Willoughby wanted to clarify not all the lofts are occupied by artists.

Ms. Tessier stated that is correct and that art is a broad term.

John Basheto a resident and Chaffey College professor, wanted to clarify that there were some businesses open at the loft for the art walk and have been participating for 4 years.

Ms. DeDiemar commended them on their efforts towards the art walks.

Mr. Lampkin wanted Mr. Basheto to describe the broadness of art.

Mr. Basheto responded.

Mr. Tipping wanted to rebut regarding parking in front of the garage and the space for the arts.

Mr. Wynes stated automotive has its place in art history, and the condos would contribute to the art walks.

Mr. Zeledon explained the vision of the Downtown.

As there was no one else wishing to speak, Chairman Gage closed the public testimony

Mr. Lampkin thanked the speakers and described what art is including cars and spoke in favor of the project.

Mr. Willoughby spoke in favor of the project and thanked staff.

Ms. DeDiemar spoke in favor of the project and thanked staff for their efforts to build the arts district.

Mr. Gage sympathized with Ms. Tessier and spoke in favor of the project.

PLANNING COMMISSION ACTION

It was moved by Lampkin, seconded by Willoughby, to recommend adoption of a resolution to approve the Planned Unit Development, File No., PUD22-001, subject to conditions of approval. Roll call vote: AYES, Anderson, Dean, DeDiemar, Gage, Lampkin, Ricci, and Willoughby; NOES, none; RECUSE, none; ABSENT, none. The motion was carried 7 to 0.

It was moved by Lampkin, seconded by Willoughby, to adopt a resolution to approve the Certificate of Appropriateness, File No., PHP21-021, subject to conditions of approval. Roll call vote: AYES, Anderson, Dean, DeDiemar, Gage, Lampkin, Ricci, and Willoughby; NOES, none; RECUSE, none; ABSENT, none. The motion was carried 7 to 0.

It was moved by Lampkin, seconded by Willoughby, to adopt a resolution to approve the Tentative Parcel Map, File No., PMTT21-009, subject to conditions of approval. Roll call vote: AYES, Anderson, Dean, DeDiemar, Gage, Lampkin, Ricci, and Willoughby; NOES, none; RECUSE, none; ABSENT, none. The motion was carried 7 to 0.

It was moved by Lampkin, seconded by Willoughby, to adopt a resolution to approve the Development Plan, File No., PDEV21-017, subject to conditions of approval. Roll call vote: AYES, Anderson, Dean, DeDiemar, Gage, Lampkin, Ricci, and Willoughby; NOES, none; RECUSE, none; ABSENT, none. The motion was carried 7 to 0.

C. **ENVIRONMENTAL ASSESSMENT, DEVELOPMENT PLAN, AND CONDITIONAL USE PERMIT REVIEW FOR FILE NOS. PDEV21-021 AND PCUP21-009:** A Development Plan (File No. PDEV21-021) to construct a 4-story, 128-room Extended Stay/Residence Inn Hotel, in conjunction with a Conditional Use Permit (File No. PCUP21-009) to establish and operate the hotel use on 1.83 acres of land located at 5060 East Fourth Street, within the Freeway Commercial land use district of The Exchange Specific Plan. The project is categorically exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15332 (Class 32, In-Fill Development Projects) of the CEQA guidelines. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 0238-012-30) **submitted by Roger Barbosa. City Council action is required.**

Planning Director Zeledon, presented the staff report. He stated that staff is recommending the Planning Commission recommend approval for File No. PCUP21-009 and approve File No. PDEV21-021, pursuant to the facts and reasons contained in the staff report and attached resolutions, and subject to the conditions of approval.

Mr. Willoughby wanted clarification regarding the material used for the circle on the entryway.

Mr. Zeledon stated that pavers and scored concrete would be used.

Mr. Willoughby wanted to know if this would be an extended stay.

Mr. Zeledon stated it would be an extended stay and referred this to the applicant for clarification.

PUBLIC TESTIMONY

Roger Barbosa appeared and spoke in favor of the project and stated that an extended stay would be the goal.

Mr. Willoughby wanted to know a time frame to move forward.

Mr. Barbosa stated they wanted to move quickly.

Mr. Gage wanted to know if they prepared for strong wind.

Mr. Barbosa stated that they did plan for the high winds.

Mr. Ricci wanted further clarification on extended stay.

Mr. Barbosa stated the ownership is looking at industrial corporate stay for several days.

Mr. Ricci wanted to know the maximum stay.

Mr. Barbosa stated 30 days.

Mr. Gage wanted to know if kitchenettes would be included.

Mr. Barbosa stated yes.

As there was no one else wishing to speak, Chairman Gage closed the public testimony

Mr. Willoughby spoke in favor of the project.

PLANNING COMMISSION ACTION

It was moved by Lampkin, seconded by Ricci, to recommend adoption of a resolution to approve the Conditional Use Permit, File No., PCUP21-009, subject to conditions of approval. Roll call vote: AYES, Anderson, Dean, DeDiemar, Gage, Lampkin, Ricci, and Willoughby; NOES, none; RECUSE, none; ABSENT, none. The motion was carried 7 to 0.

It was moved by Lampkin, seconded by Ricci, to adopt a resolution to approve the Development Plan, File No., PDEV21-021, subject to conditions of approval. Roll call vote: AYES, Anderson, Dean, DeDiemar, Gage, Lampkin, Ricci, and Willoughby; NOES, none; RECUSE, none; ABSENT, none. The motion was carried 7 to 0.

MATTERS FROM THE PLANNING COMMISSION

Old Business Reports From Subcommittees

Historic Preservation (Standing): This subcommittee met on February 10, 2022.

Mr. Willoughby stated they looked over the Certificate of Appropriateness for tonight's project and got an update that the Fallis house is a total loss after the fire.

Development Code Review (Ad-hoc): This subcommittee did not meet.

Zoning General Plan Consistency (Ad-hoc): This subcommittee did not meet.

New Business

NOMINATIONS FOR SPECIAL RECOGNITION

None at this time.

DIRECTOR'S REPORT

Mr. Zeledon stated the Monthly Activity Reports are in their packets, as well as a memo regarding the General Plan progress report.

ADJOURNMENT

Lampkin motioned to adjourn, in observance of Black History Month and in honor of the black Americans and their descendants who make up Ontario, seconded by Dean. The meeting was adjourned at 8:28 PM.

_____
Secretary Pro Tempore

_____
Chairman, Planning Commission

CITY OF ONTARIO PLANNING DEPARTMENT

PLANNING COMMISSION STAFF REPORT

March 22, 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

SUBJECT: A request for a determination of General Plan consistency pursuant to Government Code Section 65402, for the transfer of real property ownership from the City of Ontario to The University of La Verne, for properties located at 425 E B Street, 208 and 228 West Emporia Street, 200, 211 and 221 South Laurel, 3995 and 4040 Inland Empire Boulevard and 320 East D Street; (APNS: Portion of 1048-454-16, 1049-056-05, 1049-056-06, 1049-056-01, 1049-056-02, 1049-056-03, 1049-056-04, 0210-205-03, 0210-211-23 and portion of 1048-541-15).

PROPERTY OWNER: City of Ontario and University of La Verne

RECOMMENDED ACTION: That the Planning Commission adopt a resolution finding that the transfer of property between the City of Ontario and University of La Verne located at 425 E B Street, 208 and 228 West Emporia Street, 200, 211 and 221 South Laurel, 3995 and 4040 Inland Empire Boulevard and 320 East D Street is consistent with the Policy Plan (General Plan).

PROJECT SETTING: The subject properties are located at the following locations and depicted in Figures 1, 2 and 3 (Project Location Maps):

1. Approximately 0.52 acres located at the northwest corner of Sultana Avenue and B street, addressed at 425 E. B Street within the MU1 (Downtown Mixed Use) Civic Center zoning district;

2. Approximately 1.4 acres located at the northwest corner of Emporia Street and Laurel Avenue, addressed at 208 and 228 West Emporia, 200, 211 and 221 South Laurel Avenue within the MU1 (Downtown Mixed Use) Arts District North zoning district;

3. Approximately 13 acres located on the north and south side of Inland Empire Boulevard approximately 2,641 feet west of Haven Avenue, addressed at 3995 and 4040 Inland Empire Boulevard within the Open Space land use district of the Ontario Center Specific Plan; and

4. Approximately 2.3 acres located at the southwest corner of Sultana Avenue and D street, addressed at 320 East D Street within the Light Office zoning district.

Case Planner:	Rudy Zeledon, Planning Director
Planning Director Approval:	
Submittal Date:	N/A

Hearing Body	*Date*	*Decision*	*Action*
DAB			
PC	02/22/2022		Final
CC			

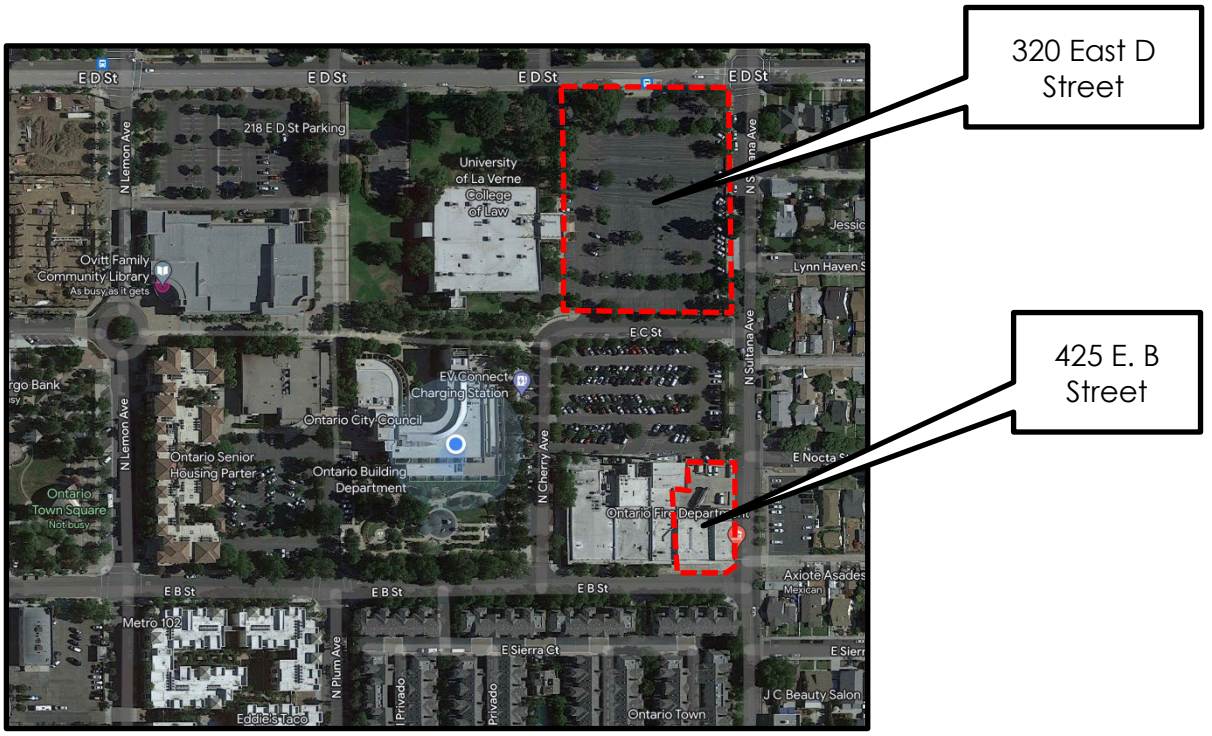


Figure 1: Project Location Map

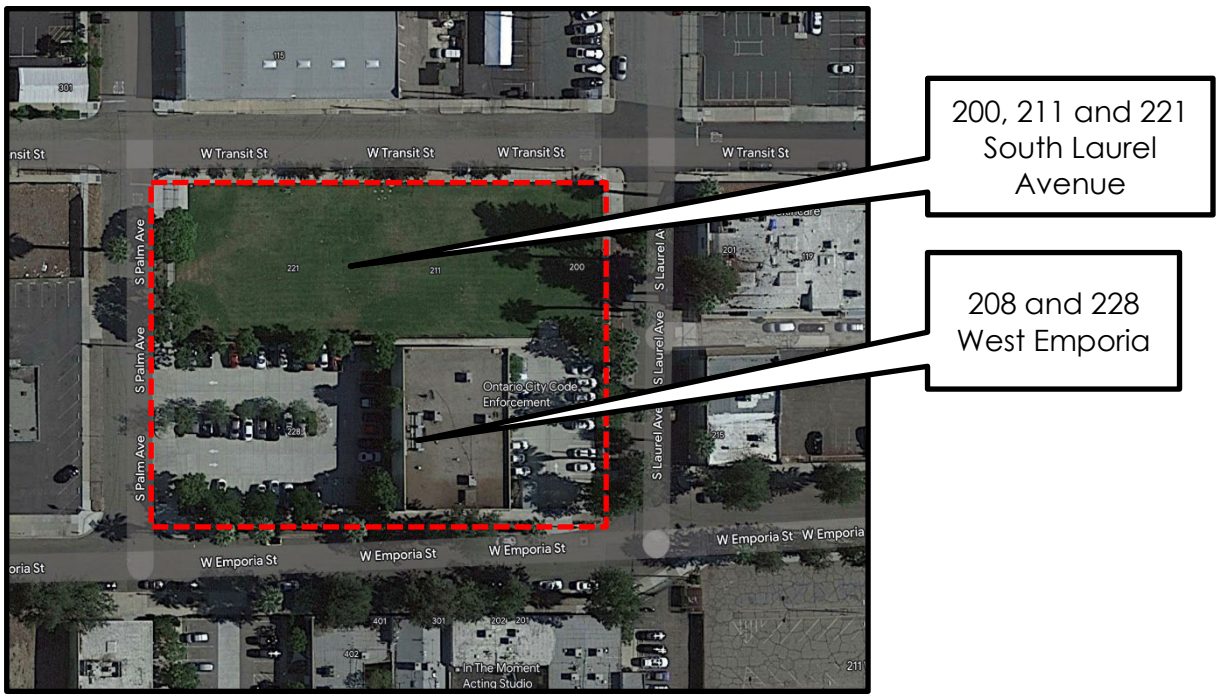


Figure 2: Project Location Map

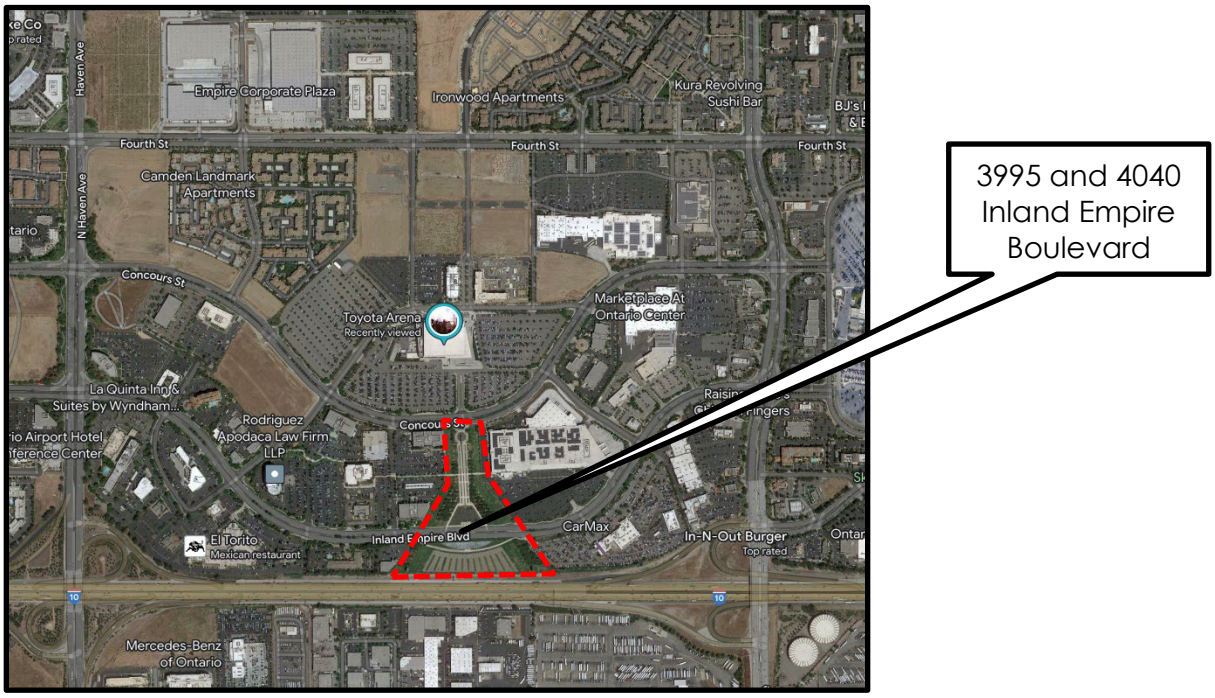


Figure 3: Project Location Map

PROJECT ANALYSIS:

(1) Background — On October 21, 2021, the City of Ontario ("the City") and the University of La Verne ("ULV") executed a Memorandum of Understanding ("MOU") to explore the viability of exchanging properties for the purpose of expanding the City of Ontario's Civic Center campus while enabling ULV to expand its footprint within the City of Ontario.

ULV envisions an innovation and education corridor within the City of Ontario, one that builds upon both the proximity of its main campus in La Verne and the University of La Verne College of Law building in the heart of Downtown Ontario. ULV's future expansion plans in Ontario includes the development of a new College of Health campus as well as the Randall Lewis Center for Innovation, Social Impact and Entrepreneurship.

The City, for its part, envisions a robust Civic Center Campus – one that modernizes facilities for public employees, brings more people to the downtown area, and better utilizes all space in the downtown core. The City expansion project ("Expansion Project") is anticipated to include the Ontario Montclair-School District headquarters, a modern City Annex, which would centralize City Hall services, a 700-space parking structure, a new state-of-the-art fire station, and a College of Health.

(2) Project Analysis —This MOU enabled the City and ULV an opportunity to negotiate terms in good faith. The project as described below is the result of these negotiations. In order to move the project forward, the Planning Commission must find that the proposed uses as described below are consistent with the General Plan.

Government Code Section 65402 provides that a local agency may not acquire real property for a public purpose until the Planning Commission determines that the location, purpose and extent of the acquisition is in conformance with the general plan.

The City is proposing an exchange of properties ("the Exchange") with ULV. The City of Ontario presently is the owner of the following:

- Approximately 0.52 acres at the northwest corner of Sultana Avenue and "B" Street (APN: Portion of 1048-545-16), which is currently developed with the City's Fire Station No. 1. The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Public Facilities and is intended for public facilities and educational uses. ULV intends to construct a College of Health campus at this site.

- Approximately 1.4 acres located at the northwest corner of Emporia Street and Laurel Avenue, addressed at 208 and 228 West Emporia, 200, 211 and 221 South Laurel Avenue (APNS: 1049-056-05, 1049-056-06, 1049-056-01, 1049-056-02, 1049-056-03 and 1049-056-04). The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Mixed-Use (Downtown Mixed-Use Area) and intended to accommodate a mixture of retail, service, office, restaurant, residential and cultural uses. ULV intends on utilizing this building, parking lot and vacant land as the future Randall Lewis Center for Innovation, Entrepreneurship and Social Impact.

- Approximately 13 acres located on the north and south side of Inland Empire Boulevard approximately 2,641 feet west of Haven Avenue, addressed as 3995 and 4040 Inland Empire Boulevard (APNS: 0210-205-03 and 0210-211-23). The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Mixed-Use (Ontario Center Mixed Use Area) and is intended to accommodate the most intensive developments in Ontario. This Mixed-Use Area is characterized by low-rise (3-5 stories) and mid-rise (5-10 stories), mixed-use buildings, iconic architecture, and regionally significant uses, such as the Events Center, and other cultural and entertainment uses. This area accommodates a vertical and horizontal mixture of entertainment, retail, office, and residential uses in an active, pedestrian oriented atmosphere. The proposed project may include future site improvements allowable by the Ontario Center Specific Plan. Any future improvement would require a development entitlement to be reviewed and approved by the appropriate hearing body and must occur within three years of a signed Exchange Agreement.

In exchange for the transfer of the properties, as described above, the University of La Verne will convey its 2.4-acre parking lot, at the southwest corner of Sultana Avenue and D street (APN: east portion of 1048-541-15), to the City. The acquisition of this lot will enable the City to relocate and construct a modernized Fire Station, currently located at the northwest corner Sultana and "B" Street. A portion of this parking lot will also serve as the future location of a 700-space parking structure that will serve all users within the Civic Center Campus. The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Office Commercial (OC) and is intended as an intense mixture of regional serving retail, service, tourist-serving, professional office, entertainment, dining, and supporting services uses that capitalize on strategic locations in Ontario. This designation also includes professional offices including financial, legal, insurance, medical, public facilities, and other similar uses in a neighborhood setting and/or as adaptive reuse.

The proposed transfer and acquisition of the properties is in the City's best interest because it achieves the City's goals of attracting workforce population to the downtown area, removing blight, activating underutilized assets in the City, and incentivizing the development of a pipeline of talent that adds more high paying wage jobs to the City. The proposed use of the properties is consistent with TOP Policy Plan goals and polices, and the land use designations for the properties (See Exhibit "A", TOP Policy Plan Land Use Plan).

COMPLIANCE WITH THE ONTARIO PLAN: The proposed project is consistent with the principles, goals and policies contained within the Vision, Governance, Policy Plan (General Plan), and City Council Priorities components of The Ontario Plan (TOP). More specifically, the goals and policies of TOP that are furthered by the proposed project are as follows:

(1) City Council Goals.

- Invest in the Growth and Evolution of the City's Economy
- Operate in a Businesslike Manner
- Focus Resources in Ontario's Commercial and Residential Neighborhoods

(2) Vision.

Distinctive Development:

- Commercial and Residential Development

  - Development quality that is broadly recognized as distinctive and not exclusively tied to the general suburban character typical of much of Southern California.

(3) Governance.

Decision Making:

- Goal G1: Sustained decision-making that consistently moves Ontario towards its Vision by using The Ontario Plan as a framework for assessing choices.

  - G1-2 Long-term Benefit. We require decisions to demonstrate and document how they add value to the community and support the Ontario Vision

Land Use Element:

- Goal LU1: A community that has a spectrum of housing types and price ranges that match the jobs in the City and that make it possible for people to live and work in Ontario and maintain a quality of life.

  - LU1-1 Strategic Growth. We concentrate growth in strategic locations that help create place and identity, maximize available and planned infrastructure, and foster the development of transit.

  - LU1-6 Complete Community: We incorporate a variety of land uses and building types in our land use planning efforts that result in a complete community where residents at all stages of life, employers, workers and visitors have a wide spectrum of choices of where they can live, work, shop and recreate within Ontario. (Refer to Complete Community Section of Community Economics Element).

Community Economics Element:

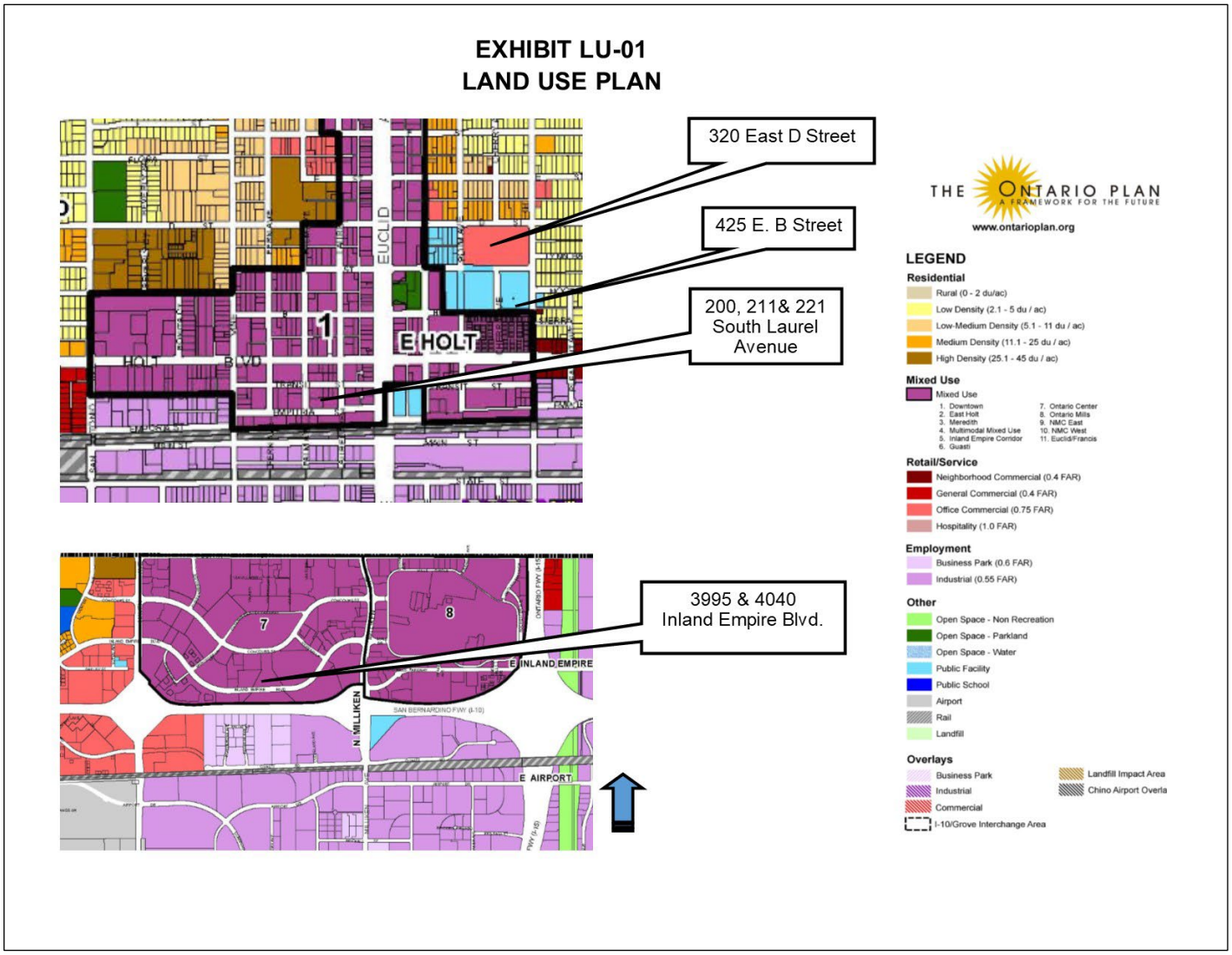
- Goal CE1: A complete community that provides for all incomes and stages of life.

  - CE2-1 Development Projects. We require new development and redevelopment to create unique, high-quality places that add value to the community.

  - CE2-2 Development Review. We require those proposing new development and redevelopment to demonstrate how their projects will create appropriately unique, functional and sustainable places that will compete well with their competition within the region.

ENVIRONMENTAL REVIEW: The proposed acquisition of the project site is exempt from review under the California Environmental Quality Act pursuant to Section 15061(b)(3) of the Guidelines, as there is no possibility that such acquisition and development will have a significant effect on the environment.

Exhibit "A" TOP Policy Plan Land Use Plan



RESOLUTION NO.

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF ONTARIO, CALIFORNIA, MAKING A REVIEW OF GENERAL PLAN CONSISTENCY PURSUANT TO GOVERNMENT CODE SECTION 65402, FOR THE TRANSFER OF REAL PROPERTY OWNERSHIP FROM THE CITY OF ONTARIO TO THE UNIVERSITY OF LA VERNE, FOR PROPERTIES LOCATED AT 425 E B STREET, 208 AND 228 WEST EMPORIA STREET, 200, 211 AND 221 SOUTH LAUREL 3995 AND 4040 INLAND EMPIRE BOULEVARD AND 320 EAST D STREET, AND MAKING FINDINGS IN SUPPORT THEREOF—APN: PORTION OF 1048-454-16, 1049-056-05, 1049-056-06, 1049-056-01, 1049-056-02, 1049-056-03, 1049-056-04, 0210-205-03, 0210-211-23 AND PORTION OF 1048-541-15.

WHEREAS, The City of Ontario ("Applicant") has requested a determination of General Plan consistency pursuant Government Code Section 65402, as described in the title of this Resolution (hereinafter referred to as "Application" or "Project"); and

WHEREAS, the Application applies to approximately 0.52 acres located at the northwest corner of Sultana Avenue and B Street, addressed at 425 E. B Street within the MU1 (Downtown Mixed Use) Civic Center zoning district, and is presently improved with Fire Station1; and

WHEREAS, the Application applies to approximately 1.4 acres located at the northwest corner of Emporia Street and Laurel Avenue, addressed at 208 and 228 West Emporia, 200, 211 and 221 South Laurel Avenue within the MU1 (Downtown Mixed Use) Arts District North zoning district, and is presently improved with a two story building/parking lot/vacant land and occupied by the City of Ontario Community Improvement Department; and

WHEREAS, the Application applies to approximately 13 acres located on the north and south side of Inland Empire Boulevard, approximately 2,641 feet west of Haven Avenue, addressed at 3995 and 4040 Inland Empire Boulevard within the Open Space land use district of the Ontario Center Specific Plan, and is presently improved with open space passive park area; and

WHEREAS, the Application applies to approximately 2.3 acres located at the southwest corner of Sultana Avenue and D street, addressed at 320 East D Street within the Light Office zoning district, and is presently improved with the University of La Verne parking lot; and

WHEREAS, Government Code Section 65402 provides that a local agency may not acquire real property for a public purpose, if such agency has adopted a general plan, until the location, purpose and extent of the acquisition has been submitted to and

reported upon by the planning agency having jurisdiction, as to the conformity of the proposed acquisition with the general plan; and

WHEREAS, on October 21, 2021, the City of Ontario ("the City") and the University of La Verne ("ULV") executed a Memorandum of Understanding ("MOU") to explore the viability of exchanging properties for the purpose of expanding the City of Ontario's Civic Center campus while enabling ULV to expand its footprint within the City of Ontario. The MOU enabled the City and ULV an opportunity to negotiate terms in good faith. The Project is the result of these negotiations; and

WHEREAS, the TOP Policy Plan (General Plan) Land Use Map designates the Project properties as follows:

- Approximately 0.52 acres at the northwest corner of Sultana Avenue and "B" Street (APN: Portion of 1048-545-16), which is currently developed with the City's Fire Station No. 1. The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Public Facilities and is intended for public facilities and educational uses. ULV intends to construct a College of Health campus at this site;

- Approximately 1.4 acres located at the northwest corner of Emporia Street and Laurel Avenue, addressed at 208 and 228 West Emporia, 200, 211 and 221 South Laurel Avenue (APNS: 1049-056-05, 1049-056-06, 1049-056-01, 1049-056-02, 1049-056-03 and 1049-056-04). The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Mixed-Use (Downtown Mixed-Use Area) and is intended to accommodate a mixture of retail, service, office, restaurant, residential and cultural uses. ULV intends on utilizing this building as the future Randall Lewis Center for Innovation, Entrepreneurship and Social Impact;

- Approximately 13 acres located on the north and south side of Inland Empire Boulevard approximately 2,641 feet west of Haven Avenue, addressed at 3995 and 4040 Inland Empire Boulevard (APNS: 0210-205-03 and 0210-211-23). The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Mixed-Use (Ontario Center Mixed Use Area) and is intended to accommodate the most intensive developments in Ontario. This Mixed-Use Area is characterized by low-rise (3-5 stories) and mid-rise (5-10 stories), mixed-use buildings, iconic architecture, and regionally significant uses, such as the Events Center, and other cultural and entertainment uses. This area accommodates a vertical and horizontal mixture of entertainment, retail, office, and residential uses in an active, pedestrian oriented atmosphere. The proposed project may include future site improvements allowable by the Ontario Center Specific Plan. Any future improvement would require a development entitlement to be reviewed and

approved by the appropriate hearing body and must occur within three years of a signed Exchange Agreement; and

WHEREAS, in exchange for the transfer of the properties, the University of La Verne will convey its 2.4-acre parking lot, at the southwest corner of Sultana Avenue and D street (APN: east portion of 1048-541-15), to the City. The acquisition of this lot will enable the City to relocate and construct a modernized Fire Station, currently located at the northwest corner Sultana and “B” Street. A portion of this parking lot will also serve as the future location of a 700-space parking structure that will serve all users within the Civic Center Campus. The Ontario Plan (TOP) Policy Plan (General Plan) land use plan designates the property as Office Commercial (OC) and is intended as an intense mixture of regional serving retail, service, tourist-serving, professional office, entertainment, dining, and supporting services uses that capitalize on strategic locations in Ontario. This designation also includes professional offices including financial, legal, insurance, medical, public facilities, and other similar uses in a neighborhood setting and/or as adaptive reuse; and

WHEREAS, the Application is a project pursuant to the California Environmental Quality Act, commencing with Public Resources Code Section 21000 (hereinafter referred to as "CEQA"); and

WHEREAS, the Project is exempt from CEQA pursuant to a categorical exemption (listed in CEQA Guidelines Article 19, commencing with Section 15300) and the application of that categorical exemption is not barred by one of the exceptions set forth in CEQA Guidelines Section 15300.2; and

WHEREAS, Ontario Development Code Table 2.02-1 (Review Matrix) grants the Planning Commission the responsibility and authority to review and act on the subject Application; and

WHEREAS, on March 22, 2022, the Planning Commission of the City of Ontario conducted a hearing to consider the Project, and concluded said hearing on that date; and

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

NOW, THEREFORE, IT IS HEREBY FOUND, DETERMINED, AND RESOLVED by the Planning Commission of the City of Ontario, as follows:

SECTION 1: ***Environmental Determination and Findings.*** As the decision-making authority for the Project, the Planning Commission has reviewed and considered the information contained in the administrative record for the Project. Based upon the facts and information contained in the administrative record, including all written and oral

evidence presented to the Planning Commission, the Planning Commission finds as follows:

(1) The administrative record has been completed in compliance with CEQA, the State CEQA Guidelines, and the City of Ontario Local CEQA Guidelines; and

(2) The Project is categorically exempt from environmental review pursuant to Section 15061(b)(3) of the CEQA Guidelines; and

(3) The application of the categorical exemption is not barred by one of the exceptions set forth in CEQA Guidelines Section 15300.2; and

(4) The determination of CEQA exemption reflects the independent judgment of the Planning Commission.

SECTION 2: ***Planning Commission Action.*** Based upon the substantial evidence presented to the Planning Commission during the above-referenced hearing and upon the specific findings set forth in Section 1 above, the Planning Commission hereby concludes that the proposed property transfer and acquisition is consistent with TOP Policy Plan (General Plan) goals and policies, and the land use designation for the project sites.

SECTION 3: Based upon the findings and conclusions set forth in Sections 1 and 2 above, the Planning Commission hereby approves the Project.

SECTION 4: ***Custodian of Records.*** The documents and materials that constitute the record of proceedings on which these findings have been based are located at the City of Ontario City Hall, 303 East “B” Street, Ontario, California 91764. The custodian for these records is the City Clerk of the City of Ontario.

SECTION 5: ***Certification to Adoption.*** The Secretary shall certify to the adoption of the Resolution.

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The Secretary Pro Tempore for the Planning Commission of the City of Ontario shall certify as to the adoption of this Resolution.

I hereby certify that the foregoing Resolution was duly and regularly introduced, passed and adopted by the Planning Commission of the City of Ontario at a regular meeting thereof held on the 22nd day of March 2022, and the foregoing is a full, true and correct copy of said Resolution, and has not been amended or repealed.

Rick Gage
Planning Commission Chairman

ATTEST:

Rudy Zeledon
Planning Director and
Secretary to the Planning Commission

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO)
CITY OF ONTARIO)

I, Gwen Berendsen, Secretary Pro Tempore of the Planning Commission of the City of Ontario, DO HEREBY CERTIFY that foregoing Resolution No., was duly passed and adopted by the Planning Commission of the City of Ontario at their regular meeting held on March 22, 2022, by the following roll call vote, to wit:

AYES:

NOES:

ABSENT:

ABSTAIN:

Gwen Berendsen
Secretary Pro Tempore

CITY OF ONTARIO PLANNING DEPARTMENT

PLANNING COMMISSION STAFF REPORT

March 22, 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

FILE NO: PDA22-003

SUBJECT: A public hearing to consider a Development Agreement between the City of Ontario and OTC Owner, LLC, to establish the terms and conditions for 11.47 acres of land to develop a future mixed use development consisting of approximately 691 residential units and up to 71,200 square feet of commercial retail uses, on three parcels of land located at the southwest corner of Via Villaggio and Via Piemonte, southeast corner of Via Villaggio and Via Piemonte, and on the southwest corner of Ontario Center Parkway and Concours Street within the proposed mixed-use Subareas 8, 11, 16 and 17 of the Piemonte Overlay of the Ontario Center Specific. **Submitted by OTC Owner, LLC. City Council action is required.**

PROPERTY OWNER: City of Ontario

RECOMMENDED ACTION: That the Planning Commission consider and recommend the City Council adopt an ordinance approving the Development Agreement (File No. PDA22-003) between the City of Ontario and OTC Owner, LLC, pursuant to the facts and reasons contained in the staff report and attached resolution.

PROJECT SETTING: The Project site is comprised of 11.47 acres of land, consisting of two vacant parcels located at the southwest corner of Via Villaggio and Via Piemonte and at the Southeast corner of Via Villaggio and Via Piemonte and one additional parcel, developed with the Toyota Arena parking lots, located at the southwest corner of Ontario Center Parkway and Concours Street. The project site within the proposed mixed-use Subareas 8, 11, 16 and 17 of the Piemonte Overlay of the Ontario Center Specific Plan, and is depicted in Figure 1: Project Location, below. The Project site is surrounded by residential, office, and commercial properties on land that is generally topographically flat. In addition to the existing surrounding developments, there are also vacant parcels along the Project boundary. The existing surrounding land uses, zoning, and general plan and specific plan land use designations are summarized in the "Surrounding Zoning & Land Uses" table located in the Technical Appendix of this report.

PROJECT ANALYSIS:

Case Planner:	Rudy Zeledon, Planning Director
Planning Director Approval:	RZ
Submittal Date:	N/A

Hearing Body	*Date*	*Decision*	*Action*
DAB	N/A	N/A	
PC	02/22/2022		Recommend
CC			Final

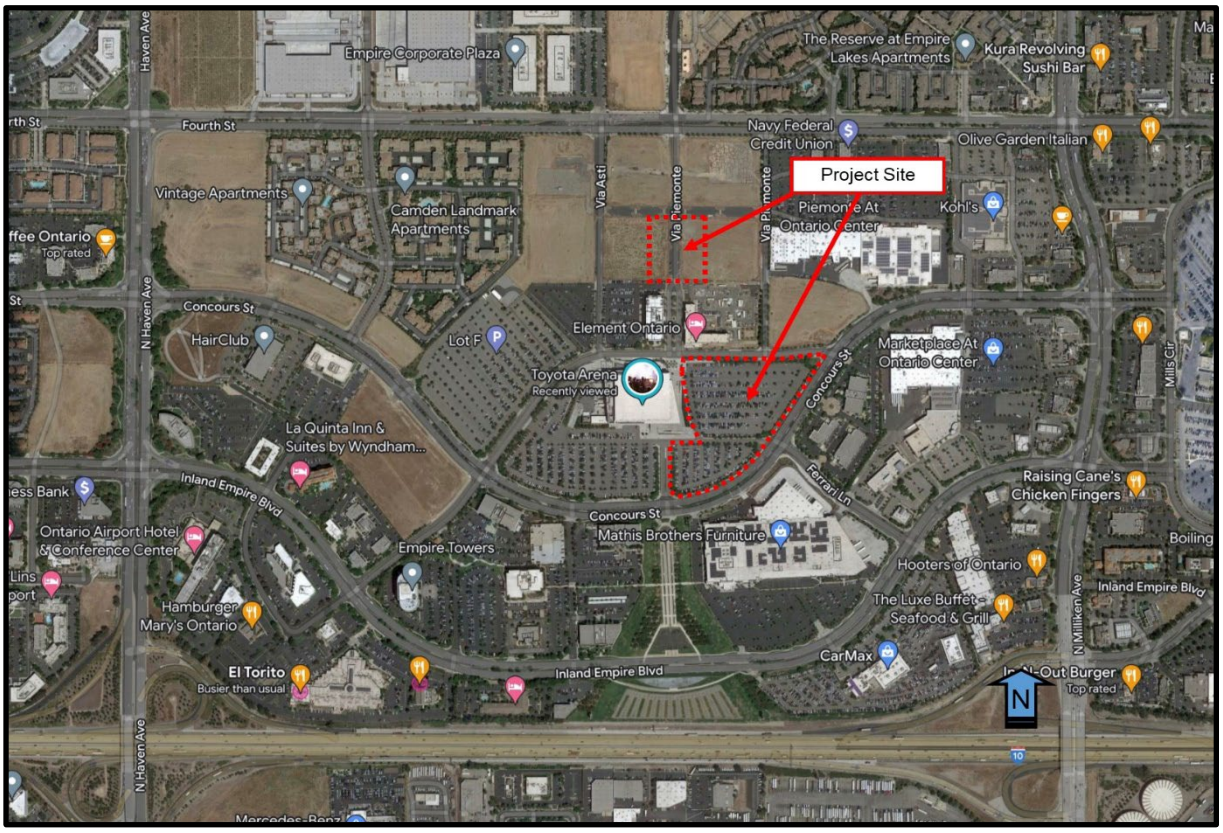


Figure 1: Project Location

(1) Background — In 2006, the City Council approved the creation of the Piemonte Overlay at The Ontario Center Specific Plan ("Piemonte Overlay") within the Urban Commercial land use district of The Ontario Center Specific Plan, establishing a master plan for the development of approximately 1.3 million square feet of retail, office, hotel, and entertainment uses, and more than 800 multiple-family dwelling units on the 84-acre Project site. The Piemonte Overlay was delineated into fifteen subareas, with land use designations of Commercial, Entertainment/Retail, Office, Special Use and Residential (See Exhibit B, Existing Boundary and Land Use Map, attached). The current Overlay area covers approximately 92 acres of land, with at least 48 acres being vacant land.

In 2017, the City Council approved an amendment to the Piemonte Overlay document (File No. PSPA16-003) to reduce the number of residential units, reduce the maximum number of hotel rooms, designate plaza areas to accommodate outdoor events, and expand the design concept from the original Tuscan-influenced architecture to allow more contemporary architectural design concepts.

In 2020, the City Council approved an amendment to the Piemonte Overlay document (File No. PSPA19-009) to allow required residential parking spaces to be provided as tandem parking spaces.

The City of Ontario Economic Development Department and OTC Owner, LLC, are coordinating to bring a mixed-use entertainment development adjacent to the Toyota Arena. The related Amendment to the Piemonte Overlay at Ontario Center Specific Plan (File No. PSPA21-001) will help facilitate the development of underutilized vacant parcels and parking lots into a high intensity mixed -use center.

In accordance with California Government Code Section 65865, which in part states that "[a]ny city… may enter into a Development Agreement with any person having a legal or equitable interest in real property for the development of such property…" and California Government Code Section 65865.52, which in part states that "a Development Agreement shall specify the duration of the Agreement, the permitted uses of the property… and may include conditions, terms, restrictions…," the City of Ontario adopted Resolution No. 2002-100 setting forth the procedures and requirements for consideration of Development Agreements.

(2) Development Agreement — The Agreement proposes to include 11.47 acres of land within the proposed Mixed-Use Subareas 8, 11, 16 and 17 of the Piemonte Overlay at the Ontario Center Specific Plan, as shown on the attached Exhibit A. The Agreement grants the Owner a vested right to develop a future mixed-use project consisting of 691 residential units and up to 71,200 square feet retail uses (as shown on Table 1: Proposed Development Density and Intensity below), provided the Owner complies with the terms and conditions of the Agreement, Piemonte Overlay at the Ontario Center Specific Plan and EIR. The conceptual site plan, as shown on attached Exhibit C, illustrates the proposed future development of the Mixed-Use Subareas 8, 11, 16 and 17 of the Piemonte Overlay of the Ontario Center Specific Plan.

Table 1: Proposed Development Density and Intensity

Lot	Subarea Area	Dwelling Units	Dwelling Units (Square Feet)	Commercial (Square Feet)	Surface Parking Spaces
A	16	359	282,870	25,256	477
B	17	98	77,060	20,802	130
C	8	107	84,170	11,047	142
D	11	127	99,990	14,095	170
Total		**691**	**544,090**	**71,200**	**919**

The term of the Agreement is for 10 years, with a 5-year option to renew. The main points of the Agreement address funding for all new City expenses created by the project, which includes: Submittal of a development entitlement application consistent with the agreed density and intensity of the conceptual site plan (Table 1: Proposed Development Intensity); Payment of all Development Impact Fees ("DIF"); Construction

of all required public infrastructure improvements; Vested right to develop the Project in accordance with existing land use regulations of the Piemonte Overlay and subject to the conditions established with the future entitlement development approval; and that the City agrees that, to the extent permitted by applicable law, not to apply any rent control or other moratoria or interim control ordinance against the Property or the Project due the term of the Ground Lease or for 70 years.

Staff finds that the Agreement is consistent with State law, The Ontario Plan, and the City's Development Agreement policies. As a result, staff is recommending approval of the application to the Planning Commission. If the Planning Commission finds the Agreement is acceptable, a recommendation of approval to the City Council would be appropriate.

COMPLIANCE WITH THE ONTARIO PLAN: The proposed project is consistent with the principles, goals and policies contained within the Vision, Governance, Policy Plan (General Plan), and City Council Priorities components of The Ontario Plan (TOP). More specifically, the goals and policies of TOP that are furthered by the proposed project are as follows:

(1) City Council Goals.
- Invest in the Growth and Evolution of the City's Economy
- Operate in a Businesslike Manner
- Focus Resources in Ontario's Commercial and Residential Neighborhoods

(2) Vision.

Distinctive Development:

- Commercial and Residential Development

➢ Development quality that is broadly recognized as distinctive and not exclusively tied to the general suburban character typical of much of Southern California.

(3) Governance.

Decision Making:

- Goal G1: Sustained decision-making that consistently moves Ontario towards its Vision by using The Ontario Plan as a framework for assessing choices.

➢ G1-2 Long-term Benefit. We require decisions to demonstrate and document how they add value to the community and support the Ontario Vision

(4) Policy Plan (General Plan)

Land Use Element:

- Goal LU1: A community that has a spectrum of housing types and price ranges that match the jobs in the City and that make it possible for people to live and work in Ontario and maintain a quality of life.

  - LU1-1 Strategic Growth. We concentrate growth in strategic locations that help create place and identity, maximize available and planned infrastructure, and foster the development of transit.

  - LU1-6 Complete Community: We incorporate a variety of land uses and building types in our land use planning efforts that result in a complete community where residents at all stages of life, employers, workers and visitors have a wide spectrum of choices of where they can live, work, shop and recreate within Ontario. (Refer to Complete Community Section of Community Economics Element).

- Goal LU2: Compatibility between a wide range of uses.

  - LU2-6: Infrastructure Compatibility: We require infrastructure to be aesthetically pleasing and in context with the community character.

- Goal LU3: Staff, regulations and processes that support and allow flexible response to conditions and circumstances in order to achieve the vision.

  - LU3-1: Development Standards: We maintain clear development standards which allow flexibility to achieve our Vision.

  - LU3-3: Land Use Flexibility: We consider uses not typically permitted within a land use category if doing so improves livability, reduces vehicular trips, creates community gathering places and activity nodes, and helps create identity.

Housing Element:

- Goal H2: Diversity of types of quality housing that are affordable to a range of household income levels, accommodate changing demographics, and support and reinforce the economic sustainability of Ontario.

  - H2-3 Ontario Airport Metro Center. We foster a vibrant, urban, intense and highly amenitized community in the Ontario Airport Metro Center Area through a mix of residential, entertainment, retail and office-oriented uses.

  - H2-5 Housing Design. We require architectural excellence through adherence to City design guidelines, thoughtful site planning, environmentally sustainable practices and other best practices.

- H2-6 Infill Development. We support the revitalization of neighborhoods through the construction of higher-density residential developments on underutilized residential and commercial sites.

- Goal H3: A City regulatory environment that balances the need for creativity and excellence in residential design, flexibility and predictability in the project approval process, and the provision of an adequate supply and prices of housing.

- H3-2 Flexible Standards. We allow flexibility in the application of residential and mixed-use development standards in order to gain benefits such as exceptional design quality, economic advantages, sustainability, or other benefits that would otherwise be unrealized.

- Goal H5: A full range of housing types and community services that meet the special housing needs for all individuals and families in Ontario, regardless of income level, age or other status.

- H5-2 Family Housing. We support the development of larger rental apartments that are appropriate for families with children, including, as feasible, the provision of services, recreation and other amenities.

Community Economics Element:

- Goal CE1: A complete community that provides for all incomes and stages of life.

- CE1-6 Diversity of Housing. We collaborate with residents, housing providers and the development community to provide housing opportunities for every stage of life; we plan for a variety of housing types and price points to support our workforce, attract business and foster a balanced community.

- Goal CE2: A City of distinctive neighborhoods, districts, and corridors, where people choose to be.

- CE2-1 Development Projects. We require new development and redevelopment to create unique, high-quality places that add value to the community.

- CE2-2 Development Review. We require those proposing new development and redevelopment to demonstrate how their projects will create appropriately unique, functional and sustainable places that will compete well with their competition within the region.

- CE2-4 Protection of Investment. We require that new development and redevelopment protect existing investment by providing architecture and urban design of equal or greater quality.

➢ CE2-5 Private Maintenance. We require adequate maintenance, upkeep, and investment in private property because proper maintenance on private property protects property values.

Safety Element:

▪ Goal S1: Minimized risk of injury, loss of life, property damage and economic and social disruption caused by earthquake-induced and other geologic hazards.

➢ S1-1 Implementation of Regulations and Standards. We require that all new habitable structures be designed in accordance with the most recent California Building Code adopted by the City, including provisions regarding lateral forces and grading.

Community Design Element:

▪ Goal CD1: A dynamic, progressive city containing distinct neighborhoods and commercial districts that foster a positive sense of identity and belonging among residents, visitors, and businesses.

➢ CD1-1 City Identity. We take actions that are consistent with the City being a leading urban center in Southern California while recognizing the diverse character of our existing viable neighborhoods.

➢ CD1-2 Growth Areas. We require development in growth areas to be distinctive and unique places within which there are cohesive design themes.

▪ Goal CD2: A high level of design quality resulting in public spaces, streetscapes, and developments that are attractive, safe, functional and distinct.

➢ CD2-1 Quality Architecture. We encourage all development projects to convey visual interest and character through:

- Building volume, massing, and height to provide appropriate scale and proportion;
- A true architectural style which is carried out in plan, section and elevation through all aspects of the building and site design and appropriate for its setting; and
- Exterior building materials that are visually interesting, high quality, durable, and appropriate for the architectural style.

➢ CD2-2 Neighborhood Design. We create distinct residential neighborhoods that are functional, have a sense of community, emphasize livability and social interaction, and are uniquely identifiable places through such elements as:

- A pattern of smaller, walkable blocks that promote access, activity and

safety;

- Variable setbacks and parcel sizes to accommodate a diversity of housing types;
- Traffic calming measures to slow traffic and promote walkability while maintaining acceptable fire protection and traffic flows;
- Floor plans that encourage views onto the street and de-emphasize the visual and physical dominance of garages (introducing the front porch as the "outdoor living room"), as appropriate; and
- Landscaped parkways, with sidewalks separated from the curb.

➢ CD2-4 Mixed Use, Urban Office and Transit Service Areas. We require mixed use, urban office and transit service areas to be designed and developed as pedestrian oriented "villages" that promote a vibrant, comfortable and functional environment.

➢ CD2-7 Sustainability. We collaborate with the development community to design and build neighborhoods, streetscapes, sites, outdoor spaces, landscaping and buildings to reduce energy demand through solar orientation, maximum use of natural daylight, passive solar and natural ventilation, building form, mechanical and structural systems, building materials and construction techniques.

➢ CD2-8 Safe Design. We incorporate defensible space design into new and existing developments to ensure the maximum safe travel and visibility on pathways, corridors, and open space and at building entrances and parking areas by avoiding physically and visually isolated spaces, maintenance of visibility and accessibility, and use of lighting.

➢ CD2-9 Landscape Design. We encourage durable landscaping materials and designs that enhance the aesthetics of structures, create and define public and private spaces, and provide shade and environmental benefits.

➢ CD2-10 Surface Parking Areas. We require parking areas visible to or used by the public to be landscaped in an aesthetically pleasing, safe and environmentally sensitive manner. Examples include shade trees, pervious surfaces, urban run-off capture and infiltration, and pedestrian paths to guide users through the parking field.

➢ CD2-11 Entry Statements. We encourage the inclusion of amenities, signage and landscaping at the entry to neighborhoods, commercial centers, mixed use areas, industrial developments, and public places that reinforce them as uniquely identifiable places.

➢ CD2-12 Site and Building Signage. We encourage the use of sign programs that utilize complementary materials, colors, and themes. Project signage should be designed to effectively communicate and direct users to various aspects of the development and complement the character of the structures.

- CD2-13 Entitlement Process. We work collaboratively with all stakeholders to ensure a high degree of certainty in the efficient review and timely processing of all development plans and permits.

- Goal CD3: Vibrant urban environments that are organized around intense buildings, pedestrian and transit areas, public plazas, and linkages between and within developments that are conveniently located, visually appealing and safe during all hours.

- CD3-1 Design. We require that pedestrian, vehicular, bicycle and equestrian circulation on both public and private property be coordinated and designed to maximize safety, comfort and aesthetics.

- CD3-2 Connectivity Between Streets, Sidewalks, Walkways and Plazas. We require landscaping and paving be used to optimize visual connectivity between streets, sidewalks, walkways and plazas for pedestrians.

- CD3-3 Building Entrances. We require all building entrances to be accessible and visible from adjacent streets, sidewalks or public open spaces.

- CD3-5 Paving. We require sidewalks and road surfaces to be of a type and quality that contributes to the appearance and utility of streets and public spaces.

- CD3-6 Landscaping. We utilize landscaping to enhance the aesthetics, functionality and sustainability of streetscapes, outdoor spaces and buildings.

- Goal CD5: A sustained level of maintenance and improvement of properties, buildings and infrastructure that protects the property values and encourages additional public and private investments.

- CD5-1 Maintenance of Buildings and Property. We require all public and privately-owned buildings and property (including trails and easements) to be properly and consistently maintained.

- CD5-2 Maintenance of Infrastructure. We require the continual maintenance of infrastructure.

HOUSING ELEMENT COMPLIANCE: The Project is consistent with the Housing Element of the Policy Plan (General Plan) component of The Ontario Plan. The Project site contains four properties listed in the Available Land Inventory contained in Table A-3 (Available Land by Planning Area) of the Housing Element Technical Report Appendix. The proposed changes affect two of the four properties listed in the Available Land Inventory (Subareas 8 and 11; Map ID No. 124 and 125). The residential capacity proposed in this Project is consistent with the number of dwelling units (198) and density (48 DU/AC) specified in the Available Land Inventory.

AIRPORT LAND USE COMPATIBILITY PLAN (ALUCP) COMPLIANCE: The California State Aeronautics Act (Public Utilities Code Section 21670 et seq.) requires that an Airport Land Use Compatibility Plan be prepared for all public use airports in the State; and requires that local land use plans and individual development proposals must be consistent with the policies set forth in the adopted Airport Land Use Compatibility Plan. On April 19, 2011, the City Council of the City of Ontario approved and adopted the Ontario International Airport Land use Compatibility Plan ("ALUCP"), establishing the Airport Influence Area for Ontario International Airport, which encompasses lands within parts of San Bernardino, Riverside, and Los Angeles Counties, and limits future land uses and development within the Airport Influence Area, as they relate to noise, safety, airspace protection, and overflight impacts of current and future airport activity. The proposed Project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the ALUCP.

ENVIRONMENTAL REVIEW: In 1980, the City Council certified The Ontario Center Specific Plan Environmental Impact Report (State Clearing House No. 80062538), in relation to the adoption of The Ontario Center Specific Plan (File No. 2254-SP) ("OCSP"), which was adopted in 1981. Over the years, several amendments to the OCSP have been approved along with appropriate environmental review. On March 19, 1991, a subsequent EIR (State Clearing House No. 89041009) ("Certified EIR") was certified in association with an amendment to the OCSP (File No. 4059-SPA). In 2016, the City approved a Mitigated Negative Declaration ("MND") in association with an amendment to the Piemonte Overlay (File No. PSPA16-003).

In association with the proposed Overlay Amendment, staff collaborated with consultant Kimley-Horn to prepare an Addendum to the Certified EIR, as amended, and found that all potential adverse direct, indirect, and cumulative environmental impacts were thoroughly analyzed and discussed in the Certified EIR, as amended, including, but not limited to potential aesthetic, air quality, greenhouse gas emissions, noise, transportation and tribal cultural resources impacts, and all feasible mitigation has been identified and will be incorporated into the proposed Project. This Project does not contemplate any actions that would require the preparation of a subsequent or supplemental environmental document under State CEQA Guidelines Section 15162 or 15163, as it is consistent with the development scenario identified within the Certified EIR. Furthermore, this Project introduces no new significant environmental impacts and no further environmental review is required.

TECHNICAL APPENDIX:

Surrounding Zoning and Land Use:

	Existing Land Use	*General Plan Designation*	*Zoning Designation*	*Specific Plan Land Use*
Site	Vacant/Existing Parking Lots	Mixed Use	Piemonte Overlay of the Ontario Center Specific Plan	Mixed-use, Office, Residential, Commercial, Special Use
North	Industrial, Office, Commercial, Residential, Vacant (City of Rancho Cucamonga)	Industrial Park, Mixed Use, Open Space (City of Rancho Cucamonga)	Industrial Park, Mixed-use Retail, IASP Sub-Area 18 Specific Plan (City of Rancho Cucamonga)	Mixed Use, Village Neighborhood
South	Office, Commercial, Vacant	Mixed Use	The Ontario Center Specific Plan	Urban Commercial, Garden Commercial, Open Space
East	Commercial	Mixed Use	The Ontario Center Specific Plan	Urban Commercial
West	Residential, Commercial	High Density Residential, Office Commercial	The Ontario Center Specific Plan	Urban Commercial

EXHIBIT A—PROPOSED PIEMONTE OVERLAY LAND USE MAP

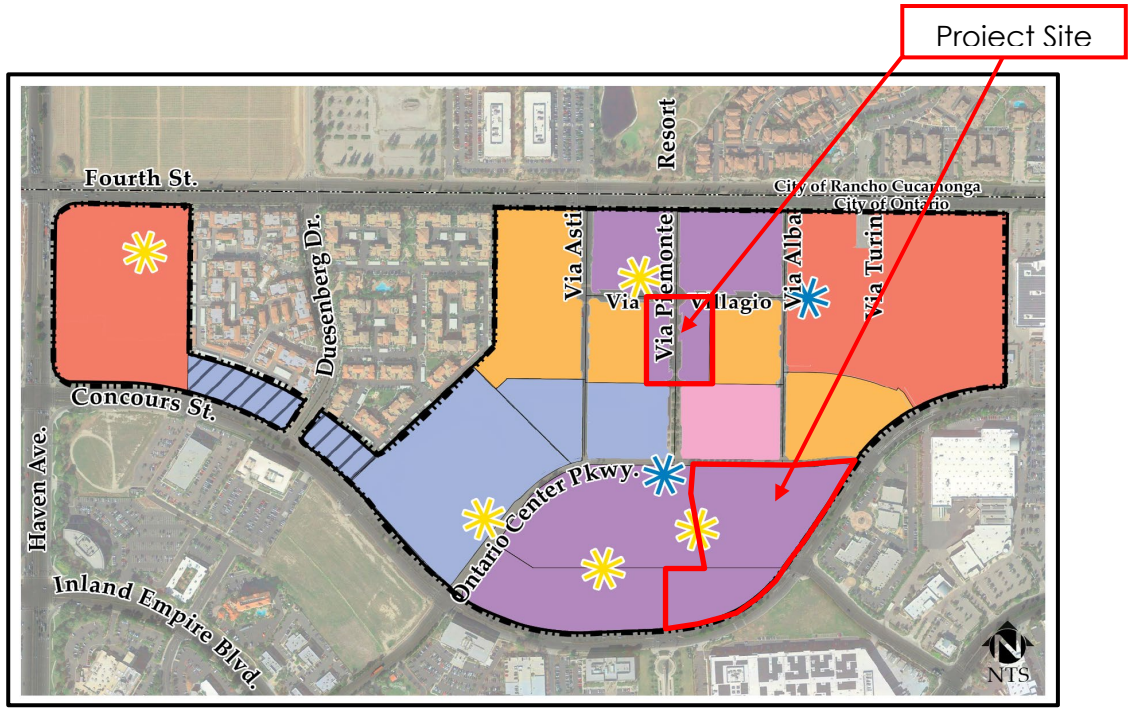


Figure 2.3: Piemonte Overlay Land Use Plan

EXHIBIT B—PIEMONTE PROPOSED SUBAREAS

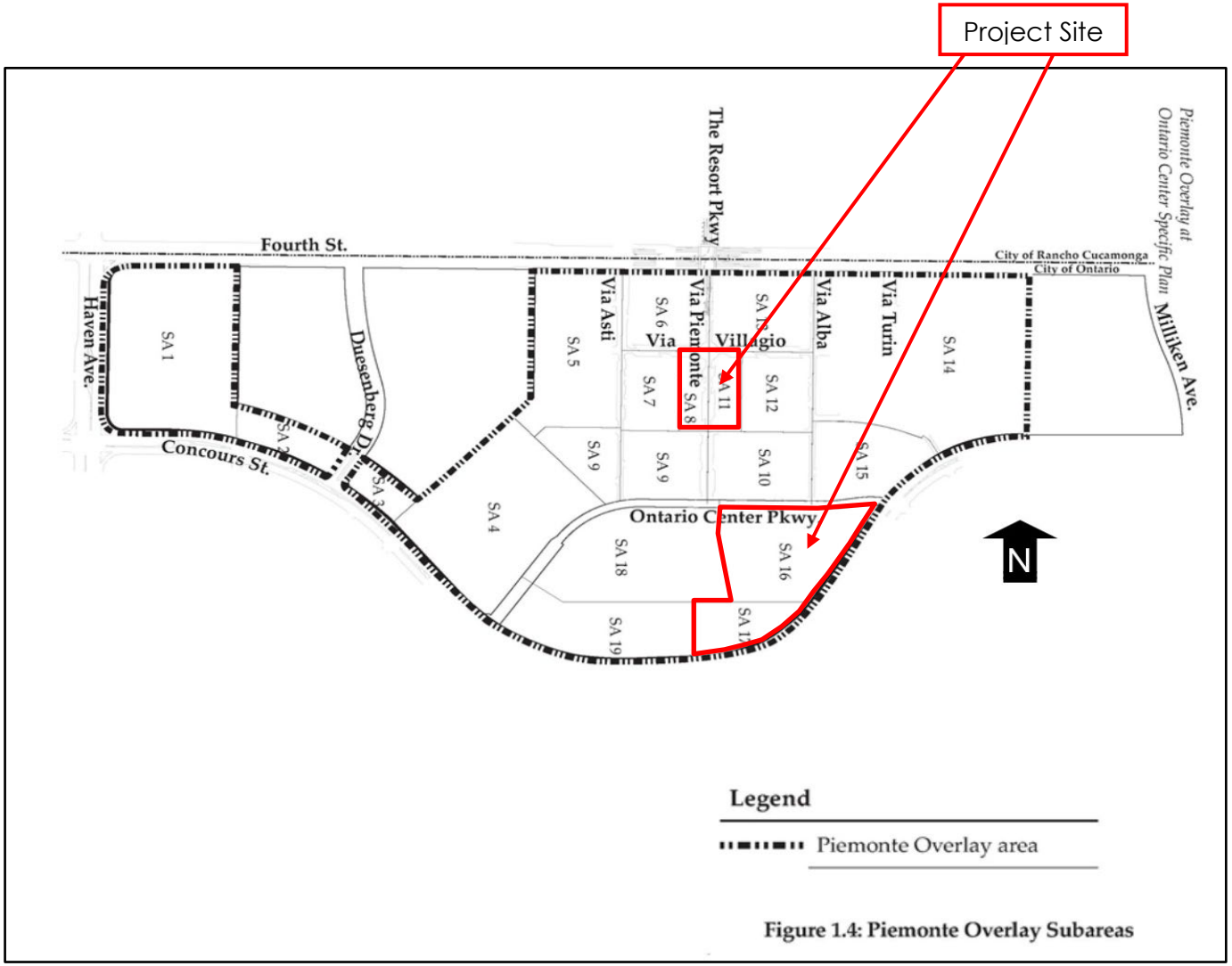


EXHIBIT C— ADEPT PROPOSED CONCEPTUAL SITE PLAN

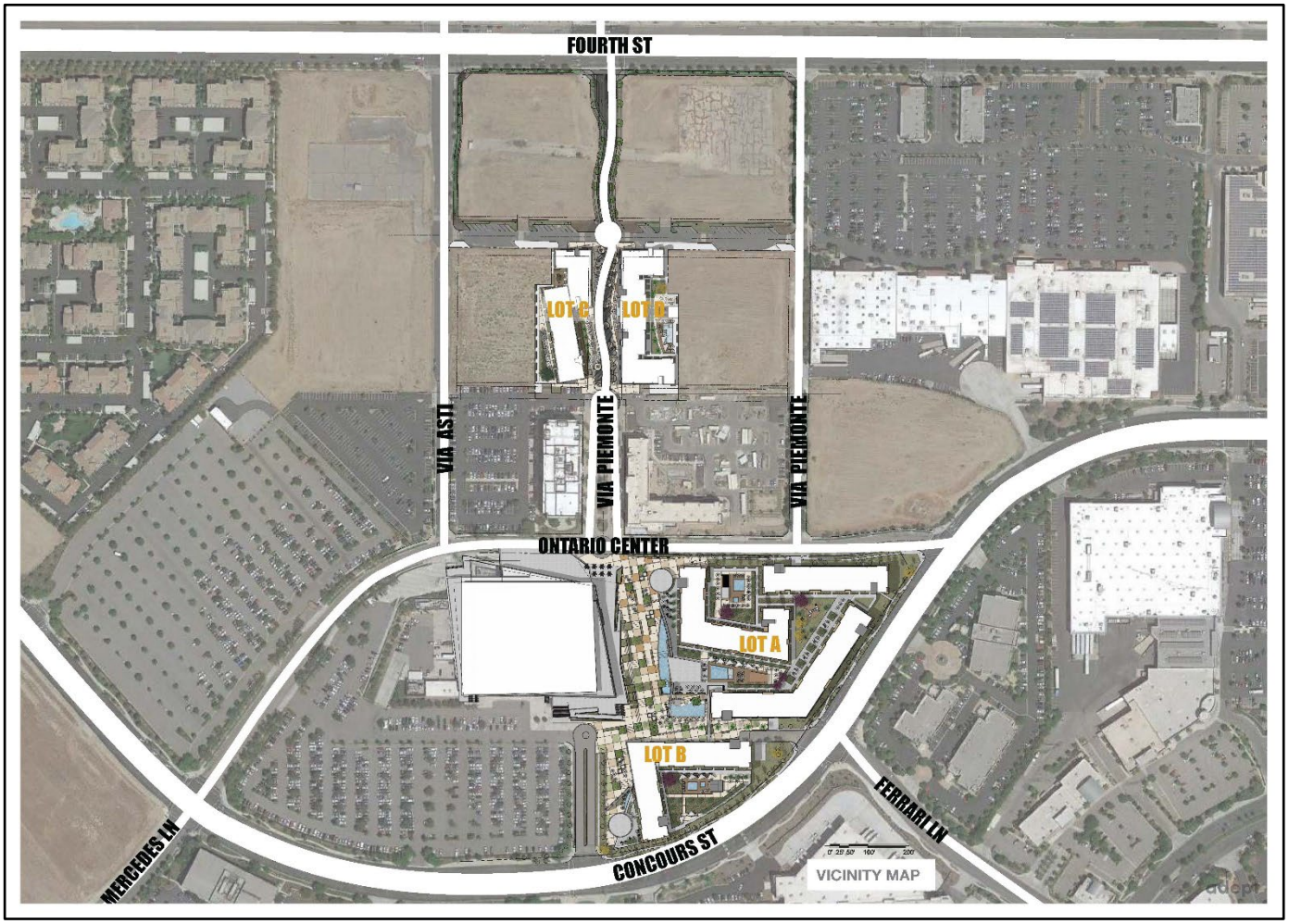
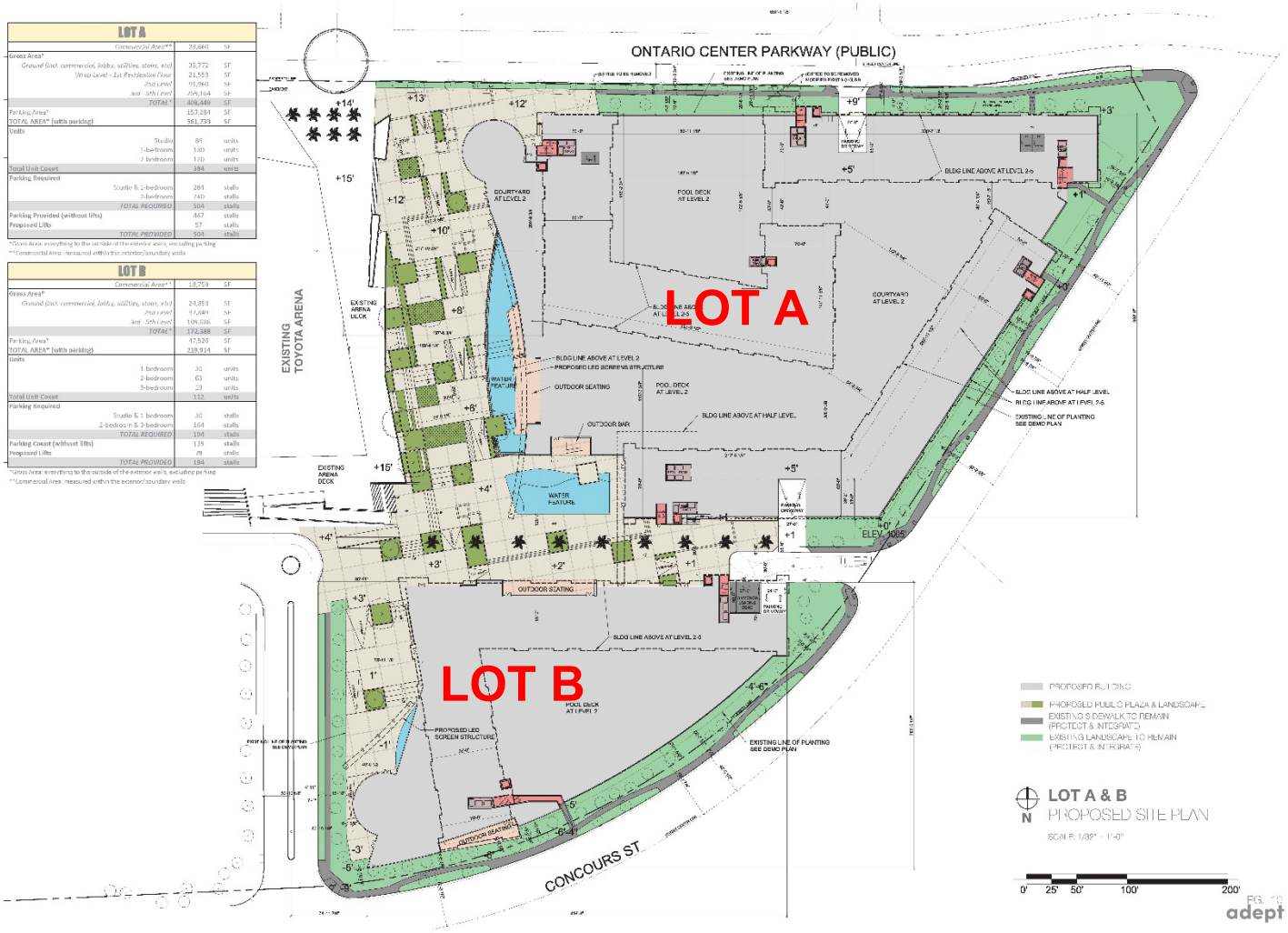


EXHIBIT C— ADEPT PROPOSED CONCEPTUAL SITE PLAN CONTINUED



LOT A

Commercial Area**	23,660	SF
Gross Area*		
Ground (incl. commercial, lobby, utilities, stairs, etc)	35,772	SF
Typ Level - 1st Residential Floor	21,555	SF
2nd Level	21,960	SF
3rd - 5th Level	104,164	SF
TOTAL*	404,449	SF
Parking Area*	153,284	SF
TOTAL AREA* (with parking)	561,733	SF
Units		
Studio	81	units
1-bedroom	180	units
2-bedroom	123	units
Total Unit Count	384	units
Parking Required		
Studio & 1-bedroom	261	stalls
2-bedroom	240	stalls
TOTAL REQUIRED	504	stalls
Parking Provided (without lifts)	447	stalls
Proposed Lifts	57	stalls
TOTAL PROVIDED	504	stalls

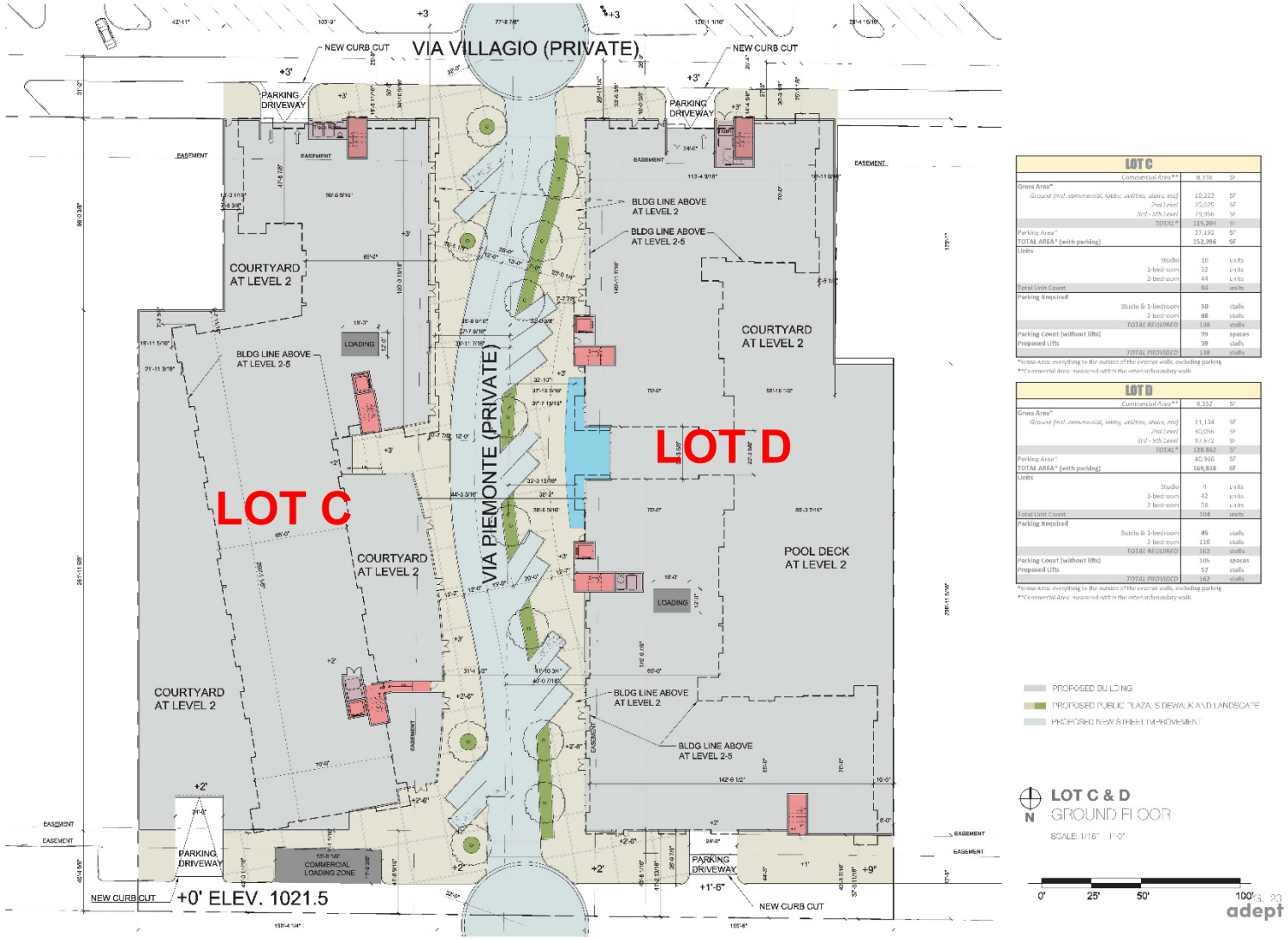
*Gross Area: everything to the outside of the exterior walls, excluding parking
**Commercial Area: measured within the exterior/boundary walls

LOT B

Commercial Area**	18,759	SF
Gross Area*		
Ground (incl. commercial, lobby, utilities, stairs, etc)	24,853	SF
2nd Level	24,884	SF
3rd - 5th Level	109,686	SF
TOTAL*	172,388	SF
Parking Area*	47,526	SF
TOTAL AREA* (with parking)	219,914	SF
Units		
1-bedroom	30	units
2-bedroom	63	units
3-bedroom	29	units
Total Unit Count	122	units
Parking Required		
Studio & 1-bedroom	30	stalls
2-bedroom & 3-bedroom	164	stalls
TOTAL REQUIRED	194	stalls
Parking Count (without lifts)	116	stalls
Proposed Lifts	78	stalls
TOTAL PROVIDED	194	stalls

*Gross Area: everything to the outside of the exterior walls, excluding parking
**Commercial Area: measured within the exterior/boundary walls

EXHIBIT C— ADEPT PROPOSED CONCEPTUAL SITE PLAN CONTINUED



RESOLUTION NO.

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF ONTARIO, CALIFORNIA, RECOMMENDING THE CITY COUNCIL APPROVE FILE NO. PDA22-003, A DEVELOPMENT AGREEMENT BETWEEN THE CITY OF ONTARIO AND OTC OWNER, LLC, TO ESTABLISH THE TERMS AND CONDITIONS FOR 11.47 ACRES OF LAND TO DEVELOP A FUTURE MIXED USE DEVELOPMENT CONSISTING OF APPROXIMATELY 691 RESIDENTIAL UNITS AND UP TO 71,200 SQUARE FEET OF COMMERCIAL RETAIL USES, ON THREE PARCELS OF LAND LOCATED AT THE SOUTHWEST CORNER OF VIA VILLAGGIO AND VIA PIEMONTE, SOUTHEAST CORNER OF VIA VILLAGGIO AND VIA PIEMONTE, AND ON THE SOUTHWEST CORNER OF ONTARIO CENTER PARKWAY AND CONCOURS STREET WITHIN THE PROPOSED MIXED-USE SUBAREAS 8, 11, 16 AND 17 OF THE PIEMONTE OVERLAY AT THE ONTARIO CENTER SPECIFIC PLAN, AND MAKING FINDINGS IN SUPPORT THEREOF—APNS: 0210-204-38, 0218-204-39 AND PORTION OF 0210-205-01.

WHEREAS, OTC Owner, LLC, ("Applicant") has filed an Application for the approval of a Development Agreement, File No. PDA22-003, as described in the title of this Resolution (hereinafter referred to as "Application" or "Project"); and

WHEREAS, the Application applies to 11.47 acres of land, consisting of two vacant parcels located at the southwest corner of Via Villaggio and Via Piemonte and at the southeast corner of Via Villaggio and Via Piemonte and one additional parcel, developed with the Toyota Arena parking lots, located at the southwest corner of Ontario Center Parkway and Concours Street. The project site within the proposed mixed-use Subareas 8, 11, 16 and 17 of the Piemonte Overlay at the Ontario Center Specific Plan, and is presently vacant and improved with the Toyota Area parking lot; and

WHEREAS, the Applicant, in partnership with the City of Ontario, has initiated a Specific Plan Amendment, File No. PSPA21-001, which consists of an Amendment to the Piemonte Overlay at the Ontario Center Specific Plan, which will allow for the future development of a mixed-use project consisting of 691 residential units and up to 71,200 square feet retail uses within the proposed Mixed-Use Subareas 8, 11, 16 and 17 of the Piemonte Overlay at the Ontario Center Specific Plan; and

WHEREAS, the environmental impacts of this project were thoroughly analyzed in the EIR Addendum, which concluded that implementation of the Project could result in a number of significant effects on the environment that were previously analyzed in the Certified EIR, and that the Certified EIR identified mitigation measures that would reduce each of those significant effects to a less-than-significant level; and

WHEREAS, the City's "Local Guidelines for the Implementation of the California Environmental Quality Act (CEQA)" provide for the use of a single environmental assessment in situations where the impacts of subsequent projects are adequately analyzed; and

WHEREAS, the Application is a project pursuant to the California Environmental Quality Act — Public Resources Code Section 21000 et seq. — (hereinafter referred to as "CEQA") and an EIR Addendum has been prepared to determine possible environmental impacts; and

WHEREAS, Ontario Development Code Table 2.02-1 (Review Matrix) grants the Planning Commission the responsibility and authority to review and make recommendations to the City Council on the subject Application; and

WHEREAS, the Project has been reviewed for consistency with the Housing Element of the Policy Plan component of The Ontario Plan, as State Housing Element law (as prescribed in Government Code Sections 65580 through 65589.8) requires that development projects must be consistent with the Housing Element, if upon consideration of all its aspects, it is found to further the purposes, principals, goals, and policies of the Housing Element; and

WHEREAS, the Project is located within the Airport Influence Area of Ontario International Airport, which encompasses lands within parts of San Bernardino, Riverside, and Los Angeles Counties, and is subject to, and must be consistent with, the policies and criteria set forth in the Ontario International Airport Land Use Compatibility Plan (hereinafter referred to as “ALUCP”), which applies only to jurisdictions within San Bernardino County, and addresses the noise, safety, airspace protection, and overflight impacts of current and future airport activity; and

WHEREAS, City of Ontario Development Code Division 2.03 (Public Hearings) prescribes the manner in which public notification shall be provided and hearing procedures to be followed, and all such notifications and procedures have been completed; and

WHEREAS, as the first action on the Project, on March 22, 2022, the Planning Commission issued a Resolution recommending the City Council approve the EIR Addendum, finding that the proposed Project introduces no new significant environmental impacts and applying all previously adopted mitigation measures to the Project, which were incorporated by reference; and

WHERES, as the Development Agreement (File No. PDA22-003) approval is contingent on the City Council approval of the related Amendment to the Piemonte Overlay at the Ontario Center Specific Plan, File PSPA21-001; and

WHEREAS, on March 22, 2022, the Planning Commission of the City of Ontario conducted a hearing to consider the Project, and concluded said hearing on that date; and

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

NOW, THEREFORE, IT IS HEREBY FOUND, DETERMINED, AND RESOLVED by the Planning Commission of the City of Ontario, as follows:

SECTION 1: ***Environmental Determination and Findings.*** As the recommending body for the Project, the Planning Commission has reviewed and considered the information contained in the Addendum, the initial study, and the administrative record for the Project, including all written and oral evidence provided during the comment period. Based upon the facts and information contained in the Addendum, the initial study, and the administrative record, including all written and oral evidence presented to the Planning Commission, the Planning Commission finds as follows:

(1) The environmental impacts of the Project were reviewed in conjunction with an Addendum to the Ontario Center Specific Plan Environmental Impact Report (State Clearinghouse No. 89041009), certified by the Ontario City Council on March 19, 1991 in conjunction with File No. 4059-SPA, in combination with an Addendum to the Mitigated Negative Declaration, adopted by the Ontario City Council on May 17, 2017 in conjunction with File No. PSPA16-003; and

(2) The EIR Addendum and administrative record have been completed in compliance with CEQA, the State CEQA Guidelines, and the City of Ontario Local CEQA Guidelines; and

(3) The City's "Guidelines for the Implementation of the California Environmental Quality Act (CEQA)" provide for the use of a single environmental assessment in situations where the impacts of subsequent projects are adequately analyzed. This Application introduces no new significant environmental impacts; and

(4) All previously adopted mitigation measures shall be a condition of project approval, as they are applicable to the Project, and are incorporated herein by this reference; and

(5) The EIR Addendum contains a complete and accurate reporting of the environmental impacts associated with the Project, and reflects the independent judgment of the Planning Commission; and

SECTION 2: ***Subsequent or Supplemental Environmental Review Not Required.*** Based on the EIR Addendum, all related information presented to the Planning Commission, and the specific findings set forth in Section 1, above, the Planning Commission finds that the preparation of a subsequent or supplemental Certified EIR is not required for the Project, as the Project:

(1) Does not constitute substantial changes to the Certified EIR that will require major revisions to the Certified EIR or MND due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; and

(2) Does not constitute substantial changes with respect to the circumstances under which the Certified EIR or MND were prepared, that will require major revisions to the Certified EIR or MND due to the involvement of new significant environmental effects or a substantial increase in the severity of the previously identified significant effects; and.

(3) Does not contain new information of substantial importance that was not known and could not have been known with the exercise of reasonable diligence at the time the Certified EIR or MND were certified/adopted, that shows any of the following:

(a) The Project will have one or more significant effects not discussed in the Certified EIR or MND; or

(b) Significant effects previously examined will be substantially more severe than shown in the Certified EIR or MND; or

(c) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the Project, but the City declined to adopt such measures; or

Mitigation measures or alternatives considerably different from those analyzed in the Certified EIR or MND would substantially reduce one or more significant effects on the environment, but which the City declined to adopt.

SECTION 3: ***Housing Element Compliance.*** Pursuant to the requirements of California Government Code Chapter 3, Article 10.6, commencing with Section 65580, as the recommending body for the Project, the Planning Commission finds that based upon the facts and information contained in the Application and supporting documentation, at the time of Project implementation, the project is consistent with the Housing Element of the Policy Plan (General Plan) component of The Ontario Plan. The project site contains four properties listed in the Available Land Inventory contained in Table A-3 (Available Land by Planning Area) of the Housing Element Technical Report Appendix. The proposed changes affect two of the four properties listed in the Available Land Inventory

(Subareas 8 and 11; Map ID No. 124 and 125). The residential capacity proposed in this Project is consistent with the number of dwelling units (198) and density (48 DU/AC) specified in the Available Land Inventory.

SECTION 4: ***Ontario International Airport Land Use Compatibility Plan ("ALUCP") Compliance.*** The California State Aeronautics Act (Public Utilities Code Section 21670 et seq.) requires that an Airport Land Use Compatibility Plan be prepared for all public use airports in the State; and requires that local land use plans and individual development proposals must be consistent with the policies set forth in the adopted Airport Land Use Compatibility Plan. On April 19, 2011, the City Council of the City of Ontario approved and adopted the ALUCP, establishing the Airport Influence Area for Ontario International Airport (hereinafter referred to as "ONT"), which encompasses lands within parts of San Bernardino, Riverside, and Los Angeles Counties, and limits future land uses and development within the Airport Influence Area, as they relate to noise, safety, airspace protection, and overflight impacts of current and future airport activity. As the recommending authority for the Project, the Planning Commission has reviewed and considered the facts and information contained in the Application and supporting documentation against the ALUCP compatibility factors, including [1] Safety Criteria (ALUCP Table 2-2) and Safety Zones (ALUCP Map 2-2), [2] Noise Criteria (ALUCP Table 2-3) and Noise Impact Zones (ALUCP Map 2-3), [3] Airspace protection Zones (ALUCP Map 2-4), and [4] Overflight Notification Zones (ALUCP Map 2-5). As a result, the PLANNING COMMISSION, therefore, finds and determines that the Project, when implemented in conjunction with the conditions of approval, will be consistent with the policies and criteria set forth within the ALUCP.

SECTION 5: ***Concluding Facts and Reasons.*** Based upon the substantial evidence presented to the Planning Commission during the above-referenced hearing, and upon the specific findings set forth in Section 1 through 4, above, the Planning Commission hereby concludes as follows:

a. The Development Agreement applies to approximately 11.47 acres of land generally located at the southwest corner of Via Villaggio and Via Piemonte, southeast corner of Via Villaggio and Via Piemonte, and on the southwest corner of Ontario Center Parkway and Concours Street; and

b. The Development Agreement establishes parameters for the development for the future develop a future mixed-use project consisting of 691 residential units and up to 71,200 square feet retail uses, within the proposed Mixed-Use Subareas 8, 11, 16 and 17 of the Piemonte Overlay of the Ontario Center Specific Plan. The Development Agreement also grants the Applicant, the right to develop, the ability to quantify the fees; and establish the terms and conditions that apply to those projects. These terms and conditions are consistent with The Ontario Plan Policy Plan (General

Plan), design guidelines and development standards for the Piemonte Overlay of the Ontario Center Specific Plan; and

c. The Development Agreement grants the Owner a vested right to develop a future mixed-use project consisting of 691 residential units and up to 71,200 square feet retail uses to develop a mixed-use project consisting of 691 residential units and retail uses within the proposed Mixed-Use Subareas 8, 11, 16 and 17 of the Piemonte Overlay of the Ontario Center Specific Plan), as long as the Owner complies with the terms and conditions of the Agreement, Piemonte Overlay of the Ontario Center Specific, EIR and future Development Entitlement conditions of approval; and

d. The Development Agreement has been prepared in conformance with the goals and policies of The Ontario Plan Policy Plan (General Plan); and

e. The Development Agreement does not conflict with the Land Use Policies of The Ontario Plan Policy Plan (General Plan) and will provide for development, within the district, in a manner consistent with the Policy Plan and with related development; and

f. This Development Agreement will promote the goals and objectives of the Land Use Element of the Policy Plan; and

g. This Development Agreement will not be materially injurious or detrimental to the adjacent properties and will have a significant impact on the environment or the surrounding properties. The environmental impacts of this project were reviewed with an Addendum to the Ontario Center Specific Plan Environmental Impact Report (State Clearing House No. 89041009) prepared for the related Amendment to the Piemonte Overlay at the Ontario Center Specific Plan (File No. PSPA21-001). This Application introduces no new significant environmental impacts. All previously adopted mitigation measures are a condition of project approval and are incorporated herein by this reference.

SECTION 6: ***Planning Commission Action.*** Based upon the findings and conclusions set forth in Sections 1 through 5, above, the Planning Commission hereby RECOMMENDS THE CITY COUNCIL APPROVE the herein described Application, subject to each and every condition set forth in the Development Agreement (File No. PDA22-003) attached hereto as "Attachment A," and incorporated herein by this reference.

SECTION 7: ***Indemnification.*** The Applicant shall agree to defend, indemnify and hold harmless, the City of Ontario or its agents, officers, and employees from any claim, action or proceeding against the City of Ontario or its agents, officers or employees to attack, set aside, void, or annul this approval. The City of Ontario shall promptly notify the

applicant of any such claim, action, or proceeding, and the City of Ontario shall cooperate fully in the defense.

SECTION 8: ***Custodian of Records.*** The documents and materials that constitute the record of proceedings on which these findings have been based are located at the City of Ontario City Hall, 303 East "B" Street, Ontario, California 91764. The custodian for these records is the City Clerk of the City of Ontario.

SECTION 9: ***Certification to Adoption.*** The Secretary shall certify to the adoption of the Resolution.

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The Secretary Pro Tempore for the Planning Commission of the City of Ontario shall certify as to the adoption of this Resolution.

I hereby certify that the foregoing Resolution was duly and regularly introduced, passed and adopted by the Planning Commission of the City of Ontario at a regular meeting thereof held on the 22nd day of March 2022, and the foregoing is a full, true and correct copy of said Resolution, and has not been amended or repealed.

Rick Gage
Planning Commission Chairman

ATTEST:

Rudy Zeledon
Planning Director and
Secretary to the Planning Commission

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO)
CITY OF ONTARIO)

I, Gwen Berendsen, Secretary Pro Tempore of the Planning Commission of the City of Ontario, DO HEREBY CERTIFY that foregoing Resolution No. ____, was duly passed and adopted by the Planning Commission of the City of Ontario at their regular meeting held on March 22, 2022, by the following roll call vote, to wit:

AYES:

NOES:

ABSENT:

ABSTAIN:

Gwen Berendsen
Secretary Pro Tempore

ATTACHMENT A:

File No. PDA22-003

DEVELOPMENT AGREEMENT

By and Between

City of Ontario
a California municipal corporation

and

OTC Owner, LLC

a Delaware limited liability company

(Development Agreement to follow this page)

RECORDING REQUESTED BY AND
WHEN RECORDED MAIL TO:

CITY OF ONTARIO
CITY CLERK / RECORDS MANAGEMENT
303 EAST "B" STREET
ONTARIO, CA 91764-4196

Exempt from Fees Per Gov. Code §§ 6103 and 27383

DEVELOPMENT AGREEMENT

By and Between

City of Ontario, a California municipal corporation,

and

OTC Owner, LLC

a Delaware limited liability company

DEVELOPMENT AGREEMENT NO. _____

This Development Agreement (hereinafter "Agreement") is dated as of April _____, 2022, for reference purposes only, and is entered into by and between the City of Ontario, a California municipal corporation (hereinafter "City"), and OTC Owner, LLC, a Delaware limited liability company (together with its successors and assigns (including without limitation partial assignees with respect to an individual Lot, collectively or individually as the context may require, "Owner"):

RECITALS

WHEREAS, City is authorized to enter into binding development agreements with persons having legal or equitable interests in real property for the development of such property, pursuant to Section 65864, et seq. of the Government Code; and

WHEREAS, Owner has a leasehold interest in the Property pursuant to the Ground Leases; and

WHEREAS, Owner has requested City to enter into a development agreement and proceedings have been taken in accordance with the rules and regulations of City; and

WHEREAS, by electing to enter into this Agreement, City shall bind future City Councils of City by the obligations specified herein and limit the future exercise of certain governmental and proprietary powers of City; and

WHEREAS, the terms and conditions of this Agreement have undergone extensive review by City and the City Council and have been found to be fair, just and reasonable; and

WHEREAS, the best interests of the citizens of the City and the public health, safety and welfare will be served by entering into this Agreement; and

WHEREAS, on _____, 2022, the City Council adopted Ordinance No. _____ approving this Agreement, and such ordinance became effective on _____, 2022; and

WHEREAS, all of the procedures of the California Environmental Quality Act have been met with respect to the Project and the Agreement. Pursuant to Resolution No. _____, the City Council reviewed and adopted an Addendum to the Ontario Center Specific Plan Environmental Impact Report (State Clearing House No. 89041009) dated _____ (the "EIR Addendum"); and

WHEREAS, this Agreement and the Project are consistent with the City's Comprehensive General Plan and any specific plan applicable thereto; and

WHEREAS, all actions taken and approvals given by City have been duly taken or approved in accordance with all applicable legal requirements for notice, public hearings, findings, votes, and other procedural matters; and

WHEREAS, this Agreement will eliminate uncertainty in planning and provide for the orderly development of the Property and generally serve the purposes for which development agreements under Sections 65864 et seq. of the Government Code are intended.

COVENANTS

NOW, THEREFORE, in consideration of the above recitals and of the mutual covenants hereinafter contained and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree as follows:

1. DEFINITIONS AND EXHIBITS.

1.1 Definitions. The following terms when used in this Agreement shall be defined as follows:

1.1.1 "Agreement" means this Development Agreement.

1.1.2 "City" means the City of Ontario, California, a California municipal corporation.

1.1.3 "City Council" means the City Council of the City of Ontario.

1.1.4 "City Manager" means City's City Manager or his or her designee.

1.1.5 "Development Approval" or "Development Approvals" means all permits and other entitlements for use subject to approval or issuance by City in connection with development of the Property whether Existing Development Approvals or Subsequent Development Approvals, including, but not limited to, the following:

(a) Piemonte Overlay at the Ontario Center Specific Plan Amendment - File No. PSP-A21-001 (the "Specific Plan Amendment");

(b) Development Plan Review – File No. _____;

(c) EIR Addendum;

(d) Ground Leases;

(e) Development Agreement - File No. _____; and

(f) Master Sign Program - File No. _____.

1.1.6 "Development Impact Fee" means a monetary exaction, other than a tax or special assessment, whether characterized as a fee, exaction, charge, assessment or a tax and whether established for a broad class of projects by legislation of general applicability or imposed on a specific project on an ad hoc basis, that is charged by a local agency to the applicant in

connection with approval of a development project for the purpose of defraying all or a portion of the cost of public facilities related to the development project. For purposes of this Agreement only, "Development Impact Fee" shall not include processing fees and charges imposed by City to cover the estimated actual costs to City of processing applications for Development Approvals or for monitoring compliance with any Development Approvals granted or issued, including, without limitation, fees for zoning variances; zoning changes; use permits; building inspections; building permits; filing and processing applications and petitions filed with the local agency formation commission or conducting preliminary proceedings or proceedings under the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000, Division 3 (commencing with Section 56000) of Title 5 of the Government Code; the processing of maps under the provisions of the Subdivision Map Act, Division 2 (commencing with Section 66410) of Title 7 of the Government Code; or planning services under the authority of Chapter 3 (commencing with Section 65100) of Division 1 of Title 7 of the Government Code, fees and charges as described in Sections 51287, 56383, 57004, 65104, 65456, 65863.7, 65909.5, 66013, 66014, and 66451.2 of the Government Code, Sections 17951, 19132.3, and 19852 of the Health and Safety Code, Section 41901 of the Public Resources Code, and Section 21671.5 of the Public Utilities Code, as such codes may be amended or superceded, including by amendment or replacement.

1.1.7 "Effective Date" means _____, 2022 the date on which both of the following are true: (a) the ordinance approving this Agreement goes into effect; and (b) the Effective Dates of the Ground Leases have occurred.

1.1.8 "Existing Development Approvals" means all Development Approvals approved or issued on or prior to the Effective Date. Existing Development Approvals are listed in Section 1.1.6 above and all other Development Approvals which are a matter of public record on the Effective Date.

1.1.9 "Existing Land Use Regulations" means all Land Use Regulations in effect on the Effective Date, as modified by the Development Approvals.

1.1.10 "General Plan" means the City's Comprehensive General Plan adopted on January 27, 2010, by Resolution No.2010-006, as may be amended as of the Effective Date.

1.1.11 "Ground Lease" or "Ground Leases" mean as applicable that certain Ground Lease by and between City and an affiliate of Owner dated substantially concurrent herewith pertaining to Lot A, as the same may be amended, modified, or supplemented from time to time; that certain Ground Lease by and between City and an affiliate of Owner dated substantially concurrent herewith pertaining to Lot B, as the same may be amended, modified, or supplemented from time to time; that certain Ground Lease by and between City and an affiliate of Owner dated substantially concurrent herewith pertaining to Lot C, as the same may be amended, modified, or supplemented from time to time; and that certain Ground Lease by and between City and an affiliate of Owner dated substantially concurrent herewith pertaining to Lot D, as the same may be amended, modified, or supplemented from time to time. On _____, 2022, the City Council adopted Ordinance No. _____ approving the Ground Leases, and such ordinance became effective on _____, 2022.

1.1.12 "Land Use Regulations" means all ordinances, resolutions, codes, rules, regulations, and official policies of City governing the development and use of land, including, without limitation, the permitted use of land, the density or intensity of use, subdivision requirements, timing and phasing of development, the maximum height and size of buildings, the provisions for reservation or dedication of land for public purposes, and the design, improvement and construction standards and specifications applicable to the development of the Property. "Land Use Regulations" does not include any City ordinance, resolution, code, rule, regulation or official policy, governing:

(a) the conduct of businesses, professions, and occupations;

(b) taxes and assessments;

(c) the control and abatement of nuisances;

(d) the granting of encroachment permits and the conveyance of similar rights and interests that provide for the use of or the entry upon public property; or

(e) the exercise of the power of eminent domain.

1.1.13 "Lot" or "Lots" shall mean Lot A, B, C, or D, as the context may require, as described on Exhibit "A" and shown on Exhibit "B" to this Agreement.

1.1.14 "Mortgagee" means any lender under any mortgage, deed of trust, or other security device securing financing with respect to the Owner's leasehold interest in the Property, and their successors and assigns.

1.1.15 "Owner" means the person or entity defined as such in the introductory paragraph of this Agreement and their permitted successors in interest to all or any part of the Property.

1.1.16 "Project" means the development, construction, and operation on the Property of approximately 71,200 square feet of commercial and 691 multi-family residential dwelling units. More specifically, the Project to be developed on the Property consists of the following components:

Lot	Subarea Area	Dwelling Units	Dwelling Units (Square Feet)	Commercial (Square Feet)	Surface Parking Spaces
A	16	359	282,870	25,256	477
B	17	98	77,060	20,802	130
C	8	107	84,170	11,047	142
D	11	127	99,990	14,095	170
Total		**691**	**544,090**	**71,200**	**919**

1.1.17 "Property" means the real property described on Exhibit "A" and shown on Exhibit "B" to this Agreement. The Property is comprised of four parcels, referred to herein as Lots A, B, C, and D.

1.1.18 "Reservations of Authority" means the rights and authority excepted from the assurances and rights provided to Owner under this Agreement and reserved to City under Section 3.6 of this Agreement.

1.1.19 "Specific Plan" means that certain specific plan adopted by the City Council, and entitled, "Piemonte Overlay at the Ontario Center Specific Plan," as amended by the Specific Plan Amendment.

1.1.20 "Subsequent Development Approvals" means all Development Approvals obtained subsequent to the Effective Date in connection with development of the Property.

1.1.21 "Subsequent Land Use Regulations" means any Land Use Regulations adopted and effective after the Effective Date of this Agreement.

1.2 Exhibits. The following documents are attached to, and by this reference made a part of, this Agreement:

Exhibit "A" Legal Description of the Property

Exhibit "B" Map showing Property and its location

2. GENERAL PROVISIONS.

2.1 Binding Effect of Agreement. The Property is hereby made subject to this Agreement. Development of the Property is hereby authorized and if and to the extent commenced shall be carried out in accordance with the terms of this Agreement.

2.2 Ownership of Property. Owner represents and covenants that it is the owner of a leasehold interest in the Property or a portion thereof.

2.3 Term. The term of this Agreement shall commence on the Effective Date and shall continue for an initial term of ten (10) years thereafter unless this term is modified or

extended pursuant to the provisions of this Agreement. The term of this Agreement may be extended for an additional five (5) years following expiration of the initial ten (10) year term, provided the following have occurred:

(a) Owner provides at least 180 days written notice to City prior to expiration of the initial term;

(b) Owner is not then in uncured default of this Agreement (after notice and the expiration of any applicable cure periods); and

(c) Such extension is approved by the City Manager is his or her reasonable discretion.

For the avoidance of doubt, any time limits that may otherwise apply to the Development Approvals listed in this Development Agreement (including without limitation, any of the time limits imposed on approvals pursuant to Section 2.02.025A of the Ontario Development Code or any other the Land Use Regulations) shall not govern the Development Approvals or this Agreement and the term set forth in this Section 2.3 shall control.

2.4 Assignment.

2.4.1 Right to Assign. Owner shall have the right to sell, transfer, or assign its interest in the Property in whole or in part (provided that no such partial transfer shall violate the Subdivision Map Act, Government Code Section 66410, et seq.), to any person, partnership, limited liability company, joint venture, firm, or corporation at any time during the term of this Agreement; provided, however, that any such sale, transfer, or assignment shall include the assignment and assumption of the rights, duties and obligations arising under or from this Agreement and be made in strict compliance with the following:

(a) As to each Lot, any such sale, transfer, or assignment is done in compliance with the Ground Lease applicable to such Lot if such Ground Lease is then in effect;

(b) No sale, transfer, or assignment of any right or interest under this Agreement shall be made unless made together with the sale, transfer, or assignment of all of Owner's interest in the applicable Lot;

(c) Prior to any such sale, transfer, or assignment, Owner shall notify City's City Manager, in writing, of such sale, transfer, or assignment and shall provide City with: (1) an executed agreement, in a form reasonably acceptable to City, by the purchaser, transferee, or assignee and providing therein that the purchaser, transferee, or assignee expressly and unconditionally assumes all the duties and obligations of Owner under this Agreement with respect to the portion of the Property so sold, transferred, or assigned; and (2) the payment of the applicable processing charge to cover the City's review and consideration of such sale, transfer, or assignment; and

(d) Any sale, transfer, or assignment not made in strict compliance with the foregoing conditions shall constitute a default by Owner under this Agreement.

Notwithstanding the failure of any purchaser, transferee, or assignee to execute the agreement required by Paragraph (c) of this Subsection 2.4.1, the burdens of this Agreement shall be binding upon such purchaser, transferee, or assignee, but the benefits of this Agreement shall not inure to such purchaser, transferee, or assignee until and unless such agreement is executed. The City Manager shall have the authority to review, consider and either approve, conditionally approve, or deny any proposed sale, transfer, or assignment that is not made in compliance with this Subsection 2.4.1. Notwithstanding any contrary provision of this Agreement, the Owner of an individual Lot shall not have any liability hereunder with respect to any other Lot and a default by the Owner of one Lot shall not impact the rights and obligations of the Owner of any other Lot.

2.4.2 Release of Transferring Owner. Notwithstanding any sale, transfer, or assignment, a transferring Owner shall continue to be obligated under this Agreement unless such transferring owner is given a release in writing by City, which release shall be provided by City upon the full satisfaction by such transferring owner of all of the following conditions:

(a) such transferring owner no longer has a legal or equitable interest in the portion of the Property sold, transferred, or assigned;

(b) such transferring owner is not then in default under this Agreement (after notice and the expiration of any applicable cure periods), in which case such transferring owner shall remain liable for such default but not any future defaults by the assignee after the date of the transfer; and

(c) such transferring owner has provided City with the notice and executed agreement required under Paragraph (c) of Subsection 2.4.1 above.

2.4.3 Subsequent Assignment. Any subsequent sale, transfer, or assignment after an initial sale, transfer, or assignment shall be made only in accordance with and subject to the terms and conditions of this Section 2.4.

2.4.4 For the avoidance of doubt, this Section 2.4 does not apply to assignments or transfers of this Agreement to Mortgagees or their initial transferees after a foreclosure, deed in lieu, or similar action permitted under the mortgage, deed of trust, or other security device securing financing with respect to the Owner's leasehold interest in the Property.

2.5 Amendment or Cancellation of Agreement; Operating Memoranda.

2.5.1 Amendment or Cancellation. This Agreement may be amended or cancelled in whole or in part only in the manner provided for in Government Code Section 65868. Any amendment of this Agreement, which amendment has been requested by Owner, shall be considered by the City only upon the payment of the applicable processing charge. This provision shall not limit any remedy of City or Owner as provided by this Agreement. Either party or successor in interest, may propose an amendment to or cancellation, in whole or in part, of this Agreement. Any amendment or cancellation shall be by mutual consent of the parties or their successors in interest except as provided otherwise in this Agreement or in Government

Code Section 65865.1. For purposes of this section, the term "successor in interest" shall mean any person having a legal or equitable interest in the whole of the Property, or any portion thereof as to which such person wishes to amend or cancel this Agreement. The procedure for proposing and adopting an amendment to, or cancellation of, in whole or in part, this Agreement shall be the same as the procedure for adopting and entering into this Agreement in the first instance. Notwithstanding the foregoing sentence, if the City initiates the proposed amendment to, or cancellation of, in whole or in part, this Agreement, City shall first give notice to the Owner of its intention to initiate such proceedings at least sixty (60) days in advance of the giving the public notice of intention to consider the amendment or cancellation.

2.5.2 Operating Memoranda.

The provisions of this Agreement require a close degree of cooperation between the City and Owner and development of the Project hereunder may demonstrate that refinements and clarifications are appropriate with respect to the details of performance of the City and Owner. If and when, from time to time, during the term of this Agreement, the City and Owner agree that such clarifications are necessary or appropriate, the City and Owner shall effectuate such clarifications through operating memoranda approved by the City and Owner, which, after execution, shall be attached hereto as addenda and become a part hereof, and may be further clarified from time to time as necessary with future approval by the City and Owner. No such operating memoranda shall constitute an amendment to this Agreement requiring public notice or hearing. The City Manager shall be authorized to make the determination on behalf of the City whether a requested clarification may be effectuated pursuant to this Section 2.5.2 or whether the requested clarification is of such a character to constitute an amendment hereof. The City Manager shall be authorized to execute any operating memoranda hereunder on behalf of the City without further Planning Commission or City Council action.

2.5.3 Certificate of Performance.

Upon "Completion" (as defined in the Ground Lease) of the portion of the Project located on a particular Lot, the City shall provide Owner, upon Owner's request, with a statement ("**Certificate of Performance**") evidencing such completion, termination of this Agreement as to that particular Lot, and the release of Owner from further obligations hereunder with respect to the applicable Lot except with respect to any obligations which survive such termination. The Certificate of Performance shall be signed by the appropriate agents of Owner and the City and shall be recorded with the County Recorder. Such Certificate of Performance is not a notice of completion as referred to in California Civil Code Section 8182.

2.6 Termination. This Agreement shall be deemed terminated and of no further effect upon the occurrence of any of the following events:

(a) Expiration of the stated term of this Agreement as set forth in Section 2.3;or

(b) As to each Lot, completion of the portion of the Project to be developed and constructed on such Lot in accordance with the terms of this Agreement including issuance

of all required occupancy permits and acceptance by City or applicable public agency of all required dedications, if any.

Termination of this Agreement shall not constitute termination of any other land use entitlements approved for the Property. Upon the termination of this Agreement, no party shall have any further right or obligation hereunder except with respect to any obligation to have been performed prior to such termination or with respect to any default in the performance of the provisions of this Agreement which has occurred prior to such termination or with respect to any right and/or obligations which are specifically set forth as surviving this Agreement. Upon such termination, any public facilities and services mitigation fees paid pursuant to Section 4.2 of this Agreement by Owner to City for residential units on which construction has not yet begun shall be refunded to Owner by City to the extent payment has been received.

2.7 Notices.

(a) As used in this Agreement, "notice" includes, but is not limited to, the communication of notice, request, demand, approval, statement, report, acceptance, consent, waiver, appointment, or other communication required or permitted hereunder.

(b) All notices shall be in writing and shall be considered given either: (i) when delivered in person, including, without limitation, by courier, to the recipient named below; or (ii) on the date of delivery shown on the return receipt, after deposit in the United States mail in a sealed envelope as either registered or certified mail with return receipt requested, and postage and postal charges prepaid, and addressed to the recipient named below. All notices shall be addressed as follows:

If to City:
Scott Ochoa, City Manager
City of Ontario
303 East "B" Street
Ontario, CA 91764

If to Owner:
OTC Owner, LLC
c/o Adept Urban
388 Cordova Street, #280
Pasadena, CA 91101
Attention: Patrick Chraghchian; Robert Montano
Email:patrick@adept-dev.com;
robert.m@adept-dev.com

with a copy to:
Ruben Duran, City Attorney
Best & Krieger, LLP
2855 E Guasti Road
Ontario, CA 91761

with a copy to:
Munger, Tolles & Olson LLP
350 S. Grand Avenue, 50th Floor
Los Angeles, CA 90071
Attention: Misty M. Sanford, Esq.
Email: misty.sanford@mto.com

(c) Either party may, by notice given at any time, require subsequent notices to be given to another person or entity, whether a party or an officer or representative of a party, or to

a different address, or both. Notices given before actual receipt of notice of change shall not be invalidated by the change.

3. DEVELOPMENT OF THE PROPERTY.

3.1 Development of the Project; Rights to Develop.

3.1.1 Development of the Project. In consideration of the premises, purposes, and intentions set forth in this Agreement, and in consideration of the assurances for development of the Project pursuant to this Agreement, Owner agrees to develop the Project in accordance with: (i) the terms and conditions of this Agreement and the Ground Leases; (ii) the terms and conditions established in the Development Approvals; and (iii) the Existing Land Use Regulations. Developer agrees that, notwithstanding any provision of law or this Agreement to the contrary, the use and development of the Property shall conform to all of the requirements, terms and conditions of the Ground Leases. Owner further agrees that the use, density and intensity, maximum height and size of structures and provisions for the Property reservation and dedication of land for public purposes related to the Property shall be limited to those uses permitted by the Ground Leases and Existing Land Use Regulations. The Project shall be developed in accordance with the Ground Leases and Development Approvals. The Project shall be constructed in compliance with all applicable building codes and standards, as such may be modified from time to time.

3.1.2 Rights to Develop. Subject to the terms of this Agreement including the Reservations of Authority, Owner shall have a vested right to develop the Project in accordance with the Existing Land Use Regulations, subject to the terms and conditions of this Agreement and the Ground Leases and the conditions established in the Development Approvals. The Project shall remain subject to all Development Approvals required to complete the Project. Except as otherwise provided in this Agreement, the permitted uses of the Property, the density and intensity of use, the maximum height and size of proposed buildings, and provisions for reservation and dedication of land for public purposes shall be those set forth in the Existing Land Use Regulations.

3.2 Effect of Agreement on Land Use Regulations. Except as otherwise provided under the terms of this Agreement including the Reservations of Authority, the rules, regulations, and official policies governing permitted uses of the Property, the density and intensity of use of the Property, the maximum height and size of proposed buildings, and the design, improvement and construction standards and specifications applicable to development of the Property shall be the Existing Land Use Regulations. In connection with any Subsequent Development Approval, City shall exercise discretion in accordance with the same manner as it exercises its discretion under its police powers, including the Reservations of Authority set forth herein; provided however, that such discretion shall not prevent development of the Property for the uses and to the density or intensity of development set forth in this Agreement.

3.3 Timing of Development. The parties acknowledge that Owner cannot at this time predict when or the rate at which phases of the Property will be developed. Such decisions

depend upon numerous factors which are not within the control of Owner, such as market orientation and demand, interest rates, absorption, completion, and other similar factors. Since the California Supreme Court held in Pardee Construction Co. v. City of Camarillo (1984) 37 Ca1. 3d 465, that the failure of the parties therein to provide for the timing of development resulted in a later adopted initiative restricting the timing of development to prevail over such parties' agreement, it is the parties' intent to cure that deficiency by acknowledging and providing that Owner shall have the right to develop (without the obligation) the Property in such order and at such rate and at such times as set forth in the Ground Lease if then in effect or if the Ground Lease is not then effect, when Owner deems appropriate within the exercise of its sole and subjective business judgment during the term of this Agreement.

3.4 Requirement for Public Infrastructure Improvements. Owner shall comply with any conditions of the Development Approvals with respect to providing public infrastructure improvements or facilities, if any.

3.5 Changes and Amendments. The parties acknowledge that refinement and further development of the Project will require Subsequent Development Approvals and may demonstrate that changes are appropriate and mutually desirable in the Existing Development Approvals. In the event Owner finds that a change in the Existing Development Approvals is necessary or appropriate, Owner shall apply for a Subsequent Development Approval to effectuate such change and City shall process and act on such application in accordance with the Existing Land Use Regulations, except as otherwise provided by this Agreement including the Reservations of Authority. Unless otherwise required by law, as determined in City's reasonable discretion, a change to the Existing Development Approvals shall be deemed "minor" and not require an amendment to this Agreement provided such change does not:

(a) Alter the permitted uses of the Property as a whole; or,

(b) Increase the density or intensity of use of the Property as a whole; (other than in de minimis amounts); or,

(c) Increase the maximum height and size of permitted buildings (other than in de minimis amounts); or,

(d) Delete a requirement for the reservation or dedication of land for public purposes within the Property as a whole; or,

(e) Constitute a project requiring a subsequent or supplemental environmental impact report pursuant to Section 21166 of the Public Resources Code.

3.6 Reservations of Authority.

3.6.1 Limitations, Reservations and Exceptions. Notwithstanding any other provision of this Agreement, the City shall not be prevented from applying new rules, regulations, and policies upon the Owner, nor shall a development agreement prevent the City from denying or conditionally approving any subsequent development project application on the

basis of such new rules, regulations, and policies where the new rules, regulations and policies consist of the following:

(a) Processing fees by City to cover its actual costs of processing applications for, or monitoring compliance with, any development approvals granted for the performance of any conditions imposed on the Project, unless otherwise waived by the City in writing;

(b) Procedural regulations relating to hearing bodies, petitions, applications, notices, findings, records, and any other matter of procedure;

(c) Regulations, policies, and rules governing engineering and construction standards and specifications applicable to public and private improvements, including all uniform codes adopted by the City and any local amendments to those codes adopted by the City; provided however that, Owner shall have a vested right to develop the Property in accordance with, and to the extent of, the standards and specifications that are expressly identified in the Specific Plan;

(d) Regulations that may conflict with this Agreement or Existing Land Use Regulations but that are reasonably necessary to protect the residents of the project and/or of the immediate community from a condition perilous to their health or safety; and are generally applicable on a citywide basis (except in the event of natural disasters as found by the City Council such as floods, earthquakes, pandemics and similar acts of God);

(e) Reserved;

(f) Regulations to which the Owner consents in writing.

3.6.2 Subsequent Development Approvals. This Agreement shall not prevent City, in acting on Subsequent Development Approvals, from applying Subsequent Land Use Regulations that do not conflict with the Development Approvals and the Existing Land Use Regulations, nor shall this Agreement prevent City from denying or conditionally approving any Subsequent Development Approval on the basis of the Existing Land Use Regulations or any Subsequent Land Use Regulation not in conflict with the Development Approvals and the Existing Land Use Regulations.

3.6.3 Modification or Suspension by State or Federal Law. In the event that State or Federal laws or regulations, enacted after the Effective Date of this Agreement, prevent or preclude compliance with one or more of the provisions of this Agreement, such provisions of this Agreement shall be modified or suspended as may be necessary to comply with such State or Federal laws or regulations, provided, however, that this Agreement shall remain in full force and effect to the extent it is not inconsistent with such laws or regulations and to the extent such laws or regulations do not render such remaining provisions impractical to enforce or comply with as determined by Owner. In the event Owner alleges that such State or Federal laws or

regulations preclude or prevent compliance with one or more provisions of this Agreement, and the City does not agree, the Owner may, at its sole cost and expense, seek declaratory relief (or other similar non-monetary remedies); provided however, that nothing contained in this Section 3.6.3 shall impose on City any monetary liability for contesting such declaratory relief (or other similar non-monetary relief).

3.6.4 Intent. The parties acknowledge and agree that City is restricted in its authority to limit its police power by contract and that the foregoing limitations, reservations, and exceptions are intended to reserve to City all of its police power which cannot be so limited. This Agreement shall be construed, contrary to its stated terms if necessary, to reserve to City all such power and authority which cannot be restricted by contract.

3.7 Public Works; Utilities. If Owner is required by any Development Approval to construct any public works facilities which will be dedicated to City or any other public agency upon completion, and if required by applicable laws to do so, Owner shall perform such work in the same manner and subject to the same requirements as would be applicable to City or such other public agency should it have undertaken such construction. As a condition of development approval, Owner shall connect the Project to all utilities necessary to provide adequate water, recycled water, sewer, gas, electric, and other utility service to the Project. As a further condition of development approval, Owner shall contract with the City for City-owned or operated utilities for this purpose, for such price and on such terms as may be available to similarly situated customers in the City.

3.8 Regulation by Other Public Agencies. It is acknowledged by the parties that other public agencies not within the control of City possess authority to regulate aspects of the development of the Property separately from or jointly with City and this Agreement does not limit the authority of such other public agencies. City agrees to cooperate fully, at no out-of-pocket cost to City, with Owner in obtaining any required permits or compliance with the regulations of other public agencies provided such cooperation is not in conflict with any laws, regulations, or policies of the City.

3.10 Rent Control. Notwithstanding anything to the contrary in this Agreement, City agrees that, to the extent permitted by applicable law, City shall not apply any rent control or other moratoria or interim control ordinance against the Property or the Project. The foregoing covenant shall survive the expiration of this Agreement and shall be in effect as to each Lot until the earliest of (a) any early termination of this Agreement other than a termination due to the completion of the portion of the Project on such Lot; (b) a termination of the Ground Lease for such Lot; or (c) seventy (70) years from the date of this Agreement.

4. PUBLIC BENEFITS.

4.1 Intent. The parties acknowledge and agree that development of the Property will result in substantial public needs that will not be fully met by the Development Approvals and the Existing Land Use Regulations and further acknowledge and agree that this Agreement confers substantial private benefits on Owner that should be balanced by commensurate public benefits. Accordingly, the parties intend to provide consideration to the public to balance the

private benefits conferred on Owner by providing more fully for the satisfaction of the public needs resulting from the Project.

4.2 Development Impact Fees.

4.2.1 Amount of Development Impact Fee. Development Impact Fees (DIF) shall be paid by Owner. The amounts for Development Impact Fees established or imposed by the City to be paid by Owner shall be the amounts that are in effect as of the Effective Date and Development Impact Fees established or imposed by other public agencies to be paid by Owner shall be the amounts that are in effect at the time such fees are due and payable during the development process. Nothing contained in this Agreement shall affect the ability of other public agencies that are not controlled by City to impose and amend, from time to time, Development Impact Fees established or imposed by such other public agencies, even though such Development Impact Fees may be collected by City.

4.2.2 Time of Payment.

(a) The following Development Impact Fees for the development of Lot A shall be paid pursuant to the amortization schedule provided in this Subsection 4.2.2(a) (collectively, the "Lot A Deferred DIFs):

[o be determined]

The current estimated projected total amount of the Lot A Deferred DIFs is $4,500,000. The actual total amount of the Lot A Deferred DIFs may vary. The City agrees that Owner may amortize payment to the City of the Lot A Deferred DIFs over thirty (30) years at a 3 percent (3%) annual interest rate. Owner agrees that, commencing upon the earlier of (i) issuance of a temporary or other certificate of occupancy for the residential component of the portion of the Project on Lot A or (ii) the fiftieth (50th) month following the date of this Agreement, Owner shall pay to the City, on the 1st day of the next following month and each and every successive month for three hundred sixty (360) consecutive months, an amount equal to the amortized principal and interest of the actual amount of the Lot A Deferred DIFs amortized over thirty (30) years at a 3 percent (3%) annual interest rate. By way of example only, if the Lot A Deferred DIFs equal $4,5000,000, the monthly payment to be made to the City would be $18,972. The entire unpaid principal balance of the amortized Lot A Deferred DIFs and any accrued but unpaid interest shall be immediately due and payable to the City upon any of the following events: (1) the termination of this Agreement; (2) any sale, transfer, assignment, or refinancing other than a termination due to the completion of the portion of the Project on such Lot; or) any uncured default by Owner with regard to repayment of the amortized Lot A Deferred DIFs to the City (if such amounts have not been paid to the City within five (5) business days of Owner's receipt of written notice from the City). Any monthly payment or portion thereof not paid to the City as and when due under the terms of this Agreement shall accrue interest from the date on which such payment was due at the rate of one percent (1%) over the prime rate announced by Bank of America. All payments under this Subsection will be applied first to penalties and late fees, then to interest, then to reduce the principal amount owed.

(b) Any Development Impact Fee not listed in Subsection (a) above, including without limitation all Development Impact Fees applicable to the development of Lots, B, C, and D, shall be paid when and as required in their standard course and schedule.

4.3 Responsibility for Construction of Public Improvements.

4.3.1 Timely Construction of Public Infrastructure. Owner shall be responsible for the timely construction and completion of all public infrastructure required for the Project by any Development Approval.

4.3.2 Construction of DIF Program Infrastructure. To the extent Owner is required to construct and completes construction of public improvements that are included in City's Development Impact Fee Program, City agrees that City shall issue DIF Credit and DIF Reimbursement in accordance with the provisions of a separate Fee Credit Agreement between City and Owner. Limitation on the use of DIF Credit issued to Owner to offset Owner's DIF payment obligations shall also be subject to the provisions of a separate Fee Credit Agreement. City and Owner agree that the Fee Credit Agreement between City and Owner shall comply with City's adopted policies applicable to such agreements.

4.4 Reserved.

4.5 Schools Obligations. Owner shall satisfy its school obligations with the applicable school district by paying school impact fees. Written evidence of approval by the applicable school district that Owner has met its school obligations may be required by the City as the condition to the issuance by the City of any building permits for the Project.

4.6 Reserved.

4.7 Reserved.

4.8 Reserved.

4.9 Maintenance of Open Space. Owner shall provide for ongoing maintenance of all park, common areas, and open space areas within the Project as may be set forth in the Development Approvals.

4.10 Intentionally Omitted.

4.11 Compliance with Public Benefits Requirements. In the event Owner fails or refuses to comply with any condition referenced in Section 4.1 through 4.9, or challenges (whether administratively or through legal proceedings) the imposition of such conditions, Owner shall be deemed in default of this Agreement pursuant to Section 8.4 hereof, thereby entitling the City to any and all remedies permitted under this Agreement, including, without limitation, the right of the City to withhold Owner's Project-related building permits, certificates of occupancy, or discretionary approvals, without liability.

5. [RESERVED]

6. REVIEW FOR COMPLIANCE.

6.1 Periodic and Special Reviews.

6.1.1 Time for and Initiation of Periodic Review. The City shall review this Agreement every twelve (12) months from the Effective Date in order to ascertain the good faith compliance by the Owner with the terms of this Agreement in accordance with Section 65865.1 of the California Government Code. Upon completion of the City's review, City shall either issue a notice of continuing compliance or a notice of non-compliance and a notice of City's intent to conduct a Special Review pursuant to Sections 6.1.2 through 6.1.6. Issuance of a notice of continuing compliance may be issued by the City Manager or his/her designee. Owner shall be responsible for paying any processing charge in connection with each such annual review, if any, provided that such charge shall be generally consistent with the cost charged for annual reviews for other development agreements to which the City is a party.

6.1.2 Initiation of Special Review. A special review may be called either by agreement between the parties or by initiation in one or more of the following ways:

(1) Recommendation of the Planning staff;

(2) Affirmative vote of at least four (4) members of the Planning Commission; or

(3) Affirmative vote of at least three (3) members of the City Council.

6.1.3 Notice of Special Review. The City Manager shall begin the special review proceeding by giving notice that the City intends to undertake a special review of this Agreement to the Owner. Such notice shall be given at least ten (10) days in advance of the time at which the matter will be considered by the Planning Commission.

6.1.4 Public Hearing. The Planning Commission shall conduct a hearing at which the Owner must demonstrate good faith compliance with the terms of this Agreement. The burden of proof on this issue is upon the Owner.

6.1.5 Findings Upon Public Hearing. The Planning Commission shall determine upon the basis of substantial evidence whether or not the Owner has, for the period under review, complied in good faith with the terms and conditions of this Agreement.

6.1.6 Procedure Upon Findings.

(a) If the Planning Commission finds and determines on the basis of substantial evidence that the Owner has complied in good faith with the terms and conditions of this Agreement during the period under review, the review for that period is concluded.

(b) If the Planning Commission finds and determines on the basis of substantial evidence that the Owner has not complied in good faith with the terms and conditions

of this Agreement during the period under review, the Planning Commission may recommend modification or termination of this Agreement and shall specify in writing the respects in which Owner has failed to so comply. The City shall provide Owner with written notice of such noncompliance, together with a written specification of the reasons therefor. Such written notice shall also specify a reasonable time for Owner to cure such non-compliance, which time shall be not less than thirty (30) days after Owner's receipt of such notice.

(c) The Owner may appeal a determination pursuant to paragraph (b) in accordance with the City's rule for consideration of appeals in zoning matters generally.

6.2 Proceedings Upon Modification or Termination. If, upon a finding under Section 6.1.6(b), the City determines to proceed with modification or termination of this Agreement, the City shall give notice to the property Owner of its intention so to do. The notice shall contain:

(a) The time and place of the hearing;

(b) A statement as to whether or not the City proposes to terminate or to modify this Agreement; and

(c) Other information that the City considers necessary to inform the Owner of the nature of the proceeding.

6.3 Hearing on Modification or Termination. At the time and place set for the hearing on modification or termination, the Owner shall be given an opportunity to be heard. The Owner shall be required to demonstrate good faith compliance with the terms and conditions of this Agreement. The burden of proof on this issue shall be on the Owner. If the City Council finds, based upon substantial evidence in the administrative record, that the Owner has not complied in good faith with the terms and conditions of the agreement, the City Council may terminate or modify this Agreement and impose those conditions to the action it takes as it considers necessary to protect the interests of the City. The decision of the City Council shall be final, subject only to judicial review pursuant to Section 1094.5 of the Code of Civil Procedure.

6.4 Certificate of Agreement Compliance. If, at the conclusion of a Periodic or Special Review, Owner is found to be in compliance with this Agreement, City shall, upon written request by Owner, issue a Certificate of Agreement Compliance ("Certificate") to Owner stating that after the most recent Periodic or Special Review and based upon the information known or made known to the Planning Director and City Council that (1) this Agreement remains in effect and (2) Owner is not in default. The Certificate shall be in recordable form, shall contain information necessary to communicate constructive record notice of the finding of compliance, shall state whether the Certificate is issued after a Periodic or Special Review and shall state the anticipated date of commencement of the next Periodic Review. Owner may record the Certificate with the County Recorder. Whether or not the Certificate is relied upon by assignees or other transferees or Owner, City shall not be bound by a Certificate if a default existed at the time of the Periodic or Special Review, but was concealed from or otherwise not known to the Planning Director or City Council.

7. [RESERVED]

8. ENFORCEABILITY.

8.1 Default.

Subject to Section 8.2, failure by any party to perform any term or provision of this Agreement required to be performed by such party shall constitute an event of default ("Event of Default"). For purposes of this Agreement, a party claiming another party is in default shall be referred to as the "Complaining Party," and the party alleged to be in default shall be referred to as the "Party in Default." Provided, a Complaining Party shall not exercise any of its remedies as the result of such Event of Default unless such Complaining Party first gives notice to the Party in Default as provided in Section 8.2, and the Party in Default fails to cure such Event of Default within the applicable cure period.

8.2 Procedure Regarding Defaults.

8.2.1 Notice Required. The Complaining Party shall give written notice of default to the Party in Default, specifying the default complained of by the Complaining Party. Delay in giving such notice shall not constitute a waiver of any default nor shall it change the time of default.

8.2.2 Right to Cure. The Party in Default shall diligently endeavor to cure, correct or remedy the matter complained of, provided such cure, correction or remedy shall be completed within the applicable time period set forth herein after receipt of written notice (or such additional time as may be deemed by the Complaining Party to be reasonably necessary to correct the matter).

8.2.3 Delay not a Waiver. Any failures or delays by a Complaining Party in asserting any of its rights and remedies as to any default shall not operate as a waiver of any default or of any such rights or remedies. Delays by a Complaining Party in asserting any of its rights and remedies shall not deprive the Complaining Party of its right to institute and maintain any actions or proceedings which it may deem necessary to protect, assert, or enforce any such rights or remedies.

8.2.4 Time to Cure. If an Event of Default occurs, prior to exercising any remedies, the Complaining Party shall give the Party in Default written notice of such default. If the default is reasonably capable of being cured within thirty (30) days, the Party in Default shall have such period to effect a cure prior to exercise of remedies by the Complaining Party. If the nature of the alleged default is such that it cannot practicably be cured within such 30 day period, the cure shall be deemed to have occurred within such 30 day period if (a) the cure is commenced at the earliest practicable date following receipt of the notice; (b) the cure is diligently prosecuted to completion at all times thereafter; (c) at the earliest practicable date (in no event later than 30 days after the curing party's receipt of the notice), the curing party provides written notice to the other party that the cure cannot practicably be completed within such 30 day period; and (d) the cure is completed at the earliest practicable date. In no event

shall the Complaining Party be precluded from exercising remedies if a default is not cured within ninety (90) days after the first notice of default is given.

8.2.5 Termination of Agreement. Subject to the foregoing, if a Party in Default fails to cure a default in accordance with the foregoing, the Complaining Party, at its option, may terminate this Agreement, and/or institute legal proceedings pursuant to this Agreement.

8.2.6 Default during Annual Review. Without limitation, evidence of default may arise in the course of the regularly scheduled annual review described in Section 8.3. below.

8.3 Institution of Legal Action.

8.3.1 Institution of Action. Subject to notice of default and opportunity to cure under Sections 8.1 and 8.2, and subject further to the limitation on remedies set forth in Section 8.4 and Section 6, in addition to any other rights or remedies, any party to this Agreement may institute legal action to cure, correct or remedy any default, to enforce any covenants or agreements herein, to enjoin any threatened or attempted violation hereof, or to obtain any other remedies consistent with this Agreement.

8.3.2 Attorneys' Fees. If a legal action or proceeding is brought by any party to this Agreement because of an Event of Default under this Agreement, or to enforce a provision hereof, the prevailing party in such action shall be entitled to reasonable attorneys' fees, expert witness fees, court costs, and such other costs as may be fixed by the court. This provision is separate and several and shall survive the merger of this Agreement into any judgment on this Agreement.

8.4 Remedies

The parties would not have entered into this Agreement without the limits on damages under this Agreement set forth herein. Accordingly, the parties agree that each of the parties hereto may pursue any remedy at law or equity available for the breach of any provision of this Agreement, subject to the following:

(a) The City and all persons acting on behalf of the City shall not be liable in damages to Owner, or to any successor in interest, or to any other person. Owner covenants not to sue for monetary damages or claim any monetary damages:

(i) For any breach of this Agreement or for any cause of action which arises out of this Agreement; or

(ii) For the taking, impairment or restriction of any property right or interest as the result of or arising under or pursuant to this Agreement, but excluding claims based upon applicable obligations of the City acting in its governmental capacity and not as a party to this Agreement;

(iii) Arising out of or connected with any dispute, controversy or issue regarding the application or interpretation or effect of the provisions of this Agreement;

(iv) Provided, however, that Owner reserves the right to sue for any monetary sums payable by City to Owner pursuant to Section 9.3.2 of this Agreement which City fails to pay.

(b) Owner shall not be liable in monetary damages to City, or to any person acting on behalf of City, and City covenants not to sue for damages or claim any monetary damages:

(i) Arising out of or connected with any dispute, controversy or issue regarding the application or interpretation or effect of the provisions of this Agreement;

(ii) Provided, however, that City reserves the right to sue for any monetary sums due City for any Development Impact Fees and any other sums payable by Owner to City under this Agreement including without limitation pursuant to any indemnities under this Agreement which Owner fails to pay.

(c) Notwithstanding provisions to the contrary contained in this Section, both parties reserve the right, by separate action, if necessary, to recover all costs and fees pursuant to Section 8.3.2 herein.

(d) The parties acknowledge that, except as provided in Sections 8.4(a)(iv), (b)(ii), and (c) above, money damages and remedies at law generally are inadequate and, specific performance or writ of mandate are available for the enforcement of this Agreement.

(e) Nothing in this Agreement shall be deemed to waive or limit any rights and remedies that the parties would otherwise have against the other in the absence of this Agreement with respect to personal injury or death or property damage caused by the negligence or willful misconduct of a party.

8.6 Release. Subject to and without limiting the indemnities in this Agreement, except as set forth in and subject to this Section 8, each party, for itself, its successors and assignees, hereby releases the other party, its officers, agents and employees from any and all claims, demands, actions, or suits of any kind or nature arising out of any liability, known or unknown, present or future, including, but not limited to, any claim or liability, based or asserted, pursuant to Article I, Section 19 of the California Constitution, the Fifth Amendment of the United States Constitution, or any other law or ordinance which seeks to impose any other liability or damage, whatsoever, upon the City because it entered into this Agreement or because of the terms of this Agreement.

8.7 Ground Leases and Other Agreements Not Affected. This Section 8 shall not be deemed to implicate, modify, or affect in any way any provisions in the Ground Leases or any other agreement entered into by the parties with respect to the Property and the Project.

9. THIRD PARTY LITIGATION.

9.1 General Plan Litigation. City has determined that this Agreement is consistent with its General Plan, as such General Plan exists as of the Effective Date, and that the General Plan meets all requirements of law. City shall have no liability in damages under this Agreement for any failure of City to perform under this Agreement or the inability of Owner to develop the Project as the result of a judicial determination that on the Effective Date, or at any time thereafter, the General Plan, or portions thereof, are invalid or inadequate or not in compliance with law.

9.2 Third Party Litigation Concerning Agreement. Subject to and without limiting the indemnity in Section 9.3.2 below, Owner shall defend, (with counsel chosen by Owner), at its expense, including attorneys' fees, indemnify, and hold harmless City and its officers and employees from any claim, action or proceeding against City, its officers, or employees to attack, set aside, void, or annul the approval of this Agreement or the approval of any permit granted pursuant to this Agreement. City shall promptly notify Owner of any such claim, action or proceeding, and City shall cooperate in the defense. If City fails to promptly notify Owner of any such claim, action or proceeding, or if City fails to cooperate in the defense, Owner shall not thereafter be responsible to defend, indemnify, or hold harmless City. City may in its discretion participate in the defense of any such claim, action or proceeding.

9.3 Indemnity.

9.3.1 Owner. In addition to the provisions of 9.2 above, subject to and without limiting the indemnity in Section 9.3.2 below, Owner shall defend,(with counsel chosen by Owner), at its expense, including attorneys' fees, indemnify, and hold harmless City and its City, and its officers, agents, attorneys, employees, and representatives (collectively, the "City Parties") from any liability whatsoever, based or asserted upon any act or omission of Owner, its officers, agents, employees, subcontractors, and/or independent contractors, for property damage, bodily injury, or death (Owner's employees included) relating to or in any way connected with or arising from the activities contemplated hereunder, including, but not limited to, the study, design, engineering, construction, completion, and operation the Project, save and except to the extent such claims for damages arises through the negligence or willful misconduct of City Parties. City may in its discretion participate in the defense of any such legal action. The City shall promptly notify Owner of any such claim, action or proceeding.

9.3.2 City. City agrees to indemnify, defend (with counsel chosen by City), and hold harmless American General Design, Inc. (dba Adept Development), a California corporation ("Adept"), and _____ ("Tenant" under the Ground Lease) ("Tenant") with respect to any notice of violation or action taken by the State of California directly against Adept or Tenant pursuant to California Government Code Sections 54220 through 54234 in connection with the City's disposition of the Property by ground lease to Tenant. Adept and Tenant shall each promptly notify the City (but in no event later than five (5) business days) following its receipt or knowledge of any notice of violation, claim, action, or proceeding initiated by the State of California, and Adept and Tenant shall reasonably and in good faith cooperate in the City's defense. The foregoing indemnity specifically excludes, and the City shall not be liable to Adept or Tenant for, and neither Adept nor Tenant shall have no right or be entitled to, any special, incidental, indirect, consequential, or punitive costs, liabilities,

loss, expenses, or damages, including without limitation economic loss, commercial loss, lost business, lost profits, lost revenues, interruptions of service, or any delay, error or loss, whether foreseeable or unforeseeable, and the City shall not be liable to Adept or Tenant, or any party claiming through Adept or Tenant, for any such costs, liabilities, loss, expenses, or damages, under this provision, or arising out of, or in connection with, any notice of violation or action taken by the State of California against Adept or Tenant in connection with the City's disposition of the Property by ground lease to Tenant, and Adept and Tenant each hereby waives on behalf of itself and any party claiming through Adept or Tenant the right to claim the same against the City.

9.4 Environment Assurances. Owner shall defend, (with counsel chosen by Owner), at its expense, including attorneys' fees, indemnify, and hold harmless the City Parties from any liability, based or asserted, upon any act or omission of Owner, its officers, agents, employees, subcontractors, and/or independent contractors for any violation of any federal, state, or local law, ordinance, or regulation relating to industrial hygiene or to environmental conditions on, under, or about the Property that were not present prior to the date that the Tenants under the Ground Leases take possession of the Property, including, but not limited to, soil and groundwater conditions, and Owner shall defend, at its expense, including reasonable attorneys' fees, the City Parties in any action based or asserted upon any such alleged act or omission. City may in its discretion participate in the defense of any such action.

9.5 Reservation of Rights. With respect to Sections 9.2, 9.3.1, and 9.4 herein, City reserves the right to either (1) approve the attorney(s) which Owner selects, hires or otherwise engages to defend City hereunder, which approval shall not be unreasonably withheld, or (2) conduct its own defense, provided, however, that Owner shall reimburse City forthwith for any and all reasonable expenses incurred for such defense, including attorneys' fees, upon billing and accounting therefor.

9.6 Survival. The provisions of this Sections 9.1 through 9.6, inclusive, shall survive the termination of this Agreement.

10. MORTGAGEE PROTECTION.

The parties hereto agree that this Agreement shall not prevent or limit Owner, in any manner, at Owner's sole discretion, from encumbering the Property or any portion thereof or any improvement thereon by any mortgage, deed of trust, or other security device securing financing with respect to the Property ("Security Instrument"). City acknowledges that the lenders providing such financing may require certain Agreement interpretations and modifications and agrees upon request, from time to time, to meet with Owner and representatives of such lenders to negotiate in good faith any such request for interpretation or modification. City will not unreasonably withhold its consent to any such requested interpretation or modification provided such interpretation or modification is consistent with the intent and purposes of this Agreement. Any Mortgagee of the Property shall be entitled to the following rights and privileges:

(a) Neither entering into this Agreement nor a breach of this Agreement shall defeat, render invalid, diminish or impair the lien of any Security Instrument on the Property made in good faith and for value, unless otherwise required by law.

(b) The Mortgagee of any Security Instrument, or any part thereof, which Mortgagee, has submitted a request in writing to the City in the manner specified herein for giving notices, shall be entitled to receive written notification from City of any default by Owner in the performance of Owner's obligations under this Agreement.

(c) If City timely receives a request from a Mortgagee requesting a copy of any notice of default given to Owner under the terms of this Agreement, City shall provide a copy of that notice to the Mortgagee within ten (10) days of sending the notice of default to Owner. The Mortgagee shall have the right, but not the obligation, to cure the default during the remaining cure period allowed such party under this Agreement.

(d) Any Mortgagee who takes title of the Property, or any part thereof, pursuant to foreclosure trustee's sale, deed in lieu of foreclosure, lease or sublease termination or otherwise, shall take the Property, or part thereof, subject to the terms of this Agreement, provided that any such Mortgagee, including its affiliate, that takes title to the Property shall be entitled to all of the benefits arising under this Agreement. Notwithstanding any other provision of this Agreement to the contrary, no Mortgagee shall have an obligation or duty under this Agreement to perform any of Owner's obligations or other affirmative covenants of Owner hereunder, or to guarantee such performance; provided, however, that to the extent that any covenant to be performed by Owner is a condition precedent to the performance of a covenant by City, the performance thereof shall continue to be a condition precedent to City's performance hereunder, and further provided that any sale, transfer, or assignment after the initial sale, transfer, or assignment by any Mortgagee shall be subject to the provisions of Section 2.4 of this Agreement.

11. MISCELLANEOUS PROVISIONS.

11.1 Recordation of Agreement. This Agreement and any amendment or cancellation thereof shall be recorded with the San Bernardino County Recorder by the City Clerk within the ten (10) days after the City executes this Agreement, as required by Section 65868.5 of the Government Code. If the parties to this Agreement or their successors in interest amend or cancel this Agreement as provided for herein and in Government Code Section 65868, or if the City terminates or modifies this Agreement as provided for herein and in Government Code Section 65865.1 for failure of the applicant to comply in good faith with the terms or conditions of this Agreement, the City Clerk shall have notice of such action recorded with the San Bernardino County Recorder. A failure to record the Agreement in a timely fashion shall not impact its effectiveness to the extent permitted by applicable law.

11.2 Entire Agreement. This Agreement sets forth and contains the entire understanding and agreement of the parties, and there are no oral or written representations, understandings or ancillary covenants, undertakings or agreements which are not contained or

expressly referred to herein. No testimony or evidence of any such representations, understandings or covenants shall be admissible in any proceeding of any kind or nature to interpret or determine the terms or conditions of this Agreement.

11.3 Severability. If any term, provision, covenant or condition of this Agreement shall be determined invalid, void or unenforceable, the remainder of this Agreement shall not be affected thereby to the extent such remaining provisions are not rendered impractical to perform taking into consideration the purposes of this Agreement. Notwithstanding the foregoing, the provision of the Public Benefits set forth in Section 4 of this Agreement, including the payment of the fees set forth therein, are essential elements of this Agreement and City would not have entered into this Agreement but for such provisions, and therefore in the event such provisions are determined to be invalid, void or unenforceable, this entire Agreement shall be null and void and of no force and effect whatsoever.

11.4 Interpretation and Governing Law. This Agreement and any dispute arising hereunder shall be governed and interpreted in accordance with the laws of the State of California. This Agreement shall be construed as a whole according to its fair language and common meaning to achieve the objectives and purposes of the parties hereto, and the rule of construction to the effect that ambiguities are to be resolved against the drafting party shall not be employed in interpreting this Agreement, all parties having been represented by counsel in the negotiation and preparation hereof.

11.5 Section Headings. All section headings and subheadings are inserted for convenience only and shall not affect any construction or interpretation of this Agreement.

11.6 Singular and Plural. As used herein, the singular of any word includes the plural.

11.7 Joint and Several Obligations. If at any time during the term of this Agreement any Lot is owned, in whole or in part, by more than one owner, all obligations of such owners under this Agreement shall be joint and several, and the default of any such owner shall be the default of all such owners.

11.8 Time of Essence. Time is of the essence in the performance of the provisions of this Agreement as to which time is an element.

11.9 Waiver. Failure by a party to insist upon the strict performance of any of the provisions of this Agreement by the other party, or the failure by a party to exercise its rights upon the default of the other party, shall not constitute a waiver of such party's right to insist and demand strict compliance by the other party with the terms of this Agreement thereafter.

11.10 No Third Party Beneficiaries. This Agreement is made and entered into for the sole protection and benefit of the parties and their successors and assigns, except that Adept and Tenant are third party beneficiaries of Section 9.3.2. No other person shall have any right of action based upon any provision of this Agreement.

11.11 Force Majeure. Neither party shall be deemed to be in default where failure or delay in performance of any of its obligations under this Agreement is caused by floods,

earthquakes, other Acts of God, fires, wars, riots or similar hostilities, strikes and other labor difficulties beyond the party's control, (including the party's employment force), government regulations, third party litigation, or other causes beyond the party's control. If any such events shall occur, the term of this Agreement and the time for performance by either party of any of its obligations hereunder may be extended by the written agreement of the parties for the period of time that such events prevented such performance, provided that the term of this Agreement shall not be extended under any circumstances for more than five (5) years.

11.12 Mutual Covenants. The covenants contained herein are mutual covenants and also constitute conditions to the concurrent or subsequent performance by the party benefited thereby of the covenants to be performed hereunder by such benefited party.

11.13 Successors in Interest; Covenants Running with the Land. The burdens of this Agreement shall be binding upon, and the benefits of this Agreement shall inure to, all successors in interest to the parties to this Agreement. All provisions of this Agreement shall be enforceable as equitable servitudes and constitute covenants running with the land. Each covenant to do or refrain from doing some act hereunder with regard to development of the Property: (a) is for the benefit of and is a burden upon every portion of the Property; (b) runs with the Property and each portion thereof; and, (c) is binding upon each party and each successor in interest during ownership of the Property or any portion thereof. In any event, no owner or tenant of an individual completed residential unit within the Project shall have any rights under this Agreement.

11.14 Counterparts. This Agreement may be executed by the parties in counterparts, which counterparts shall be construed together and have the same effect as if all of the parties had executed the same instrument.

11.15 Jurisdiction and Venue. Any action at law or in equity arising under this Agreement or brought by a party hereto for the purpose of enforcing, construing or determining the validity of any provision of this Agreement shall be filed and tried in the Superior Court of the County of San Bernardino, State of California, and the parties hereto waive all provisions of law providing for the filing, removal or change of venue to any other court.

11.16 Project as a Private Undertaking. It is specifically understood and agreed by and between the parties hereto that the development of the Project is a private development, that neither party is acting as the agent of the other in any respect hereunder, and that each party is an independent contracting entity with respect to the terms, covenants and conditions contained in this Agreement. No partnership, joint venture or other association of any kind is formed by this Agreement. The only relationship between City and Owner is that of a government entity regulating the development of private property and the owner of such property.

11.17 Further Actions and Instruments. Each of the parties shall cooperate with and provide reasonable assistance to the other to the extent contemplated hereunder in the performance of all obligations under this Agreement and the satisfaction of the conditions of this Agreement. Upon the request of either party at any time, the other party shall promptly execute, with acknowledgment or affidavit if reasonably required, and file or record such required

instruments and writings and take any actions as may be reasonably necessary under the terms of this Agreement to carry out the intent and to fulfill the provisions of this Agreement or to evidence or consummate the transactions contemplated by this Agreement. The City Manager may delegate his powers and duties under this Agreement to an Assistant City Manager or other management level employee of the City.

11.18 Eminent Domain. No provision of this Agreement shall be construed to limit or restrict the exercise by City of its power of eminent domain.

11.19 Agent for Service of Process. In the event Owner is not a resident of the State of California or it is an association, partnership or joint venture without a member, partner or joint venturer resident of the State of California, or it is a foreign corporation, then in any such event, Owner shall file with the Planning Director, upon its execution of this Agreement, a designation of a natural person residing in the State of California, giving his or her name, residence and business addresses, as its agent for the purpose of service of process in any court action arising out of or based upon this Agreement, and the delivery to such agent of a copy of any process in any such action shall constitute valid service upon Owner. If for any reason service of such process upon such agent is not feasible, then in such event Owner may be personally served with such process out of this County and such service shall constitute valid service upon Owner. Owner is amenable to the process so served, submits to the jurisdiction of the Court so obtained and waives any and all objections and protests thereto. Owner for itself, assigns and successors hereby waives the provisions of the Hague Convention (Convention on the Service Abroad of Judicial and Extra Judicial Documents in Civil or Commercial Matters, 20 U.S.T. 361, T.I.A.S. No. 6638).

11.20 Estoppel Certificate. Within thirty (30) days following a written request by any of the parties, the other party shall execute and deliver to the requesting party a statement certifying that (i) either this Agreement is unmodified and in full force and effect or there have been specified (date and nature) modifications to the Agreement, but it remains in full force and effect as modified; and (ii) either there are no known current uncured defaults under this Agreement or that the responding party alleges that specified (date and nature) defaults exist. The statement shall also provide any other reasonable information requested. The failure to timely deliver this statement shall constitute a conclusive presumption that this Agreement is in full force and effect without modification except as may be represented by the requesting party and that there are no uncured defaults in the performance of the requesting party, except as may be represented by the requesting party. Owner shall pay to City all reasonable costs incurred by City in connection with the issuance of estoppel certificates under this Section 11.20 prior to City's issuance of such certificates.

11.21 Authority to Execute. Each party represents and warrants that the person or persons executing this Agreement on behalf of such party has the authority to execute this Agreement on behalf of such party and has the authority to bind such party to the performance of its obligations hereunder.

11.22 Attorneys' Fees. In the event of any action between the City and Owner for enforcement or interpretation of any of the terms or conditions of this Agreement, the prevailing

party in such action shall be entitled to recover its reasonable costs and expenses, including without limitation court costs and attorneys' fees actually and reasonably incurred, as awarded by a court of competent jurisdiction. This Section shall survive the termination of this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year set forth below.

[SIGNATURES CONTAINED ON FOLLOWING PAGE]

SIGNATURE PAGE
TO DEVELOPMENT AGREEMENT

"Owner"

OTC Owner, LLC
a Delaware limited liability company

By: _____
Name:
Its: _____
Date: _____

"CITY"

City OF ONTARIO

By:_____
Scott Ochoa
City Manager

Date: _____

ATTEST:

_____
City Clerk, Ontario

APPROVED AS TO FORM:

_____
Kane, Ballmer & Berkman, City Special Counsel

ACKNOWLEDGEMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
COUNTY OF_____)

On _____, 20_____, before me,_____,
Date *Insert Name and Title of the Officer*

personally appeared _____
Name(s) of Signer(s)
_____, who proved to me on the basis of satisfactory evidence to be the person whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity, and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature_____
Signature of Notary Public

Place Notary Seal Above

ACKNOWLEDGEMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA)
COUNTY OF_____)

On _____, 20_____, before me_____,
Date *Insert Name and Title of the Officer*

personally appeared _____
Name(s) of Signer(s)
_____, who
proved to me on the basis of satisfactory evidence to be the person whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity, and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature_____
Signature of Notary Public

Place Notary Seal Above

EXHIBIT "A"
TO DEVELOPMENT AGREEMENT

Legal Description of Property

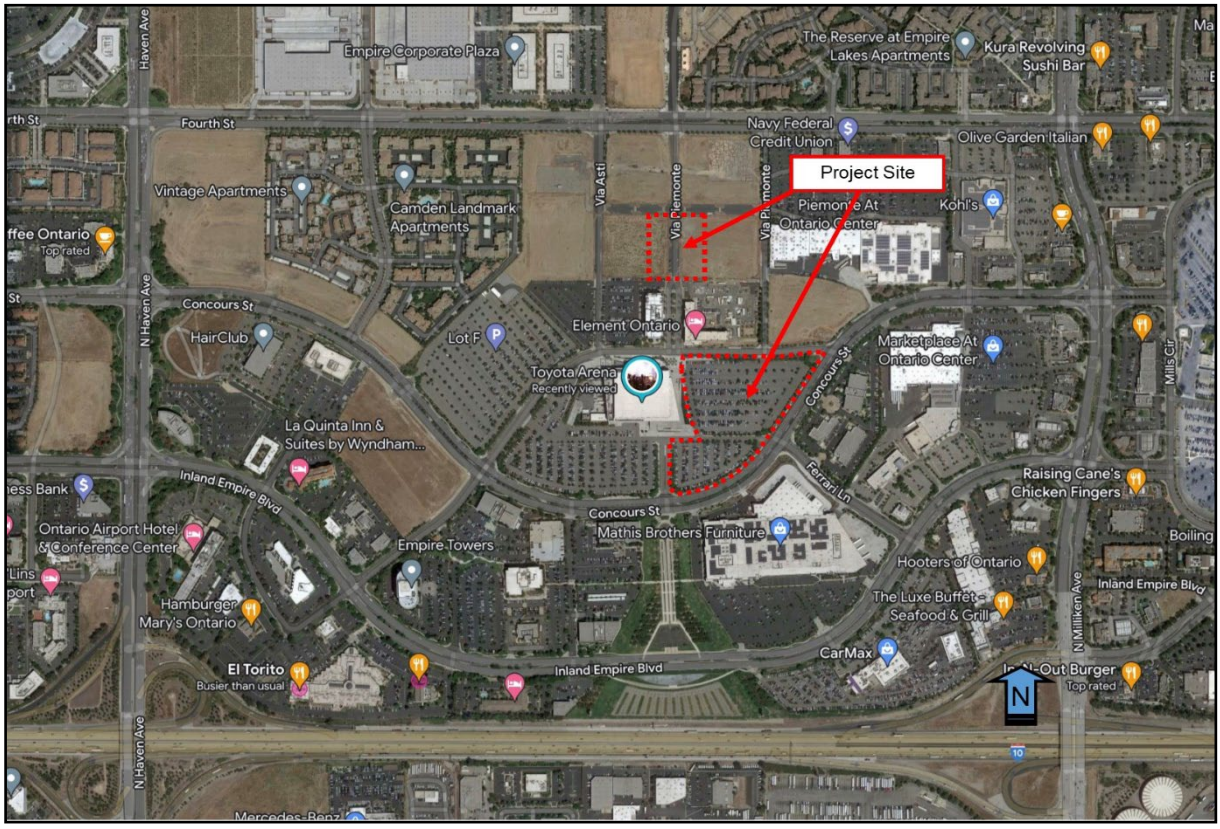
APN NO. 0210-204-38
THAT PORTION OF PARCEL 20, PARCEL MAP NO. 17550 MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT THE SOUTHEAST CORNER OF SAID PARCEL 20, AS SHOWN ON SAID PARCEL MAP; THENCE, NORTH 89 DEG 22'30" WEST, ALONG THE SOUTH LINE OF SAID PARCEL 20, 184.06 FEET; THENCE, LEAVING SAID SOUTH LINE, THE FOLLOWING THREE (3) COURSES: NORTH 00 DEG 34'06" EAST 302.44 FEET; NORTH 90 DEG 00'00" EAST 42.92 FEET; NORTH 00 DEG 00'00" WEST 96.10 FEET, TO A POINT ON A LINE THAT IS PARALLEL WITH AND 31.00 FEET SOUTH, MEASURED AT RIGHT ANGLES, TO THE NORTH LINE OF SAID PARCEL 20; THENCE, NORTH 89 DEG 22'30" WEST 287.51 FEET, TO A POINT ON THE WEST LINE OF SAID PARCEL 20; THENCE, NORTH 00 DEG 37'30" EAST 31.00 FEET, TO THE NORTHWEST CORNER OF SAID PARCEL 20; THENCE, SOUTH 89 DEG 22'30" EAST, ALONG THE NORTH LINE OF SAID PARCEL 20, 430.00 FEET TO THE NORTHEAST CORNER OF SAID PARCEL 20; THENCE, SOUTH 00 DEG 37'30" WEST 430.00 FEET, TO THE POINT OF BEGINNING.

APN NO. 0210-204-39
THAT PORTION OF PARCEL 23, PARCEL MAP NO. 17550, MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT THE SOUTHWEST CORNER OF SAID PARCEL 23, AS SHOWN ON SAID PARCEL MAP; THENCE, NORTH 00 DEG 37'30" EAST, ALONG THE WEST LINE OF SAID PARCEL 23, 430.00 FEET TO THE NORTHWEST CORNER OF SAID PARCEL 23; THENCE, SOUTH 89 DEG 22'30" EAST, ALONG THE NORTH LINE OF SAID PARCEL 23, 515.00 FEET TO THE NORTHEAST CORNER OF SAID PARCEL 23; THENCE, SOUTH 00 DEG 37'30" WEST, ALONG THE EAST LINE OF SAID PARCEL 23, 31.00 FEET TO A POINT ON A LINE THAT IS PARALLEL WITH AND 31.00 FEET SOUTH, MEASURED AT RIGHT ANGLES, TO THE NORTH LINE OF SAID PARCEL 23; THENCE, ALONG SAID PARALLEL LINE NORTH 89 DEG 22'30" WEST 351.45 FEET; THENCE SOUTH 00 DEG 37'22" WEST 116.97 FEET; THENCE NORTH 89 DEG 59'51" EAST 29.41 FEET; THENCE, SOUTH 00 DEG 00'06" EAST 282.37 FEET TO A POINT ON THE SOUTH LINE OF SAID PARCEL 23; THENCE, NORTH 89 DEG 22'30" WEST, ALONG SAID SOUTH LINE, 196.05 FEET TO THE POINT OF BEGINNING.

APN NO. PORTION OF 0210-205-01
PARCEL MAP 17978 PARCEL 1 BOOK 216 PAGE 44

EXHIBIT "B"
TO DEVELOPMENT AGREEMENT

Map showing Property and its location



CITY OF ONTARIO PLANNING DEPARTMENT

PLANNING COMMISSION STAFF REPORT

March 22, 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

FILE NO: PSPA21-001

SUBJECT: A public hearing to consider an Amendment to the Piemonte Overlay at Ontario Center Specific Plan, including [1] revising the overlay boundary to add approximately 24.9 acres, comprising of the property located at 4000 Ontario Center Parkway, to the overlay area, [2] changing the land use designation on approximately 4.9 acres of land from Office and Entertainment/Retail to Mixed Use, in an area bounded by Fourth Street to the north, Concours Street and Ontario Center Parkway to the south, Via Alba to the east, and the Camden Landmark Apartment and vacant land to the west, and [3] establishing development standards and design guidelines for the Mixed Use land use area within the Piemonte Overlay at Ontario Center Specific Plan; (APN(s): 0210-204-12, 0210-204-13, 0210-204-14, 0210-204-15, 0210-204-17, 0210-204-18, 0210-204-20, 0210-204-21, 0210-204-22, 0210-204-23, 0210-204-23, 0210-204-24, 0210-204-25, 0210-204-26, 0210-204-28, 0210-204-36, 0210-204-37, 0210-204-37, 0210-204-38, 0210-204-39, 0210-204-40, 0210-204-41, 0210-531-06, 0210-531-07, 0210-531-08, 0210-531-09, 0210-531-10, 0210-231-11, 0210-231-12, 0210-231-13, 0210-231-14, 0210-231-15, 0210-231-16, and 0210-205-01). **City initiated. City Council action required.**

PROPERTY OWNERS: Lewis Piemonte Land LLC; San Juan Owners LLC; Piemonte on 4th LLC; SL & C Ontario LLC; SMG; LCD Residential at Ontario, LLC; Dekalb Properties LLC; Target Corporation; Ontario Covenant Group LLC; City of Ontario

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RECOMMENDED ACTION: That the Planning Commission consider and recommend that the City Council approve the use of an Addendum to The Ontario Center Environmental Impact Report (State Clearing House No. 89041009) and approve the amendment to the Piemonte Overlay at The Ontario Center Specific Plan (File No. PSPA21-001), pursuant to the facts and reasons contained in the staff report and attached resolutions.

PROJECT SETTING: The Project site is comprised of 119.8 acres of land located at the northerly boundary of the City of Ontario, south of Fourth Street, east of Haven Avenue, west of Milliken Avenue, and north of Concours Street, within the Piemonte Overlay at The Ontario Center Specific Plan and The Ontario Center Specific Plan zoning districts, and is depicted in Figure 1: Project Location, below. The Project site is surrounded by residential, office, and commercial properties on land that is generally topographically flat. In addition to the existing surrounding developments, there are also vacant parcels along the Project boundary. The existing surrounding land uses, zoning, and general plan

Case Planner:	Edmelynne V. Hutter, AICP
Planning Director Approval:	
Submittal Date:	N/A

Hearing Body	*Date*	*Decision*	*Action*
DAB	N/A	N/A	N/A
PC	3/22/2022		Recommend
CC	TBD		Final

and specific plan land use designations are summarized in the "Surrounding Zoning & Land Uses" table located in the Technical Appendix of this report.

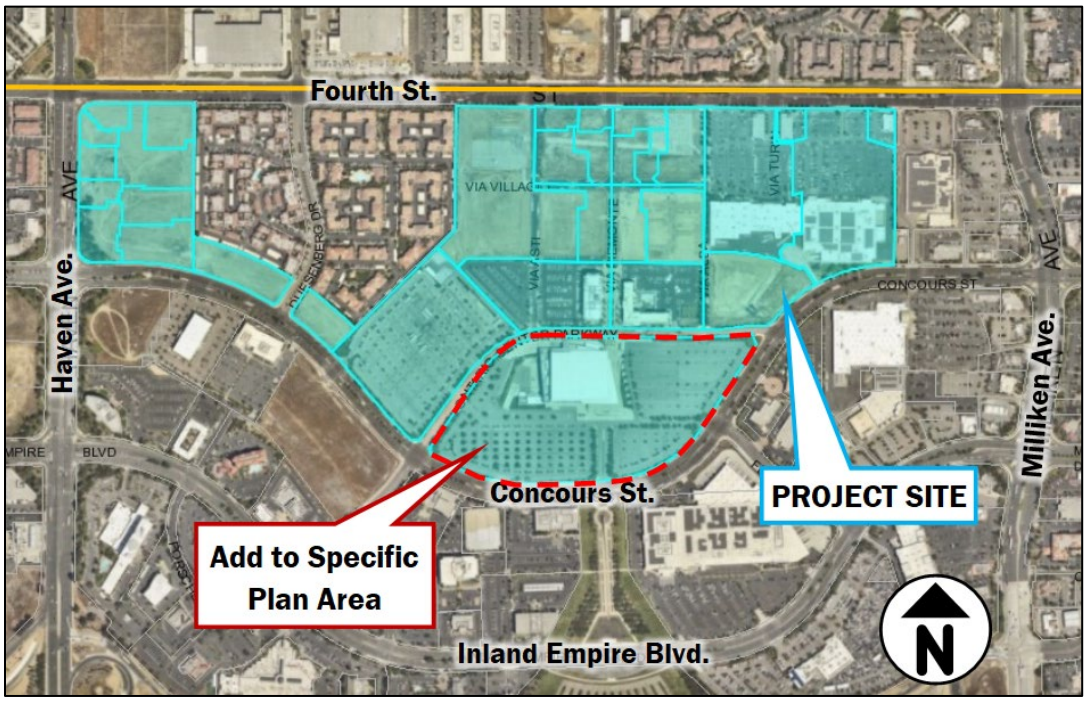


Figure 1: Project Location

PROJECT ANALYSIS:

(1) Background — In 2006, the City Council approved the creation of the Piemonte Overlay at The Ontario Center Specific Plan ("Piemonte Overlay") within the Urban Commercial land use district of The Ontario Center Specific Plan, establishing a master plan for the development of approximately 1.3 million square feet of retail, office, hotel, and entertainment uses, and more than 800 multiple-family dwelling units on the 84-acre Project site. The Piemonte Overlay was delineated into fifteen subareas, with land use designations of Commercial, Entertainment/Retail, Office, Special Use and Residential (See Exhibit B, Existing Boundary and Land Use Map, attached). The current Overlay area covers approximately 92 acres of land, with at least 48 acres being vacant land.

In 2017, the City Council approved an amendment to the Piemonte Overlay document (File No. PSPA16-003) to reduce the number of residential units, reduce the maximum number of hotel rooms, designate plaza areas to accommodate outdoor events, and expand the design concept from the original Tuscan-influenced architecture to allow more contemporary architectural design concepts.

In 2020, the City Council approved an amendment to the Piemonte Overlay document (File No. PSPA19-009) to allow required residential parking spaces to be provided as tandem parking spaces.

The City of Ontario Economic Development Department and a land developer are coordinating to bring a mixed-use development adjacent to the Toyota Arena. The proposed Amendment to the Piemonte Overlay of the Ontario Center Specific Plan would help facilitate the development of underutilized and vacant parcels.

(2) Specific Plan Amendment — The proposed Amendment to the Piemonte Overlay at the Ontario Center Specific Plan ("Overlay Amendment") is focused on incorporating more opportunities for vibrant, mixed-use developments that allow for entertainment, dining and housing. The Overlay Amendment would expand the Project boundary, revise the Entertainment/Retail land use designation to Mixed-Use, establish new development standards and guidelines for mixed-use developments, and implement associated minor text amendments. The proposed boundary and land use plan are provided in Exhibit C, Proposed Boundary and Land Use Map, attached. A "track-changes" document has been prepared that shows the proposed changes in the Piemonte Overlay at The Ontario Center Specific Plan, which is attached to the Specific Plan Amendment action resolution provided with this report.

(a) *Overlay Boundary Expansion* – The Piemonte Overlay boundary would be expanded to include the property located at 4000 Ontario Center Parkway, which is developed with the Toyota Arena sports and entertainment venue and surrounding parking lots. This additional land area is comprised of 24.9 acres of land, which would be delineated into four new subareas and designated with the Mixed-Use land use. The new proposed Subareas ("SA") include SA16, SA17, SA18, and SA19 (See Exhibit D, Existing and Proposed Subareas, attached). SA18 is developed with the Toyota Arena building and the other three areas are developed with parking lots. The Overlay Amendment anticipates that SA16 and SA17 will be developed with service commercial uses on the ground floor and multiple-family residential complexes on the upper floors.

(b) *Land Use Plan / Mixed-use Land Use* – In addition to expanding the Piemonte Overlay boundary, the areas currently designated as Entertainment/Retail would be recategorized as Mixed-Use, which would allow for residential uses in addition to commercial uses. It is anticipated that SA8 and SA11 (See Exhibit D, Existing and Proposed Subareas, attached) will be developed with ground floor retail and residential units above. The incorporation of residential uses into these areas introduces a use not previously anticipated and requires analysis of potential impacts to infrastructure and services. Therefore, an Addendum to The Ontario Center Specific Plan Environmental Impact Report (State Clearinghouse No. 89041009) was prepared and will be discussed further in this report. In summary, the Addendum analyses the future development of 691 residential units and approximately 71,000 square feet of retail space. The development plan review for the residential and retail uses will be processed in future Development Plan applications.

Land use revisions proposed in the Overlay Amendment involve changing areas currently designated as Entertainment/Retail, to Mixed-Use. The revision affects Subareas 8 and 11,

as well as new Subareas 16, 17, 18, and 19. The Mixed-Use land use designation allows for residential, entertainment, retail, dining, and other commercial uses.

(c) *Development Standards and Guidelines* – The Overlay Amendment will establish development standards and guidelines for the Mixed-Use areas, which address site and building designs that can successfully blend residential and commercial uses with pedestrian oriented spaces, providing opportunities for service commercial uses within proximity to residential uses and a large entertainment venue.

The Overlay Amendment incorporates various standards and guidelines that address elements such as site plan design, building design, building materials, parking structures, plaza areas, signage, residential open spaces, and parking requirements.

The development standards for Mixed-Use areas require 15-foot building setbacks along the private streets, as measured from the curb face, to allow for pedestrian oriented corridors. The setback requirements, however, do allow flexibility along Via Piemonte in that the building setbacks can be as little as 5 feet from curb face if an average 15-foot setback is provided along the building frontage. The setback flexibility along Via Piemonte will allow variations in building façades and footprint in order to create pedestrian spaces that are ideal for outdoor activities such as dining, people watching, and shopping.

Development standards for Mixed-Use areas include requirements for private and common open space for residential developments, mandating a minimum 50 square feet of private open space per dwelling unit and a minimum 150 square feet per dwelling unit for common open space.

The design guidelines address design goals for mixed-use developments. The Contemporary architectural style, for instance, can give architects and designers flexibility and creative leeway to design a truly unique and successful mixed-use project that can accommodate residential living, entertainment and dining experiences, and opportunities for retail businesses.

The Overlay Amendment includes the addition of design guidelines for parking structures in anticipation of future parking structures to support higher levels of residential and commercial activities than what currently exists. The design guidelines encourage parking structure designs that are compatible with surrounding buildings, aesthetically pleasing, safe for pedestrians, and visually unobtrusive.

(3) Circulation Concept — The overall circulation concept in the Piemonte Overlay remains largely unchanged. The Piemonte Overlay area is accessed from the surrounding public streets: Haven Avenue, Fourth Street, Milliken Avenue, Concours Street and Ontario Center Parkway. Internal circulation is provided through the existing private streets: Via Piemonte, Via Villagio, Via Asti and Via Alba.

The Overlay Amendment envisions that the main retail and mixed-use corridor will be oriented in a north-south direction, along Via Piemonte, instead of the east-west Via Villagio, as shown in the current Piemonte Overlay concept. The north-south orientation will make Via Piemonte, a private street, as the primary north access point from Fourth Street and will terminate at Ontario Center Parkway to the south. A pedestrian corridor along Via Piemonte will continue south of Ontario Center Parkway as a pedestrian-only area that connects to the Toyota Arena, future service commercial uses, and residential uses.

The Circulation Concept, including the street plans and sections shown as Figures in the Overlay Amendment, are considered conceptual in nature and final street designs may have minor variations from these Figures as development plan applications and designs are refined.

(4) Landscaping — The landscape and streetscape design guidelines have been revised to reflect new streetscape requirements along the internal private streets. Primarily, the Via Piemonte streetscape design was revised to be the main pedestrian and passenger vehicle corridor for the mixed-use development, with curb-adjacent parkway landscape areas and wider pedestrian walkways.

Streetscape designs along Fourth Street, Concours Street, and Ontario Center Parkway remain largely the same, with the exception of a new drop-off and pick-up zone on the south side of Ontario Center Parkway, at the Via Piemonte intersection and just north of the Toyota Arena building. This new zone would allow for taxi or car-service drop-off and pick-up, providing a convenient arrival/departure point for visitors to the mixed-use areas and the Arena.

(5) Infrastructure and Services — The proposed Overlay Amendment does not propose specific changes in the infrastructure and services in relation to the Mixed-use land use designation. As part of the development plan review process, infrastructure demand and capacity of future projects will be analyzed during the planning entitlement process. Specific requirements in infrastructure sizing, location, etc. will be addressed in the development plan design and conditions of approval.

(6) Signage — The Piemonte Overlay requires that development projects prepare a Master Sign Program for the development prior to installing any identification or business signage. In addition to the current sign requirements and guidelines in the Piemonte Overlay, the proposed Overlay Amendment includes a section on Digital Advertising Signs and would limit such signs to the pedestrian corridor area east of the Arena building.

COMPLIANCE WITH THE ONTARIO PLAN: The proposed Project is consistent with the principles, goals and policies contained within the Vision, Governance, Policy Plan (General Plan), and City Council Priorities components of The Ontario Plan (TOP). More specifically, the goals and policies of TOP that are furthered by the proposed Project are as follows:

(1) City Council Goals.

- Invest in the Growth and Evolution of the City's Economy
- Operate in a Businesslike Manner
- Focus Resources in Ontario's Commercial and Residential Neighborhoods

(2) Vision.

Distinctive Development:

- Commercial and Residential Development

➢ Development quality that is broadly recognized as distinctive and not exclusively tied to the general suburban character typical of much of Southern California.

(3) Governance.

Decision Making:

- Goal G1: Sustained decision-making that consistently moves Ontario towards its Vision by using The Ontario Plan as a framework for assessing choices.

➢ G1-2 Long-term Benefit. We require decisions to demonstrate and document how they add value to the community and support the Ontario Vision

(4) Policy Plan (General Plan)

Land Use Element:

- Goal LU1: A community that has a spectrum of housing types and price ranges that match the jobs in the City and that make it possible for people to live and work in Ontario and maintain a quality of life.

➢ LU1-1 Strategic Growth. We concentrate growth in strategic locations that help create place and identity, maximize available and planned infrastructure, and foster the development of transit.

➢ LU1-6 Complete Community: We incorporate a variety of land uses and building types in our land use planning efforts that result in a complete community where residents at all stages of life, employers, workers and visitors have a wide spectrum of choices of where they can live, work, shop and recreate within Ontario. (Refer to Complete Community Section of Community Economics Element).

- Goal LU2: Compatibility between a wide range of uses.

- LU2-6: Infrastructure Compatibility: We require infrastructure to be aesthetically pleasing and in context with the community character.

- Goal LU3: Staff, regulations and processes that support and allow flexible response to conditions and circumstances in order to achieve the vision.

- LU3-1: Development Standards: We maintain clear development standards which allow flexibility to achieve our Vision.

- LU3-3: Land Use Flexibility: We consider uses not typically permitted within a land use category if doing so improves livability, reduces vehicular trips, creates community gathering places and activity nodes, and helps create identity.

Housing Element:

- Goal H2: Diversity of types of quality housing that are affordable to a range of household income levels, accommodate changing demographics, and support and reinforce the economic sustainability of Ontario.

- H2-3 Ontario Airport Metro Center. We foster a vibrant, urban, intense and highly amenitized community in the Ontario Airport Metro Center Area through a mix of residential, entertainment, retail and office-oriented uses.

- H2-5 Housing Design. We require architectural excellence through adherence to City design guidelines, thoughtful site planning, environmentally sustainable practices and other best practices.

- H2-6 Infill Development. We support the revitalization of neighborhoods through the construction of higher-density residential developments on underutilized residential and commercial sites.

- Goal H3: A City regulatory environment that balances the need for creativity and excellence in residential design, flexibility and predictability in the project approval process, and the provision of an adequate supply and prices of housing.

- H3-2 Flexible Standards. We allow flexibility in the application of residential and mixed-use development standards in order to gain benefits such as exceptional design quality, economic advantages, sustainability, or other benefits that would otherwise be unrealized.

- Goal H5: A full range of housing types and community services that meet the special housing needs for all individuals and families in Ontario, regardless of income level, age or other status.

- H5-2 Family Housing. We support the development of larger rental apartments that are appropriate for families with children, including, as feasible, the provision of services, recreation and other amenities.

Community Economics Element:

- Goal CE1: A complete community that provides for all incomes and stages of life.

- CE1-6 Diversity of Housing. We collaborate with residents, housing providers and the development community to provide housing opportunities for every stage of life; we plan for a variety of housing types and price points to support our workforce, attract business and foster a balanced community.

- Goal CE2: A City of distinctive neighborhoods, districts, and corridors, where people choose to be.

- CE2-1 Development Projects. We require new development and redevelopment to create unique, high-quality places that add value to the community.

- CE2-2 Development Review. We require those proposing new development and redevelopment to demonstrate how their projects will create appropriately unique, functional and sustainable places that will compete well with their competition within the region.

- CE2-4 Protection of Investment. We require that new development and redevelopment protect existing investment by providing architecture and urban design of equal or greater quality.

- CE2-5 Private Maintenance. We require adequate maintenance, upkeep, and investment in private property because proper maintenance on private property protects property values.

Safety Element:

- Goal S1: Minimized risk of injury, loss of life, property damage and economic and social disruption caused by earthquake-induced and other geologic hazards.

- S1-1 Implementation of Regulations and Standards. We require that all new habitable structures be designed in accordance with the most recent California Building Code adopted by the City, including provisions regarding lateral forces and grading.

Community Design Element:

- Goal CD1: A dynamic, progressive city containing distinct neighborhoods and commercial districts that foster a positive sense of identity and belonging among residents, visitors, and businesses.

  - CD1-1 City Identity. We take actions that are consistent with the City being a leading urban center in Southern California while recognizing the diverse character of our existing viable neighborhoods.

  - CD1-2 Growth Areas. We require development in growth areas to be distinctive and unique places within which there are cohesive design themes.

- Goal CD2: A high level of design quality resulting in public spaces, streetscapes, and developments that are attractive, safe, functional and distinct.

  - CD2-1 Quality Architecture. We encourage all development projects to convey visual interest and character through:

    - Building volume, massing, and height to provide appropriate scale and proportion;
    - A true architectural style which is carried out in plan, section and elevation through all aspects of the building and site design and appropriate for its setting; and
    - Exterior building materials that are visually interesting, high quality, durable, and appropriate for the architectural style.

  - CD2-2 Neighborhood Design. We create distinct residential neighborhoods that are functional, have a sense of community, emphasize livability and social interaction, and are uniquely identifiable places through such elements as:

    - A pattern of smaller, walkable blocks that promote access, activity and safety;
    - Variable setbacks and parcel sizes to accommodate a diversity of housing types;
    - Traffic calming measures to slow traffic and promote walkability while maintaining acceptable fire protection and traffic flows;
    - Floor plans that encourage views onto the street and de-emphasize the visual and physical dominance of garages (introducing the front porch as the "outdoor living room"), as appropriate; and
    - Landscaped parkways, with sidewalks separated from the curb.

  - CD2-4 Mixed Use, Urban Office and Transit Service Areas. We require mixed use, urban office and transit service areas to be designed and developed as pedestrian oriented "villages" that promote a vibrant, comfortable and functional environment.

- CD2-7 Sustainability. We collaborate with the development community to design and build neighborhoods, streetscapes, sites, outdoor spaces, landscaping and buildings to reduce energy demand through solar orientation, maximum use of natural daylight, passive solar and natural ventilation, building form, mechanical and structural systems, building materials and construction techniques.

- CD2-8 Safe Design. We incorporate defensible space design into new and existing developments to ensure the maximum safe travel and visibility on pathways, corridors, and open space and at building entrances and parking areas by avoiding physically and visually isolated spaces, maintenance of visibility and accessibility, and use of lighting.

- CD2-9 Landscape Design. We encourage durable landscaping materials and designs that enhance the aesthetics of structures, create and define public and private spaces, and provide shade and environmental benefits.

- CD2-10 Surface Parking Areas. We require parking areas visible to or used by the public to be landscaped in an aesthetically pleasing, safe and environmentally sensitive manner. Examples include shade trees, pervious surfaces, urban run-off capture and infiltration, and pedestrian paths to guide users through the parking field.

- CD2-11 Entry Statements. We encourage the inclusion of amenities, signage and landscaping at the entry to neighborhoods, commercial centers, mixed use areas, industrial developments, and public places that reinforce them as uniquely identifiable places.

- CD2-12 Site and Building Signage. We encourage the use of sign programs that utilize complementary materials, colors, and themes. Project signage should be designed to effectively communicate and direct users to various aspects of the development and complement the character of the structures.

- CD2-13 Entitlement Process. We work collaboratively with all stakeholders to ensure a high degree of certainty in the efficient review and timely processing of all development plans and permits.

▪ Goal CD3: Vibrant urban environments that are organized around intense buildings, pedestrian and transit areas, public plazas, and linkages between and within developments that are conveniently located, visually appealing and safe during all hours.

- CD3-1 Design. We require that pedestrian, vehicular, bicycle and equestrian circulation on both public and private property be coordinated and designed to maximize safety, comfort and aesthetics.

- CD3-2 Connectivity Between Streets, Sidewalks, Walkways and Plazas. We require landscaping and paving be used to optimize visual connectivity between streets, sidewalks, walkways and plazas for pedestrians.

- CD3-3 Building Entrances. We require all building entrances to be accessible and visible from adjacent streets, sidewalks or public open spaces.

- CD3-5 Paving. We require sidewalks and road surfaces to be of a type and quality that contributes to the appearance and utility of streets and public spaces.

- CD3-6 Landscaping. We utilize landscaping to enhance the aesthetics, functionality and sustainability of streetscapes, outdoor spaces and buildings.

- Goal CD5: A sustained level of maintenance and improvement of properties, buildings and infrastructure that protects the property values and encourages additional public and private investments.

- CD5-1 Maintenance of Buildings and Property. We require all public and privately owned buildings and property (including trails and easements) to be properly and consistently maintained.

- CD5-2 Maintenance of Infrastructure. We require the continual maintenance of infrastructure.

HOUSING ELEMENT COMPLIANCE: The Project is consistent with the Housing Element of the Policy Plan (General Plan) component of The Ontario Plan. The Project site contains four properties listed in the Available Land Inventory contained in Table A-3 (Available Land by Planning Area) of the Housing Element Technical Report Appendix. The proposed changes affect two of the four properties listed in the Available Land Inventory (Subareas 8 and 11; Map ID No. 124 and 125). The residential capacity proposed in this Project is consistent with the number of dwelling units (198) and density (48 DU/AC) specified in the Available Land Inventory.

AIRPORT LAND USE COMPATIBILITY PLAN (ALUCP) COMPLIANCE: The California State Aeronautics Act (Public Utilities Code Section 21670 et seq.) requires that an Airport Land Use Compatibility Plan be prepared for all public use airports in the State; and requires that local land use plans and individual development proposals must be consistent with the policies set forth in the adopted Airport Land Use Compatibility Plan. On April 19, 2011, the City Council of the City of Ontario approved and adopted the Ontario International Airport Land use Compatibility Plan ("ALUCP"), establishing the Airport Influence Area for Ontario International Airport, which encompasses lands within parts of San Bernardino, Riverside, and Los Angeles Counties, and limits future land uses and development within the Airport Influence Area, as they relate to noise, safety, airspace protection, and overflight impacts of current and future airport activity. The proposed Project is located

within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the ALUCP.

ENVIRONMENTAL REVIEW: In 1980, the City Council certified The Ontario Center Specific Plan Environmental Impact Report (State Clearing House No. 80062538), in relation to the adoption of The Ontario Center Specific Plan (File No. 2254-SP) ("OCSP"), which was adopted in 1981. Over the years, several amendments to the OCSP have been approved along with appropriate environmental review. On March 19, 1991, a subsequent EIR (State Clearing House No. 89041009) ("Certified EIR") was certified in association with an amendment to the OCSP (File No. 4059-SPA). In 2016, the City approved a Mitigated Negative Declaration ("MND") in association with an amendment to the Piemonte Overlay (File No. PSPA16-003).

In association with the proposed Overlay Amendment, staff collaborated with consultant Kimley-Horn to prepare an Addendum to the Certified EIR, as amended, and found that all potential adverse direct, indirect, and cumulative environmental impacts were thoroughly analyzed and discussed in the Certified EIR, as amended, including, but not limited to potential aesthetic, air quality, greenhouse gas emissions, noise, transportation and tribal cultural resources impacts, and all feasible mitigation has been identified and will be incorporated into the proposed Project. This Project does not contemplate any actions that would require the preparation of a subsequent or supplemental environmental document under State CEQA Guidelines Section 15162 or 15163, as it is consistent with the development scenario identified within the Certified EIR. Furthermore, this Project introduces no new significant environmental impacts and no further environmental review is required. A copy of the Addendum and previous MND Mitigation Measures table are included as attachments to the environmental action resolution provided with this report.

CONDITIONS OF APPROVAL: The Overlay Amendment is City-initiated and no conditions of approval are associated with this Project.

TECHNICAL APPENDIX:

Surrounding Zoning and Land Use:

	Existing Land Use	*General Plan Designation*	*Zoning Designation*	*Specific Plan Land Use*
Site	Office, Commercial, Arena, Hotel, Vacant	Mixed Use	Piemonte Overlay of the Ontario Center Specific Plan	Mixed-use, Office, Residential, Commercial, Special Use
North	Industrial, Office, Commercial, Residential, Vacant (City of Rancho Cucamonga)	Industrial Park, Mixed Use, Open Space (City of Rancho Cucamonga)	Industrial Park, Mixed-use Retail, IASP Sub-Area 18 Specific Plan (City of Rancho Cucamonga)	Mixed Use, Village Neighborhood
South	Office, Commercial, Vacant	Mixed Use	The Ontario Center Specific Plan	Urban Commercial, Garden Commercial, Open Space
East	Commercial	Mixed Use	The Ontario Center Specific Plan	Urban Commercial
West	Residential, Commercial	High Density Residential, Office Commercial	The Ontario Center Specific Plan	Urban Commercial

EXHIBIT A—PROJECT LOCATION MAP

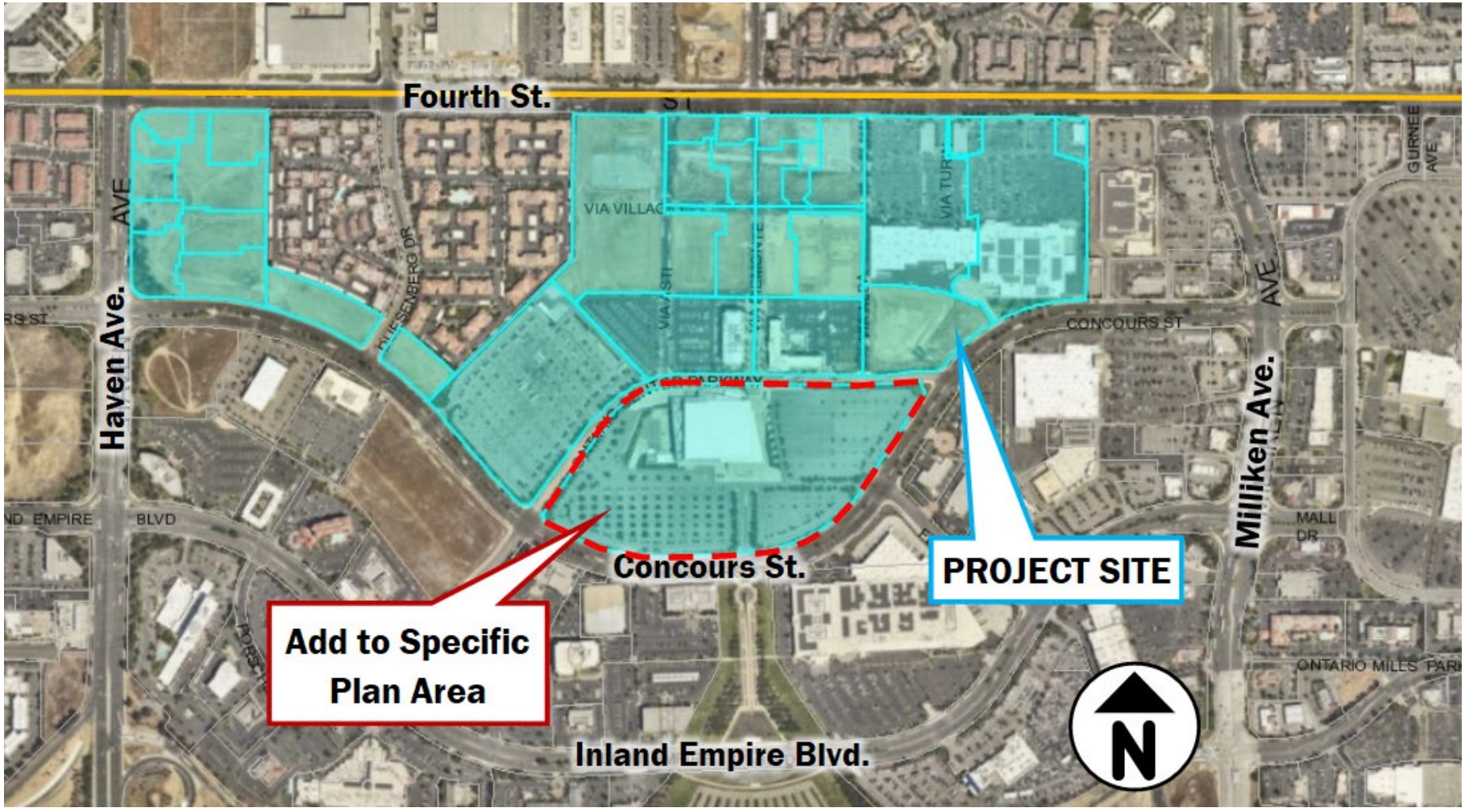


EXHIBIT B—EXISTING BOUNDARY AND LAND USE MAP

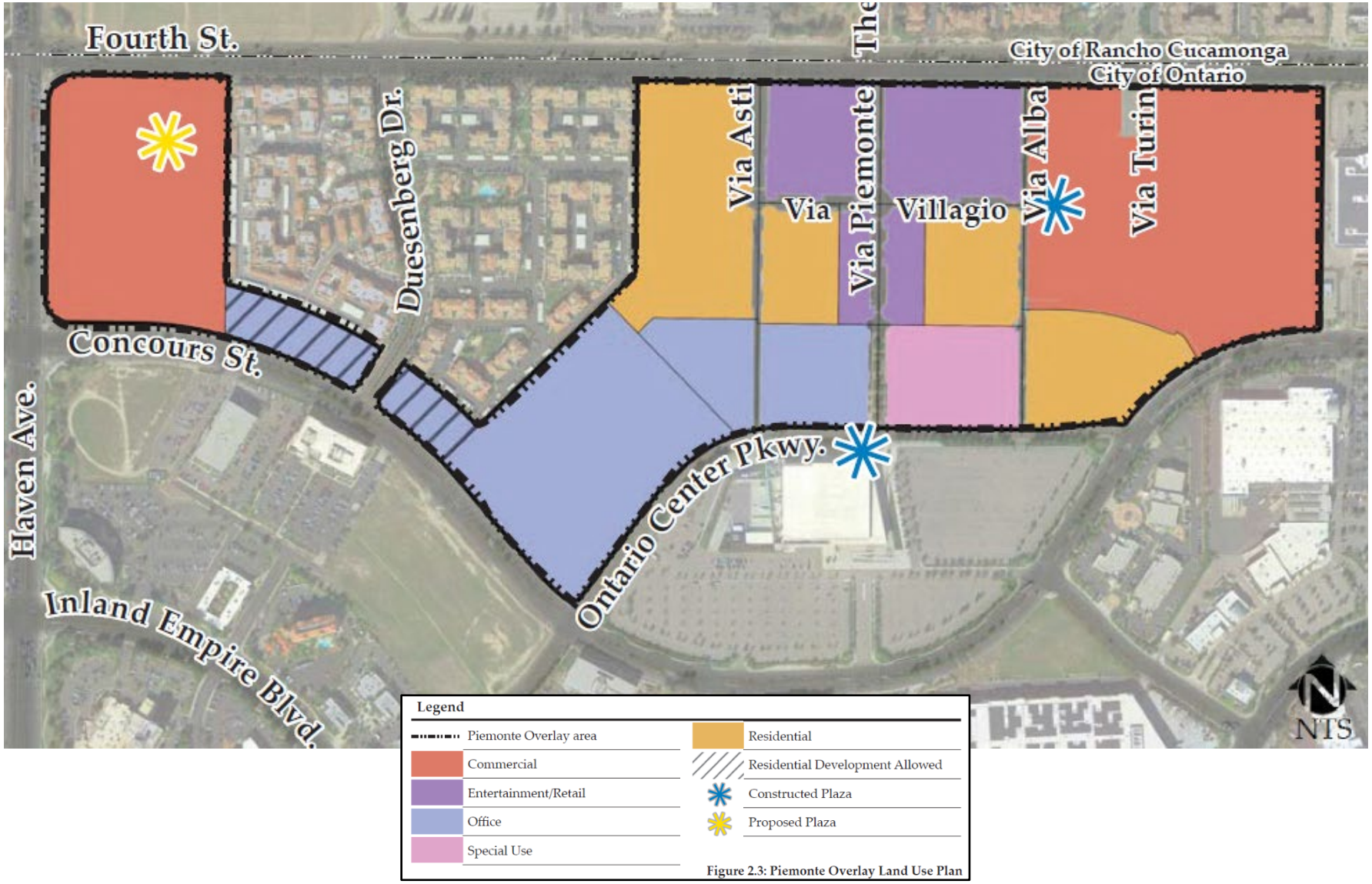


Figure 2.3: Piemonte Overlay Land Use Plan

EXHIBIT C—PROPOSED BOUNDARY AND LAND USE MAP

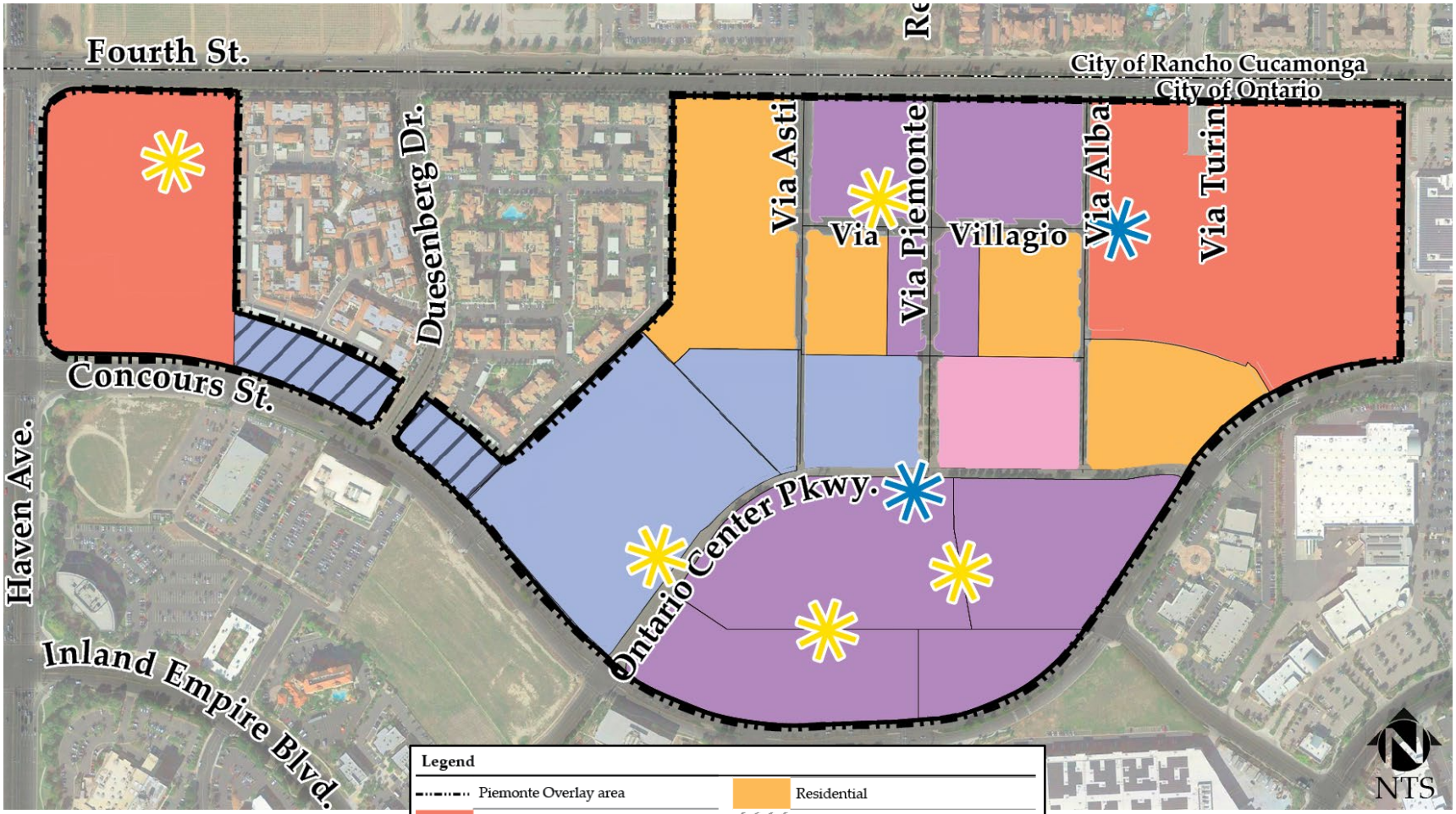
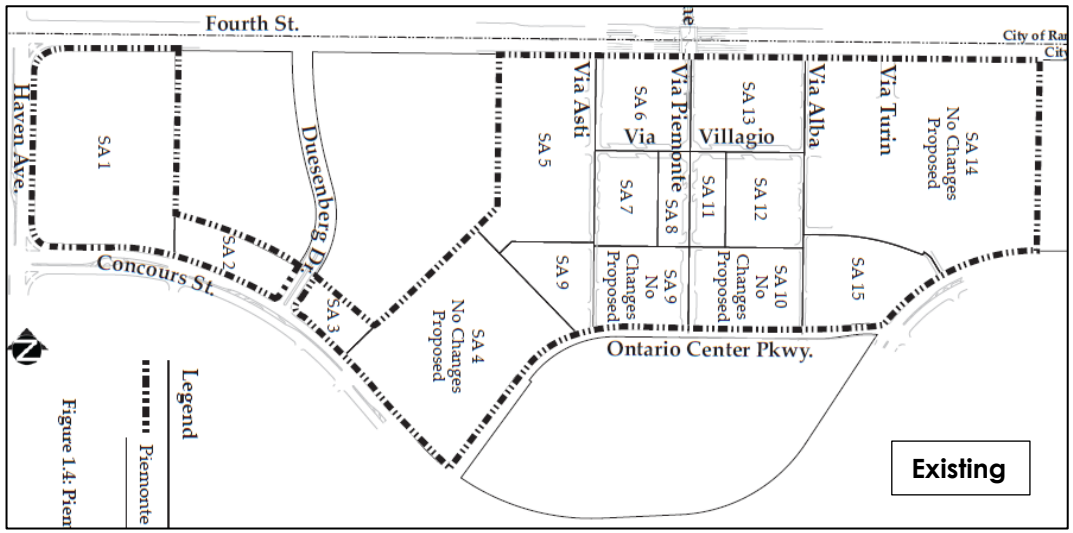
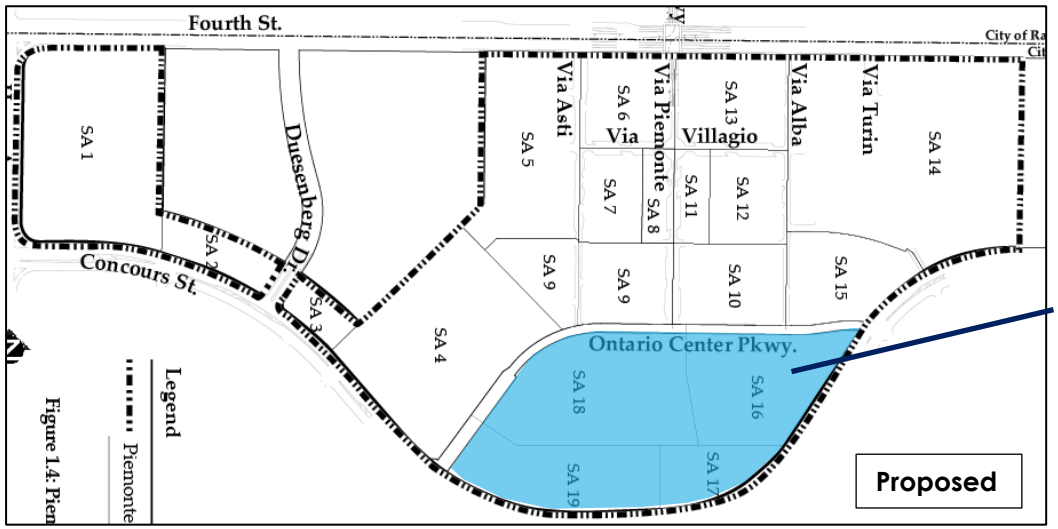


Figure 2.3: Piemonte Overlay Land Use Plan

EXHIBIT D—EXISTING AND PROPOSED SUBAREAS





RESOLUTION NO.

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF ONTARIO APPROVING AN ADDENDUM TO THE ONTARIO CENTER SPECIFIC PLAN ENVIRONMENTAL IMPACT REPORT, PURSUANT TO THE REQUIREMENTS OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT, AS AMENDED, FOR FILE NO. PSPA21-001.

WHEREAS, the City of Ontario (hereinafter referred to as "City") has initiated a Specific Plan Amendment, File No. PSPA21-001, which consists of an Amendment to the Piemonte Overlay of the Ontario Center Specific Plan, in the City of Ontario, California (hereinafter referred to as "Application" or "Project"); and

WHEREAS, the Ontario Center Specific Plan Environmental Impact Report (State Clearinghouse No. 89041009) was certified on March 19, 1991, (hereinafter referred to as “Certified EIR”), in which development and use of the Project site was discussed in the Amendment to the Ontario Center Specific Plan (File No. 4059-SPA); and

WHEREAS, a Mitigated Negative Declaration was subsequently adopted on May 16, 2017, (hereinafter referred to as “MND”), in which development and use of the Project site was discussed in association with an Amendment to the Ontario Center Specific Plan (File No. PSPA16-003); and

WHEREAS, the Planning Director of the City of Ontario has prepared and approved for attachment to the certified EIR and adopted MND, an Addendum to the Certified EIR and MND (hereinafter collectively referred to as “EIR Addendum”) in accordance with the requirements of the California Environmental Quality Act of 1970, together with State and local guidelines implementing said Act, all as amended to date (collectively referred to as “CEQA”); and

WHEREAS, the EIR Addendum concluded that implementation of the Project could result in a number of significant effects on the environment that were previously analyzed in the Certified EIR and MND, and that the Certified EIR and MND identified mitigation measures that would reduce each of those significant effects to a less-than-significant level; and

WHEREAS, pursuant to State CEQA Guidelines Section 15164(a), a lead agency shall prepare an addendum to a previously certified EIR if some changes or additions are necessary to a project, but the preparation of a subsequent or supplemental EIR is not required; and

WHEREAS, pursuant to State CEQA Guidelines Section 15164(b), an addendum to an adopted MND may be prepared if only minor technical changes or additions are necessary but the preparation of a subsequent EIR or MND is not required; and

WHEREAS, the City determined that none of the conditions requiring preparation of a subsequent or supplemental EIR or MND would occur from the Project, and that preparation of an Addendum to the Certified EIR and MND was appropriate; and

WHEREAS, the City of Ontario is the lead agency on the Project, and the Planning Commission is the recommending authority for the requested approval to undertake the Project; and

WHEREAS, the Planning Commission has reviewed and considered the EIR Addendum for the Project, has concluded that none of the conditions requiring preparation of a subsequent of supplemental EIR or MND have occurred, and intends to take actions on the Project in compliance with CEQA and state and local guidelines implementing CEQA; and

WHEREAS, the EIR Addendum for the Project is on file in the Planning Department, located at 303 East B Street, Ontario, CA 91764, is available for inspection by any interested person at that location and are, by this reference, incorporated into this Resolution as if fully set forth herein; and

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

NOW, THEREFORE, IT IS HEREBY FOUND, DETERMINED, AND RESOLVED by the Planning Commission of the City of Ontario, as follows:

SECTION 1: ***Environmental Determination and Findings.*** As the recommending authority for the Project, the Planning Commission has reviewed and considered the information contained in the administrative record for the Project. Based upon the facts and information contained in the administrative record, including all written and oral evidence presented to the Planning Commission, the Planning Commission finds as follows:

(1) The environmental impacts of this project were reviewed in conjunction with an Addendum to the Ontario Center Specific Plan Environmental Impact Report (State Clearinghouse No. 89041009), certified by the Ontario City Council on March 19, 1991, in conjunction with File No. 4059-SPA; and

(2) The environmental impacts of this project were reviewed in conjunction with a Mitigated Negative Declaration, adopted by the Ontario City Council on May 17, 2017, in conjunction with File No. PSPA16-003; and

(3) The EIR Addendum and administrative record have been completed in compliance with CEQA, the State CEQA Guidelines, and the City of Ontario Local CEQA Guidelines; and

(4) The City's "Guidelines for the Implementation of the California Environmental Quality Act (CEQA)" provide for the use of a single environmental assessment in situations where the impacts of subsequent projects are adequately analyzed. This Application introduces no new significant environmental impacts.

(5) All previously adopted mitigation measures shall be a condition of project approval, as they are applicable to the Project, and are incorporated herein by this reference.

(6) The EIR Addendum contains a complete and accurate reporting of the environmental impacts associated with the Project, and reflects the independent judgment of the Planning Commission; and

(7) There is no substantial evidence in the administrative record supporting a fair argument that the project may result in significant environmental impacts.

SECTION 2: ***Additional Environmental Review Not Required.*** Based on the Addendum, all related information presented to the Planning Commission, and the specific findings set forth in Section 1, above, the Planning Commission finds that the preparation of a subsequent or supplemental EIR or MND is not required for the Project, as the Project:

(1) Does not constitute substantial changes to the Certified EIR or MND that will require major revisions to the Certified EIR or MND due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; and

(2) Does not constitute substantial changes with respect to the circumstances under which the Certified EIR or MND were prepared, that will require major revisions to the Certified EIR or MND due to the involvement of new significant environmental effects or a substantial increase in the severity of the previously identified significant effects; and.

(3) Does not contain new information of substantial importance that was not known and could not have been known with the exercise of reasonable diligence at the time the Certified EIR or MND were certified/adopted, that shows any of the following:

(a) The project will have one or more significant effects not discussed in the Certified EIR or MND; or

(b) Significant effects previously examined will be substantially more severe than shown in the Certified EIR or MND; or

(c) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the Project, but the City declined to adopt such measures; or

(d) Mitigation measures or alternatives considerably different from those analyzed in the Certified EIR or MND would substantially reduce one or more significant effects on the environment, but which the City declined to adopt.

SECTION 3: ***Planning Commission Action.*** Based upon the findings and conclusions set forth in Sections 1 and 2, above, the Planning Commission hereby recommends the City Council finds that based upon the entire record of proceedings before it, and all information received, that there is no substantial evidence that the Project will constitute substantial changes to the Certified EIR or MND, and does hereby recommend the City Council approve the use of the EIR Addendum, attached hereto as "Attachment A," and incorporated herein by this reference.

SECTION 4: ***Indemnification.*** The Applicant shall agree to defend, indemnify and hold harmless, the City of Ontario or its agents, officers, and employees from any claim, action or proceeding against the City of Ontario or its agents, officers or employees to attack, set aside, void, or annul this approval. The City of Ontario shall promptly notify the applicant of any such claim, action, or proceeding, and the City of Ontario shall cooperate fully in the defense.

SECTION 5: ***Custodian of Records.*** The documents and materials that constitute the record of proceedings on which these findings have been based are located at the City of Ontario City Hall, 303 East "B" Street, Ontario, California 91764. The custodian for these records is the City Clerk of the City of Ontario.

SECTION 6: ***Certification to Adoption.*** The Secretary shall certify to the adoption of the Resolution.

- - - - - - - - - - - - - -

The Secretary Pro Tempore for the Planning Commission of the City of Ontario shall certify as to the adoption of this Resolution.

I hereby certify that the foregoing Resolution was duly and regularly introduced, passed and adopted by the Planning Commission of the City of Ontario at a regular meeting thereof held on the 22nd day of March 2022, and the foregoing is a full, true and correct copy of said Resolution, and has not been amended or repealed.

Rick Gage
Planning Commission Chairman

ATTEST:

Rudy Zeledon
Planning Director and
Secretary to the Planning Commission

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO)
CITY OF ONTARIO)

I, Gwen Berendsen, Secretary Pro Tempore of the Planning Commission of the City of Ontario, DO HEREBY CERTIFY that foregoing Resolution No. ____ was duly passed and adopted by the Planning Commission of the City of Ontario at their regular meeting held on March 22, 2022, by the following roll call vote, to wit:

AYES:

NOES:

ABSENT:

ABSTAIN:

Gwen Berendsen
Secretary Pro Tempore

ATTACHMENT A:

Addendum to the Ontario Center Specific Plan Environmental Impact Report

(Addendum to follow this page)

Addendum

to the

Ontario Center Specific Plan EIR

for the

Adept-Piemonte Overlay Project

March 2022

Addendum

to the Ontario Center Specific Plan EIR

for the Adept-Piemonte Overlay Project

(EIR No. 88-2, SCH No. 89041009)

Prepared for:

The City of Ontario
303 East "B" Street
Ontario, California 91764

Technical Assistance Provided By:

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March 2022

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1.0 Introduction

1.0 INTRODUCTION

This Addendum to the Certified Ontario Center Specific Plan Environmental Impact Report No. 88-2 (Certified EIR) has been prepared in response to an application for the construction and operation of approximately 71,200 square feet (SF) of retail and 694 Multi-Family Residential Dwelling Units (DU) (540,373 SF) and approximately 998 parking spaces in the City of Ontario; refer to **Figure 1**, ***Regional Vicinity Location*****.**

1.1 PROJECT BACKGROUND

The City of Ontario approved the Ontario Center Specific Plan (OCSP) in August 1981. As adopted in 1981, the OCSP provided for up to 1,530 residential units, close to seven million square feet of commercial development, and nearly two million square feet of industrial uses on approximately 600 acres. Several amendments to the 1981 OCSP, along with appropriate environmental review, have been approved by the City since its adoption. Specifically, EIR 80-3 (State Clearinghouse No. 80062538), which evaluated the original OCSP along with development proposals for adjacent areas totaling more than 1,500 acres (the "Ontario International Center" project), was certified by the City in 1980. EIR 88-2 (the Certified EIR considered by this Addendum, State Clearinghouse (No. 89041009) was certified in 1990 as a "Subsequent EIR" to EIR 80-3. The analysis presented in the Certified EIR was limited to those undeveloped portions of the OCSP remaining as of 1990, comprising approximately 495 acres located between Fourth Street and Interstate 10, and between Turner Avenue and Interstate 15.

The Project Description from the Certified EIR includes the following:

Certified Ontario Center Specific Plan Environmental Impact Report 88-2 (Certified EIR)

EIR 88-2 was prepared to review and update, where necessary, existing environmental conditions, to address the proposed redistribution of allowable building density within The Ontario Center, and to address expected impacts of a proposed regional shopping center within the Center. (EIR 88-2, page II-1).

The regional shopping center referenced above was developed in the mid-1990s as the "Ontario Mills," revising the OCSP's original concept to implement industrial uses between Milliken and the I-15. The remaining portions of the OCSP, designated for commercial and residential uses, have largely been developed. In recent years, multi-family residential development to the north of Fourth Street has occurred rapidly and has been accompanied by multiple commercial infill projects along the Milliken Avenue and Fourth Street corridors. Two multi-family residential projects totaling approximately 800 units on 32 acres, known as the Fairfield and Sares-Regis projects, are currently under construction south of Fourth Street and east of Haven Avenue. The Project described within this Addendum will account for the majority of the remaining undeveloped areas of the original OCSP; refer to **Figure 2**, ***The Ontario Center Specific Plan (OCSP)***.

As noted above, since the Certification of the Certified EIR, several addenda to the original EIR have been adopted. The following three amendments to the original Certified EIR have been certified by the City:

1) The Community Events Center Addendum (CECA), 2006, which consisted of a request for approval to construct a 9,000-seat Community Events Center, a multi-purpose stadium totaling 214,420 square feet (SF) on approximately 24.5 acres, located at the northeast corner of Concours Street and Mercedes Lane, within the Urban Commercial land use district and within the OCSP in the southernmost portion of Statistical Area "E."

2) The Piemonte at Ontario Center Addendum to the Certified EIR (POCA), 2006, was permitted to realize approximately 1,292,068 SF of mixed retail, commercial, office, and hotel uses; and up to 806 condominium/apartment units. Excluding the Project's proposed residential uses.

3) The 2017 Piemonte Overlay at Ontario Center (POOC) Mitigated Negative Declaration (MND) (PSPA 16-003) proposed approximately 1.3 million SF of retail, office, hotel, and entertainment uses; however, 791 multiple-family DU were proposed. These are summarized in Section 3.4 below and are incorporated by reference.

1.2 PROJECT SUMMARY

The proposed Project consists of a request for approval to construct 694 Multi-family DUs (540,373 SF), 71,20071,200 SF of commercial and approximately 998 parking spaces, all within Statistical Area "E"; refer to **Figure 2**. Because the proposed Project Statistical Area "E" footprint was separately amended by the previously identified CECA, POCA and the POOC MND, the proposed Project will cite to these various documents where appropriate to adequately note how the proposed Project's footprint was previously amended. The Project consists of construction and operation of a mixed-use town center development with residential and commercial/retail land use within six development areas/lots (A, B, C, D, F, and G). More specifically, the proposed Project Lots A and B will be developed in the portion of the STATISTICAL AREA "E" originally amended by the CECA. Lots C, D, F and G of the proposed Project will occur just north of Lots A and B within the portion of STATISTICAL AREA "E" previously amended by the POCA and later amended by the POOC. Refer to Section 2.0, Project Description, of this addendum. Refer to **Table 2-1**, ***Detailed Proposed Project Summary***, and **Table 2-2**, ***Land Use Comparison Summary***.

1.3 PURPOSE

The purpose of this EIR Addendum is to define, describe, compare, and contrast potential environmental impacts of the proposed Project in the context of the environmental impacts associated with the OCSP (March 1990), as assessed in the Certified EIR. In so doing, this Addendum will provide environmental documentation for the Adept-Piemonte Overlay Project at the Ontario Center consistent with the requirements of the California Environmental Quality Act (CEQA).

Section 15164 of the *CEQA* Guidelines states that an Addendum to an EIR shall be prepared "if some changes or additions [to a Certified EIR] are necessary, but none of the conditions described in [*CEQA Guidelines*] Section 15162 calling for preparation of a subsequent EIR have occurred." Section 15162 of the *CEQA Guidelines* identifies the conditions that require preparation of a subsequent EIR as follows:

No subsequent EIR shall be prepared for a project unless the lead agency determines, on the basis of substantial evidence, that one or more of the following conditions are met:

- Substantial changes are proposed in the project that require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of the previously identified significant effects;
- Substantial changes have occurred with respect to the circumstances under which the project is undertaken that will require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of the previously identified significant effects; or New information of substantial importance, which was not known and could not have been known with exercise of reasonable diligence at the time the previous EIR was certified, shows any of the following:
- The project will have one or more significant effects not discussed in the previous EIR;
- Significant effects previously examined will be substantially more severe than identified in the previous EIR;
- Mitigation measures or alternatives previously found not to be feasible would, in fact, be feasible, and would substantially reduce one or more significant effects of the project, but the project proponent declines to adopt the mitigation measures or alternatives;
- Mitigation measures or alternatives that are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponent declines to adopt the mitigation measures or alternatives.

This Addendum to the Certified EIR describes the Project and substantiates how the potential environmental effects of the proposed Project are appropriately and adequately addressed in the Certified EIR and the aforementioned certified addenda and MND. The focus of the analysis is the adequacy of the previously Certified EIR, addenda and MND, relative to the Project in its current environmental context.

1.4 DOCUMENT ORGANIZATION

This Addendum is presented in four (4) sections, as follows:

- **Section 1.0**, "Introduction," provides an overview of the Project, its context, and environmental documentation applicable to the proposed development. A table summarizing impacts and mitigation from the Ontario Center Certified EIR is included in this section, and mitigation measures applicable to the Project are identified. No new or substantially modified mitigation measures are required.
- **Section 2.0**, "Project Description," presents the Project in greater detail, and describes its relationship to existing and anticipated vicinity development.
- **Section 3.0,** "Environmental Analysis," assesses potential environmental impacts of the Project. The analysis considers potential effects of the Project for all environmental topics addressed in the Certified EIR.
- **Section 4.0,** "Determination," presents the determination regarding the appropriate environmental document for the Project.

1.5 CONCLUSIONS

The analysis presented in this document substantiates that the Certified EIR for the Ontario Center is sufficient to satisfy CEQA requirements for the approval of the proposed Project at the OCSP. That is, implementation and operation of the proposed Project described herein would not result in any new or substantially more severe environmental impacts than were previously considered and addressed in the Certified EIR, or in the previously noted CECA, POCA, and POOC. Further, the Project would implement all applicable mitigation measures presented in the Certified EIR. As such, potential environmental impacts of the Project are considered to be adequately and appropriately addressed by analysis presented in the Certified EIR. The Project does not require any major revision of the Certified EIR, nor would the Project result in conditions that would require preparation of a Subsequent or Supplemental EIR as described in Sections 15162 and 15163 of the *CEQA Guidelines*.

1.6 SUMMARY OF IMPACTS AND MITIGATION MEASURES FROM THE ONTARIO CENTER CERTIFIED EIR

The following **Table 1-1**, ***The Ontario Center EIR Mitigation Measures***, is excerpted from the Certified EIR (SCH No. 89041009) and includes a summary of impacts and mitigation measures associated with *that* project. To the satisfaction of the City, the proposed Project will implement all applicable mitigation measures. As substantiated within Section 3.0 of this Addendum, no new or modified or modified mitigation measures are required.

Table 1-1: The Ontario Center EIR Mitigation Measures Monitoring and Reporting Program

Timing	Responsible Entity/Agency	Mitigation Measures	Draft EIR Page
FIRE PROTECTION			
1. Prior to issuance of a building permit	Developer	The developer will pay a fair share of "in-lieu" fees to subsidize additional facilities and equipment as mutually agreed upon by both the developer and the City of Ontario.	III-20
2. At the time of Water Master Plan Update	Developers within TOC	All new development will participate in updating the City of Ontario Water Master Plan and will contribute on a "fair share" basis toward implementation of Master Plan programs.	III-20
3. Prior to issuance of a building permit	Ontario Fire Department/Developers within TOC	Ontario Fire Department and project developer will provide, in writing, assurance of water supply adequacy from local water purveyor.	III-20
4. During site plan review	Ontario Fire Department	Design features at the site plan level will reduce risk of fire hazard. Site plan proposals will be reviewed during site plan review by Ontario Fire Department (OFD). Protection measures recommended by the OFD will be implemented by project proponent.	III-20
LAW ENFORCEMENT			
1. At the issuance of a building permit	Developer	If a proposed ordinance is adopted, the regional center builder/developer may be required to pay a one-time developer assessment fee to the Police Department at the time of issuance of a building permit. This developer fee will mitigate the fiscal impact incurred by the Police Department. Due to the projected increase in police calls for service to be generated by the development. The amount of this fee will be established by the Ontario Police Department based on land use and projected calls-for-service from that use.	III-23
2. During site plan review for individual projects	Developers within TOC	Each individual project within The Ontario Center will incorporate on-site security measures. These measures will be reviewed by the Ontario Police Department. They will include, but not be limited to, limited-height landscaping, exterior lighting, security hardware.	III-23
3. During site plan review for individual projects	Developers within TOC	In addition to these physical security and lighting requirements, the Police Department requests that the developer submit a plan delineating which functions are to be addressed by on-site private security and what functions are to be served by the Police Department. This plan may include	III-23

Timing	Responsible Entity/Agency	Mitigation Measures	Draft EIR Page
		personnel selection and training and physical security measures, i.e., video surveillance, emergency call boxes, communication and alarms. This plan shall be approved by the Police Department prior to implementation.	
SCHOOLS			
1. Prior to the issuance of a building permit	Residential Developers within TOC	Developers of residential projects within The Ontario Center will pay required school impact mitigation fees of $29,000 per gross acre to Cucamonga School District per agreement reached between the District and the developer dated December 31, 1986.	III-26
2. Prior to the issuance of a building permit	Residential Developers within TOC	Developers of projects within The Ontario Center will pay fees, as noted below, to the Chaffey Joint Unified School District: Residential $.48/square foot Commercial/Industrial/Office $.08/square foot	III-26
PARKS AND RECREATION			
1. Prior to the issuance of a building permit if a County ordinance is adopted	Developers within TOC	*Regional Parks:* The responsibility for rehabilitating existing regional parks and/or building new facilities, rests with the County of San Bernardino Parks Department. A Draft Ordinance has been prepared by the County Parks Department which will require developers to pay fees for future parks and open space. Developers within The Ontario Center shall comply with the City of Ontario's implementation of the County's fee ordinance for the collection of development fees for regional parks, trails, and open space if and when it is enacted.	III-30
2. At the time of issuance of building permit	Developers within TOC	*Local Parks:* A Park Development Fund Fee of $802/single family detached unit and $700/multiple family unit will be paid at the time of issuance of building perm its.	III-30
3. During site plan review for individual projects	Developers within TOC	Private recreational opportunities shall be encouraged for the commercial retail/industrial use areas.	III-30
WATER SUPPLY			
1. During site plan review	Developer and Ontario Municipal Utilities Company	All existing and future users will share in costs of supplemental city-wide water supply system	III-34
2. During site plan review for individual projects when water is available	Developers within TOC	Reclaimed water, as it is available from CBMWD Regional Plan No. 4, will be used for open space irrigation when economically feasible.	III-34

Timing	Responsible Entity/Agency	Mitigation Measures	Draft EIR Page
3. Ongoing	Developers within TOC	Cooperation between CBMWD, the City of Ontario, developers of The Ontario Center and other landowners will be necessary to ensure adequate capacity.	III-34
WASTEWATER			
1. During site plan review of individual project	Developer and Ontario Municipal Utilities Company	Design and construction of wastewater collection facilities within the Ontario Center will be completed under the jurisdiction of the City of Ontario.	III-38
2. Ongoing and during site plan review of individual projects	Developer and Ontario Municipal Utilities Company	Any plans for use of the non-reclaimable waste line (NRW) system will be made known to the City and CBMWD.	III-39
3. Prior to issuance of construction permits	Developer	Wastewater collection facilities will be designed so that all parcels can be served by gravity mains without pumping.	III-39
4. Ongoing	Developer and Ontario Municipal Utilities Company	The Ontario Center project development will coordinate construction activities with the City of Ontario and CBMWD to assure adequate interceptor, trunk sewer and treatment plant capacity is available as development proceeds.	III-39
5. Ongoing	Developer and Ontario Municipal Utilities Company	Continued coordination between CBMWD, the City, the developers of The Ontario Center, and other property owners/developers will occur to assure adequate capacity is available in the Cucamonga Interceptor as development occurs within the tributary area.	III-39
SOLID WASTE			
1. 2-3 Years	City of Ontario Community Facilities Department, Integrated Waste Department	Solid waste will be disposed of in Milliken Landfill. Upon closing of the Milliken Landfill, waste will be disposed of at the San Timoteo Landfill. A transfer station for the City will be constructed by the City in the next 2 to 3 years to transport waste from Ontario to the San Timoteo Landfill.	III-44, III-45
2. Ongoing	Developers within TOC/City of Ontario Community Facilities Department, Integrated Waste Department	Reusable materials will be recycled. Trash compactors will be used.	III-45

Timing	Responsible Entity/Agency	Mitigation Measures	Draft EIR Page
3. During site plan review of individual projects	Developers within TOC	Site plans shall address the use of trash bins (dumpsters) provided for office, commercial, industrial, residential other land uses.	III-45
4. Prior to ultimate build-out	City of Ontario Community Facilities Department, Integrated Waste Department	One (1) additional commercial trash vehicle will be required to serve The Ontario Center at ultimate development.	III-45
5. Ongoing	Developers within TOC	A recycling program will be undertaken within The Ontario Center to encourage the economic re-use of such items as paper, glass, metal and other salvageable material.	III-45
TELEPHONE			
1. When needed	Developer	New facilities are proposed, including a switching station and a remote switching station. Supporting Structure expenses will be shared by GTE (the telephone services provider) and the developer.	III-46
2. Ongoing	Developers within TOC	Ultimate phasing of telephone improvements shall be consistent with the development of land uses in the Center.	III-47
3. Prior to installation	City of Ontario Engineering Department	All substructure and supporting structures shall be subject to approval by the City Engineer.	III-47
4. Prior to building occupancy	GTE	GTE (telephone services provided) will place cable and wire to each unit at its own expense and there will be no charges by GTE to individual subscribers other than normal connection charges. New connections will be provided by GTE under contract to any new clients will-serve basis.	III-47
TRAFFIC			
1. As warranted by traffic volume	TOC and Developers within TOC	Buildout in the project vicinity of the proposed circulation system defined in the Specific Plan Amendment will occur.	III-60
2. When peak hour traffic reaches LOS C as determined by City Engineer	TOCOA/City of Ontario Engineering Department	Development and implementation of a Transportation Systems Management (TSM) program with a goal of a ten percent reduction in peak hour trips will occur as defined in the Specific Plan Amendment.	III-63
3. Prior to issuance of building permits	Developer(s) within and adjacent to The Ontario Center	Applicants for all future specific plans and specific plan amendments in the vicinity of The Ontario Center project will be required to complete traffic impact and mitigation studies to ensure that the forty (40) intersections studied this EIR will not exceed an intersection capacity utilization greater than Level of Service E.	III-63

Timing	Responsible Entity/Agency	Mitigation Measures	Draft EIR Page
AIR QUALITY			
1. During construction	Ontario Building Department, TOC, Developers within TOC and contractor(s)	Regular watering, paving construction roads, or other dust control measures defined in SCAQM D Rule 403 will occur during construction.	III-86
2. During construction	Developer and contractor(s)	Construction equipment will be maintained in proper tune to minimize the volume of equipment exhaust emissions.	III-86
3. When peak hour traffic reaches LOS C as determined by City Engineer	TOC, TOCOA, Developers within TOC/City of Ontario Engineering Department	Comprehensive ridesharing incentive program will be developed as part of a Transportation System Management.	III-87
4. During site review of individual projects	Developers within TOC/City of Ontario Engineering Department	Orientation of project for transit convenience and accessibility will occur in design phase; provision of easy pedestrian access will occur in design phase; provision of bus shelters, benches and bus pockets on streets.	III-87
5. During site review of individual projects	Developers within TOC/City of Ontario Engineering Department	Provision of traffic flow improvements will occur as buildout of project occurs.	III-87
6. During design phase	Developers within TOC	Inclusion of solar and other energy-saving devices in residences and businesses including: • Delamping • increased building insulation • heating/ventilation/air conditioning Improvements • solar heaters • utilization of landscape features to shade buildings	III-87
7. During construction	Developers within TOC and contractor(s)	Construction activities should avoid high ozone days and discontinue construction during second stage alerts. After grading, seed and water until vegetation cover is established.	III-87
8. During construction	TOC, Developers and contractor(s)	Wet area down, sufficient enough to form a crust on the surface with repeated soakings, as necessary, to maintain the crust and prevent dust pickup by the wind.	III-87
9. During construction	Contractor(s) within TOC	Use water trucks or sprinkler systems to keep all areas where vehicles move damp enough to prevent dust from being raised beyond site operations. W et construction areas down in the late morning and after work is completed in the day.	III-87

Timing	Responsible Entity/Agency	Mitigation Measures	Draft EIR Page
10. During construction	TOC, Developers and contractor(s)	Use low sulfur fuel for construction equipment (0.5 percent by w eight).	III-87
NOISE			
1. During construction	City of Ontario Building Department	The City of Ontario will enforce the City's noise ordinance during all phases of construction which limits the hours construction to normal weekday working hours.	III-98
2. Prior to issuance of building permit	Developers with TOC, City of Ontario Building Department	Project applicants will design private offices to 40 50 Leq (l 2), general offices and retail uses to 45 55 Leq (l 2), and industrial buildings to 55-65 Leq (l). Interior noise levels will be in accordance with the City's interior noise requirement for commercial uses.	III-98
3. Prior to issuance of building permit	Developers with TOC, City of Ontario Building Department	The project applicant will specify measures to comply with the 45 CNEL interior noise standards for residences at the time of building permit application.	III-98
4. During site plan review	Developers within TOC/City of Ontario Building Department	Locate truck access routes and loading areas away sensitive land uses such as residential areas.	III-98
5. During site plan review	Developers within TOC/City of Ontario Building Department	Locate mechanical equipment such as ventilation and air conditioning units away from sensitive receptors and install equipment with proper acoustical shielding.	III-98
6. During site plan review	Developer within TOC, City of Ontario Building Department	Minimize noise impacts through proper selection of such ventilation and air conditioning equipment.	III-98
7. Prior to issuance of building permit	Developers within TOC, City of Ontario Building Department	The project applicants will design all structures in accordance with the most recent revision of the Uniform Building Code and will implement measures to reduce noise to acceptable levels where residential buildings are proposed within the 65 CNEL contours.	III-99
8. Prior to issuance of building permit	Developers within TOC, City of Ontario Building Department	The City will review the design of proposed structures to ensure that adequate noise mitigation measures have been incorporated.	III-99
AESTHETICS			
1. During site plan review and prior to issuance of building permit	Developers within TOC/City of Ontario Planning Department	Design and construction standards as defined in the Specific Plan shall be adhered to.	III-104

Timing	Responsible Entity/Agency	Mitigation Measures	Draft EIR Page
SEISMICITY			
1. Prior to issuance of building permit	Developers within TOC/City of Ontario Building Department	The potential for groundshaking, associated with seismic activity in the region exists and is unavoidable. All requirements of the Uniform Building Code shall be met in the design and engineering of buildings on site in order to minimize the effects of seismic activity.	III-104
HYDROLOGY			
1. Prior to issuance of grading permit	Developers within TOC/City of Ontario Engineering Department	On-site drainage plans will be designed, submitted to, and approved by the City of Ontario prior to the issuance of a grading permit.	III-110
2. Prior to construction	Developers with TOC, City of Ontario Engineering Department	Proposed storm drainage facilities to be installed as The Ontario Center develops, will be placed in public streets. W here storm drains must be placed in areas other than public streets, a drainage easement will be dedicated as needed.	III-111
3. Prior to issuance of occupancy permit	Developers with TOC, City of Ontario Engineering Department	Some modification will be necessary to existing drainage facilities. No existing facility will be removed without replacement by another structure to serve the particular condition.	III-111
4. During construction	Developers within TOC/City of Ontario Engineering Department	As development proceeds, there will be a need for temporary siltation basins to reduce sedimentation from construction activities. These will be located in specific areas of construction and sized in accordance with City of Ontario criteria.	III-111
WATER QUALITY			
1. During construction	Developers within TOC and contractors, City of Ontario Engineering Department	During construction, a variety of temporary structural measures such as velocity dissipators, siltation fences or basins and. vegetative buffer zones will be used to reduce siltation and sedimentation runoff from construction sites.	III-115
2. Prior construction	Developers with TOC, contractors/City of Ontario Public Works Agency.	Periodic cleaning of storm drains and inlets, construction of pervious pavement surfaces in areas designated by the City, periodic street sweeping.	III-115
3. Ongoing	City of Ontario Public Works Agency/Developers within TOC/TOCOA	Periodic street sweeping will be conducted by the City of Ontario for streets dedicated to the City. Periodic vacuum sweeping will be conducted by the owners of individual sites.	III-115

Source: Final Mitigation Monitoring and Reporting Plan for the Ontario Center Specific Plan. SCH No. 89041009. Dated October 12, 1990.

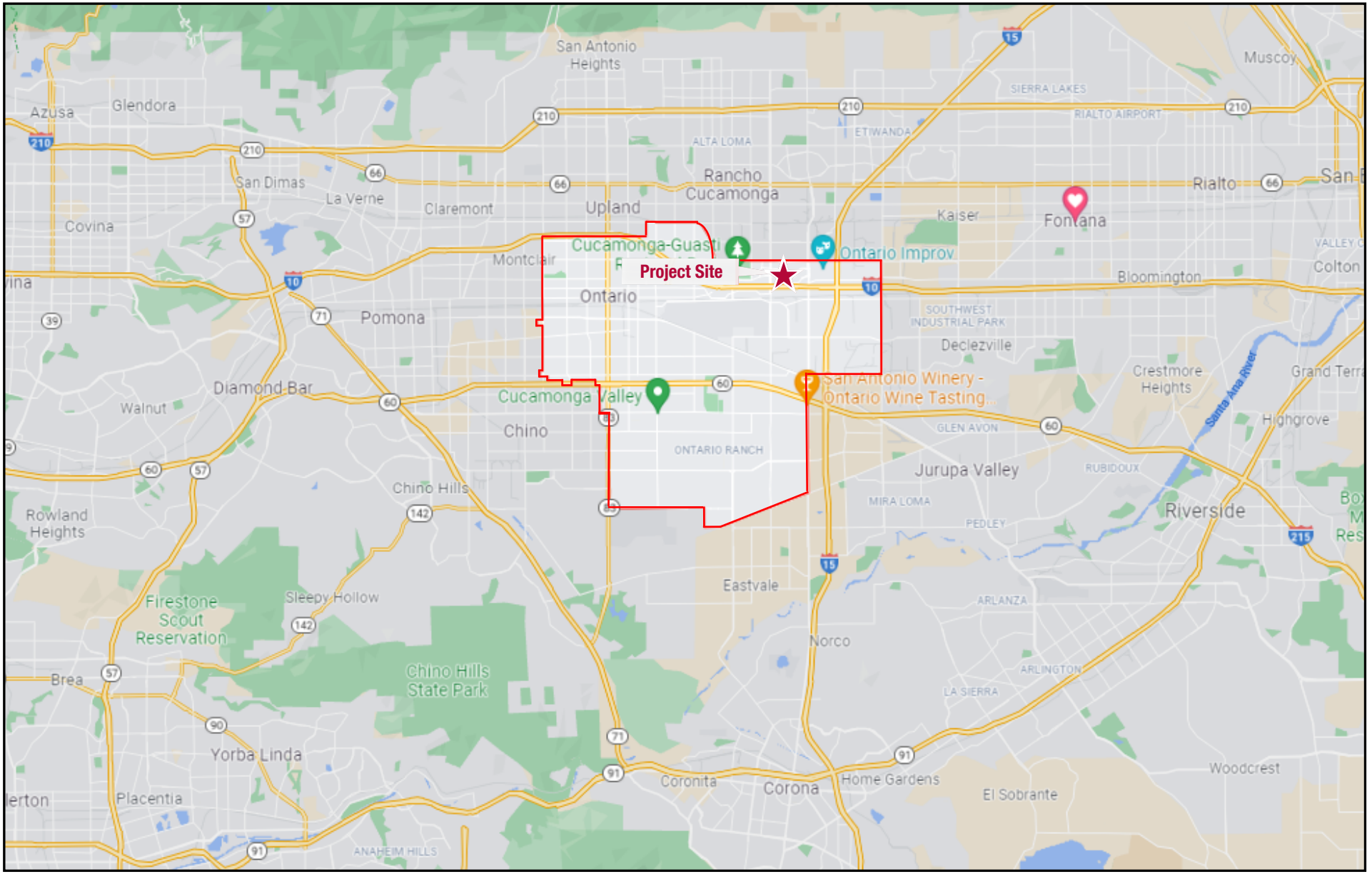

Figure 1: Regional Vicinity Map

Adept-Piemonte Overlay Project Addendum EIR

City of Ontario

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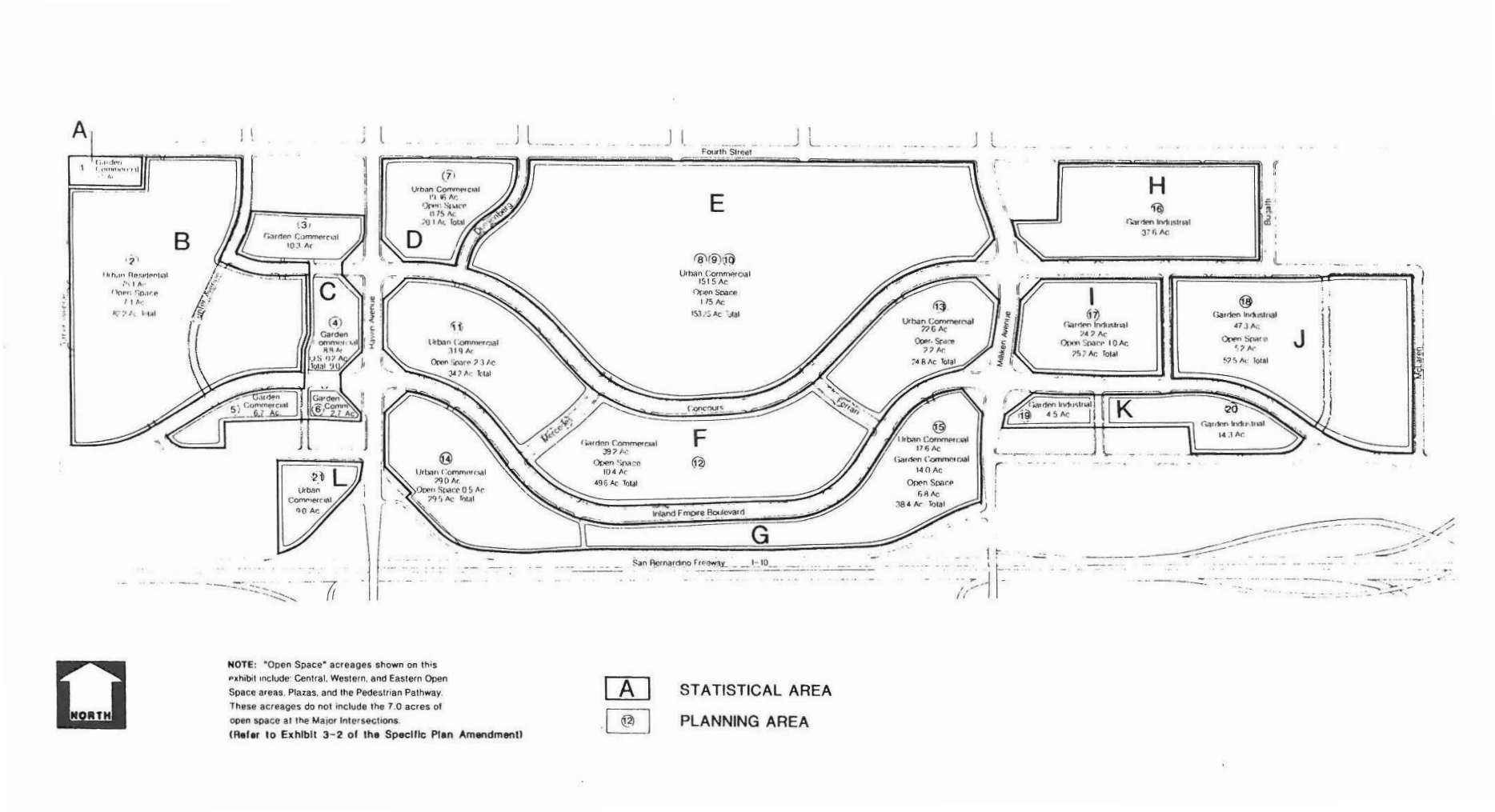

Figure 2: The Ontario Center Specific Plan (OCSP)

Adept-Piemonte Overlay Project Addendum EIR

City of Ontario

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2.0 Project Description

2.0 PROJECT DESCRIPTION

2.1 SETTING

The Project site consists of approximately 19 acres of fully developed and previously graded land located at the northerly boundary of the City of Ontario, south of Fourth Street, north of Concours Street, between Haven Avenue and Milliken Avenue, and less than one-quarter mile north of Interstate 10 (I-10); refer to **Figure 1**.

Regional access to the Project site and vicinity is provided by the I-10 and Interstate 15 (I-15) freeways, which converge approximately one mile southeasterly of the Project site. Local access to I-10 is provided at Milliken and Haven Avenues, and access to I-15 is available from Fourth Street. Supplementing freeway and surface street access, a Metrolink transit station is located approximately 1.5 miles northerly of the Project site, west of Milliken Avenue at Eighth Street.

2.1.1 Surrounding Land Uses

Figure 3, ***Local Vicinity***, provides an aerial view of the Project site and surrounding land uses. Local context of the Project is described below.

Fourth Street, which forms the site's northerly boundary, is also the corporate boundary dividing the cities of Ontario and Rancho Cucamonga. Multi-family residential uses (apartments) and a small retail/restaurant development are located northerly of the Project site across Fourth Street, in Rancho Cucamonga.

To the east, across Milliken Avenue, is the Ontario Mills Shopping Center, comprised of a central mall surrounded by free-standing commercial, entertainment, and restaurant uses. The Kohl's department store is located between the Project site and Milliken Avenue, at the southwest corner of Milliken and Fourth Street.

To the southeast, across Concours, additional existing retail uses are located adjacent to Milliken Avenue. Directly within the Project area is the existing multi-purpose Toyota Arena along with its supporting facilities. To the west, on both sides of Duesenberg Drive between Fourth Street and Concours, is the 800-unit Fairfield/Sares-Regis multi-family residential complex.

2.2 PROJECT CHARACTERISTICS

The proposed Project is the Adept-Piemonte Overlay Project, which is composed of the following six Lots: A, B, C, D, F and G, see Figure 2. Lots A and B are currently developed as vehicle parking areas serving the Toyota Arena (formerly the Citizens Business Bank Arena) and developed under the CECA. Lots C, D, F and G are vacant, but have been previously graded and are located north of Lots A and B. Lots C, D, F and G do not contain native habitat, they are fenced and are bounded by a fully developed internal roadway system. To this day, other development has occurred mostly within the western portion of Statistical Area E, see Figure 2.

The proposed Project includes a total of 694 multi-family residential DUs, 71,200 square feet of retail uses and approximately 998 parking spaces on the approximately 19-acre site. The site plan used for this analysis is provided in **Figures 9 and 10** Also refer to **Table 2-1*, Proposed Project Summary,*** and **Table 2-2, *Previous Projects vs. Proposed Project Comparison Summary***.

Table 2-1: Proposed Project Summary

Lot	Commercial (SF)	DU (SF)	Parking Area (SF)	Dwelling Units	Parking Stalls
A	25,870	268,181	153,284	384	504
B	20,802	111,021	47,526	112	194
C	11,047	75,866	37,192	94	138
D	14,095	85,305	40,966	104	162
TOTAL	71,200	540,373	278,968	694	998

Notes:
DU: Dwelling Unit(s)
SF: Square Feet

Table 2-2: Previous Projects vs. Proposed Project Comparison Summary

Land Use	Certified EIR/ OCSP (Statistical Area "E")	CECA (Statistical Area "E")	POCA (Statistical Areas "D" & "E")	POOC (Statistical Areas "D" & "E")	Proposed Project (Statistical Area "E")
Commercial/ Entertainment (SF)	-	214,420 (Arena)	447,313	562,068	-
Urban Commercial (SF)	2,200,000 (Statistical Area "E")	-	-	-	71,200
Hotel (SF)	-	-	290,400 (336 rooms)	180,000 (236 rooms)	-
Office (SF)	-	-	554,355	550,000	-
Multi-Family Residential (DU)	-	-	806	791	694
Total	**2,200,000 SF**	**214,420 SF**	**1,292,068 SF & 806 DU**	**1,292,068 SF & 791 DU**	**71,200 SF & 694 DU**

Notes:
DU: Dwelling Unit(s)
SF: Square Feet
CECA: Community Events Center Addendum
POCA: Piemonte at Ontario Center Addendum to the Certified EIR
POOC: Piemonte Overlay at Ontario center Mitigated Negative Declaration

Construction of the proposed Project is estimated to occur in one phase and is anticipated to begin in the last quarter of 2022 and last approximately 21 months. Construction activities are expected to consist of demolition, site preparation, grading, building construction, paving, and architectural coating. The proposed Project is anticipated to demolish an existing asphalt surface parking lot of approximately 7.5 acres within Lots A and B. The proposed Project is not expected to require the import or export of earthwork materials; preliminary grading estimates show a balanced site. The Project is expected to be operational in the year 2023.

2.2.1 Development Concept

The proposed Project development concept is illustrated in **Figure 4**, ***Development Concept – Lot A*** through **Figure 7**, ***Development Concept – Lot D***. The overall design concept for the proposed Project depicts a contemporary, pedestrian-oriented development, with an emphasis on wide sidewalks, outdoor seating, retail, dining areas, and landscape.

The central corridor or spine of the Project development concept is established by the north-south Via Piemonte roadway which traverses the Project site and Fourth street on the north, and terminates at Ontario Center Parkway, just north of Lots A and B. Via Piemonte is currently anchored by offices to the south and the Toyota Area and other uses further south and commercial to the east.

The proposed Project will incorporate varied landscape/hardscape features and pedestrian-oriented activity areas. Building mass and placement along Via Piemonte will be used to create interesting spaces, to include courtyards and outdoor seating areas. In so doing, the Via Piemonte development concept (Lots C and D) will provide a visually and spatially varied streetscape. Similarly, the development of Lots A and B will provide visually and spatially varied street scape visible from Concours Street and Ontario Center Parkway; refer to Figures 4 – 9.

Lots A and B are designed to emphasize dining and entertainment opportunities and will be delineated by decorative pavement and other defining landscape/hardscape treatments. This central core area is also designed to encourage visitors to move in a north/south direction, thereby fostering interaction with the hotel use and office uses located in the south and central portion of the Project site. Via Piemonte will allow for direct connectivity between all of the proposed developments. The various land use components within the Project will be connected by a series of defined pedestrian walkways. Pedestrian links have also been designed to allow workers, residents, and visitors to move through the site.

The Project will provide ample parking located in Lots E and F, abutting Fourth Street. As indicated in **Figures 4** through **9**, the proposed Project will integrate residential and commercial uses seamlessly to provide an active area that is utilized to its potential.

2.3 LAND USE AND DEVELOPMENT

2.3.1 Adept-Piemonte Land Uses and Development Components

At completion, the Project will realize more than six-hundred thousand square feet of development, as summarized in **Table 2-1**.

2.3.2 Development Intensity

The proposed Project is proposed within Statistical Area “E” of the OCSP. Statistical Area “E” is made up of Planning Areas (PAs) 8-10, totals 153.25 acres, and was originally approved for 2,200,000 square feet (SF) of urban commercial; refer to **Figure 2**.

Table 2-1 shows a breakdown of the proposed Project features. Also refer to **Table 2-2** for a comparison between the proposed Project and previous Projects approved on the site. Additionally, refer to **Table 2-3**,

Detailed Project Land Use Summary, for a specific breakdown of the proposed Project uses. As shown in **Table 2-2**, the Project is anticipated to develop the Project site with much less intensity compared than the previously analyzed and approved uses in the Certified EIR/OCSP, CECA, POCA, and POOC.

Table 2-3: Detailed Project Land Use Summary

Lot	Land Use	Units	Residential Square Feet (SF)	Commercial (SF)	Parking Spaces
A	Residential 2 Bedroom 1 Bedroom Studio	 120 180 84	268,181	-	504
	Retail	-	-	25,256	-
B	Residential 3 Bedroom 2 Bedroom 1 Bedroom	 19 63 30	111,021	-	194
	Retail	-	-	20,802	-
C	Residential 2 Bedroom 1 Bedroom Studio	 44 32 18	75,866	-	138
	Retail	-	-	11,047	-
D	Residential 2 Bedroom 1 Bedroom Studio	 58 42 4	85,305	-	162
	Retail	-	-	14,095	-
Project Total		**694**	**540,373**	**71,200**	**998**
Source: Adept-Piemonte Overlay at Ontario Center Project Site Plan Concept, March 2022.					

As noted above in **Table 2-3**, the proposed Project would realize approximately 71,200 SF of mixed retail, 694 multi-family DUs (540,373 SF) and would include approximately 998 vehicle parking spaces. The proposed commercial/retail/residential uses that would be realized under the proposed Project are consistent with uses envisioned under the Certified EIR and OCSP and would comprise 611,573 of combined SF or 1,588,427 SF less than the originally approved 2.2 million SF of allowable maximum development intensity for Statistical Area "E" which was anticipated to be a composition of urban commercial under the original OCSP and the Certified EIR, and later amended by the CECA, POCA, and POOC addendums to allow residential/ commercial/entertainment/retail, urban commercial, and office.

The subsequent addendums to the OCSP and the Certified EIR introduced a multi-family residential component which allowed up to 806 apartments within the POCA and 791 apartments within the POOC, but these amendments also included Statistical Area "D" in their analysis which is a smaller portion of the OCSP. Statistical Area "D" was also originally planned for urban commercial uses. Statistical Area "D" and

will occasionally be referenced throughout this addendum for reference purposes only in order to accurately reference the POCA and POOC projects.

Because the 694 multi-family DUs proposed by the Project would be less intense than that previously approved for the site and based on the 1,548,710 SF balance of development SF referenced above, it can be reasonably anticipated that the proposed Project in total would not exceed the remaining allowable maximum development intensity for Statistical Area E, as noted in the Certified EIR.

Additionally, an approximation of relative development intensity can be discerned by comparing defining characteristics of land uses, such as traffic generation, water demand, and wastewater generation rates. These factors are particularly appropriate when assessing the Project's relative development intensity, in that the upper limit of development intensity defined for the OCSP is founded largely on estimated roadway and water/sewer carrying capacities. In short, the forecast trip generation from the proposed Project is anticipated to be well-below the trips available for future use within Statistical Area "D and E" of the OCSP. The proposed Project is anticipated to generate approximately 94 percent less weekday trips, approximately 86 percent less weekday AM Peak Hour trips and approximately 84 percent less weekday PM Peak Hour trips than the total trips available for future uses within Statistical Areas D and E, as noted in **Table 3-3**.

As noted above, traffic generation rates would be reduced because of the Project's lower overall proposed development intensity compared to the approved development under the POOC. Similarly, water demands, and wastewater generation rates would be much lower when compared to the maximum allowable development from the OCSP on the same acreage. More specifically, it is anticipated that 694 apartment units would result in mean annual water demands of approximately 298,420 gallons per day (GPD) and 71,200 SF of commercial is anticipated to demand approximately 34,309 GPD, for a total combination of 332,729 GPD for the proposed Project. In contrast, if the same acreage was developed with commercial uses at the maximum allowable development intensity of the remaining 1,772,000 SF of urban commercial as permitted under the OCSP, water demands would be approximately 855,876 GPD[1].

Under the POCA, the site was proposed to include approximately 1.3 million square feet of mixed commercial, hotel, and office uses, as well as up to 806 condominium/apartment units would have been implemented. Total water demands of these uses were forecast at 727,888 GPD. Compared to the previously approved POCA, the proposed Project would reduce water consumption by approximately 55 percent. Total water demands of the proposed Project land uses are summarized in **Table 2-4*, Estimated Water Demand***.

Table 2-4: Estimated Water Demand

Land Use [1]	Units	Demand Factor [2]	Total Dem and
Commercial	71,200 TSF	483 GPD/TSF	34,389 GPD
Residential	694 DU	430 GPD/DU	298,420 GPD
Total Water Demand			**332,729 GPD**

[1] Ontario Center Specific Plan. Page 122

Sources:
[1]Land uses from: Piemonte at Ontario Center Development Concept, February 2006.
[2]Water demand rates from *Preliminary Sewer and Water Demand Study for Rancho Piemonte* (SB&O, Inc.) January 2006.
[3]Commercial water demand rate of 483 GPD/thousand square feet (TSF) derived from *Final Environmental Impact Report #88-2 for the Ontario Center* (P&D Technologies) October 1990, SCH #890410009, Table III-6, "Domestic Water Consumption Ultimate Development," Page III, and the POCA, Table 2-2, Estimated Water Demand Piemonte at Ontario Center Project

Additionally, maximum allowable building coverage for the Project site under the adopted OCSP is 60 percent, as averaged over the net area of each urban commercial PA. Based on the Project proposed 71,200SF of combined commercial development as shown in **Table 2-3**, and compared to the maximum allowable commercial development intensity of the remaining 1,772,000 SF of urban commercial as permitted under the OCSP, the Project proposed a building coverage for the Project site of 4.0 percent, or 56 percent less commercial building coverage than permitted under the OCSP.

Based on the preceding discussions, development intensities realized under the proposed Project would be no greater than those anticipated under the adopted OCSP. Further, related environmental effects of the proposed Project would be no greater than, and would be reduced, when compared to anticipated environmental effects that would result under commercial development of the site envisioned under the adopted OCSP, and also the POCA and POOC as these last two originally proposed greater development intensity of the site than the proposed Project.

2.3.3 Circulation Plan Concept

The Project would utilize the existing private and public circulation system (namely Ontario Center Parkway, Via Piemonte, Via Asti, Concours Street, and Fourth Street) and would follow the established design standards for vehicular and pedestrian movement. Following are summary descriptions of both the vehicular and pedestrian circulation systems.

2.3.4 Vehicular Circulation

Primary access to the Project would be provided via public roadways that border the Project site, including Haven Avenue to the west, Concours Street to the south, and Fourth Street to the north. Within the Project site, access to individual uses would be provided by privately owned and maintained streets, as well as the public Ontario Center Parkway. Private streets within the Project site would provide for and incorporate necessary access/public utilities easements.

Pedestrian Circulation

The proposed Project will make use of the existing pedestrian network which provides connections, to and supports interaction, between the various Project land uses. The Project pedestrian network largely parallels the serving roadway network, with additional internal pedestrian linkages providing connections between the Project land uses. Defined connections are also provided where the Project pedestrian network connects to other existing pedestrian paths.

The pedestrian network will be enhanced with landscaping and would typically include ornamental grasses, groundcover, and shrubs, all of which are thematically employed throughout the Project site.

2.4 LANDSCAPE CONCEPT

Figures 9 and 10 provide a sense of landscaping features and their locations within the proposed Project. The proposed landscape would be consistent with the design guidelines of the Specific Plan, specifically as noted as Operational Design Features E-DF-4, and those design elements as noted in **Table 1-1**.

2.5 PROJECT PHASING AND CONSTRUCTION SEQUENCE

2.5.1 Buildings and Facilities

Construction of the proposed Project may occur in more than one phase. Construction is anticipated to begin during year 2022.

2.5.2 Utilities and Infrastructure

The Project site and its vicinity is fully developed, and utilities infrastructure have been previously installed and fitted to accommodate the maximum planned development under the CECA, POCA, and POOC. According to the OCSP and the Certified EIR, maximum allowed development intensity within Statistical Area "E" was 2,200,000 SF, while Statistical Area "D" maximum allowed intensity was 640,000 SF. As previously noted, the proposed Project would introduce a mixed-use development with a lower development intensity of 71,200 SF of commercial and 694 multi-family apartment units. All roadway improvements (public and private) have been previously developed with the implementation of the existing uses.

2.5.3 Parks and Open Space

Public and private urban open/common space areas within the Project would be completed concurrent with, and largely as a consequence of, completion of adjacent building and facilities within the Project area. In this sense, open/common space areas would support and complement other aspects of the Project in a manner and fashion consistent with likely demands for, and use of, these facilities. In addition, the Project would comply with applicable City/OCSP park dedication/in-lieu fee payment requirements.

2.6 INTENDED USE OF THIS ADDENDUM, PROJECT DISCRETIONARY ACTIONS

2.6.1 Use of this Addendum

This EIR Addendum will serve as the City of Ontario's environmental review of the Project as required under CEQA. The City may also employ this Addendum EIR in any subsequent review or consideration of the individual development proposals within the Project area.

2.6.2 Project Discretionary Actions, Permits, Consultation

Discretionary actions, permit and related consultation(s) necessary to approve and implement the Project include, but are not limited to, the following.

2.6.2.1 Discretionary Actions

CEQA Section 15124 states in pertinent part that if "a public agency must make more than one decision on a project, all its decisions subject to CEQA should be listed." Requested decisions, or discretionary actions, necessary to realize the Adept-Piemonte Overlay Project at The Ontario Center include the following:

- Certification of this Addendum to the Ontario Center EIR;
- Adoption of the -Piemonte Overlay at Ontario Center Specific Plan Amendment (File no. PSPA21-001);
- Approval of Parcel Maps;
- Approval of Tract Map(s) for condominium purposes;
- Development Plan Approvals for various development parcels;
- Approval of the Project Development Agreement;
- Approval of Infrastructure Improvement Plan, including but not limited to: roads, sewer, water, and stormwater management systems;
- Approval of Conditional Use Permit(s).

2.6.2.2 Consultation and Permits

CEQA Section 15124 also states that environmental documentation should, to the extent known, list other permits or approvals required to implement the Project. Based on the current Project design concept, in addition to City permits and approvals, anticipated permits necessary to realize the proposal will likely include, but are not limited to the following:

- Permitting may be required by/through the Regional Water Quality Control Board (RWQCB) pursuant to requirements of the City's National Pollutant Discharge Elimination System (NPDES) Permit;
- Permitting may be required by/through the South Coast Air Quality Management District (SCAQMD) for certain equipment or land uses that may be implemented within the Project area.
- Various construction, grading, and encroachment permits allowing implementation of the Project facilities.

Figure 3: Local Vicinity Map
Adept-Piemonte Overlay Project Addendum EIR
City of Ontario

Not to Scale

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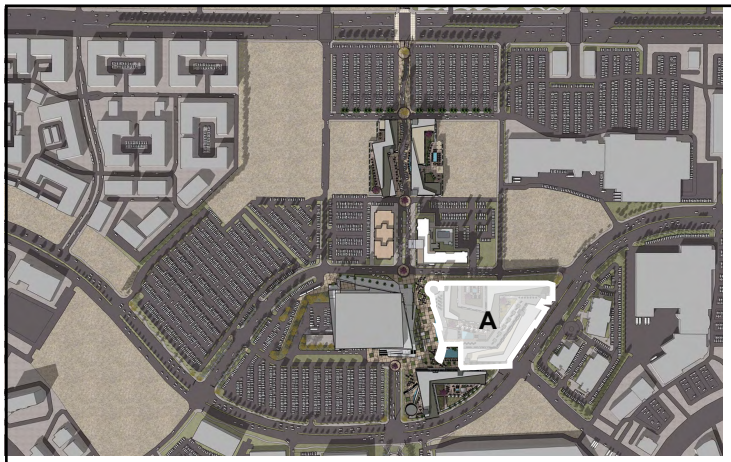

Unit Count - Total 384
120 - 2 Bedroom
180 - 1 Bedroom
84 - Studio

Parking Count - Total: 504

Retail Area: 25,870 ft²
Net Residential Area: 268,181 ft²

Figure 4: Development Concept - Lot A
Adept-Piemonte Overlay Project Addendum EIR
City of Ontario

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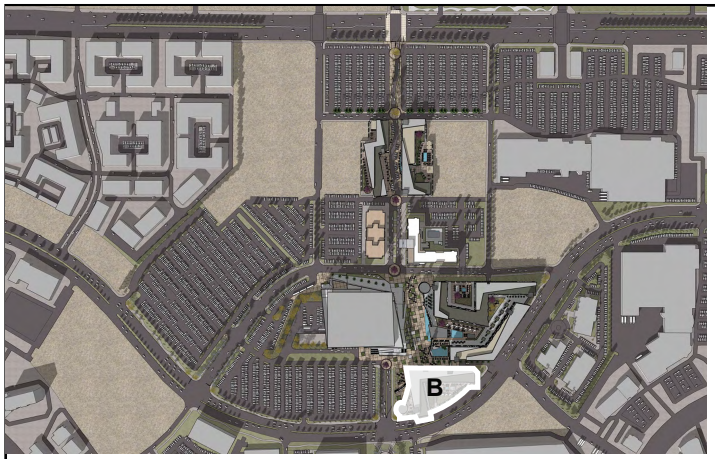

Unit Count - Total 112
19 - 3 Bedroom
63 - 2 Bedroom
30 - 1 Bedroom

Parking Count - Total: 194

Retail Area: 20,802 ft²
Net Residential Area: 111,021 ft²

Figure 5: Development Concept - Lot B
Adept-Piemonte Overlay Project Addendum EIR
City of Ontario

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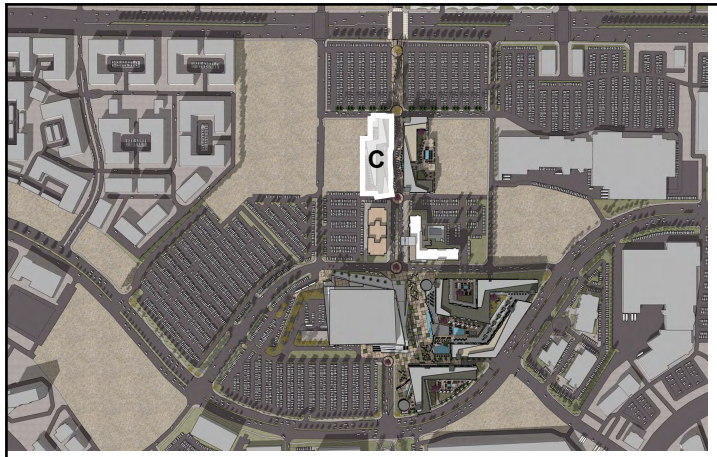

Unit Count - Total 94
44 - 2 Bedroom
32 - 1 Bedroom
18 - Studios

Parking Count - Total: 138

Retail Area: 11,047 ft²
Net Residential Area: 75,866 ft²

Figure 6: Development Concept - Lot C
Adept-Piemonte Overlay Project Addendum EIR
City of Ontario

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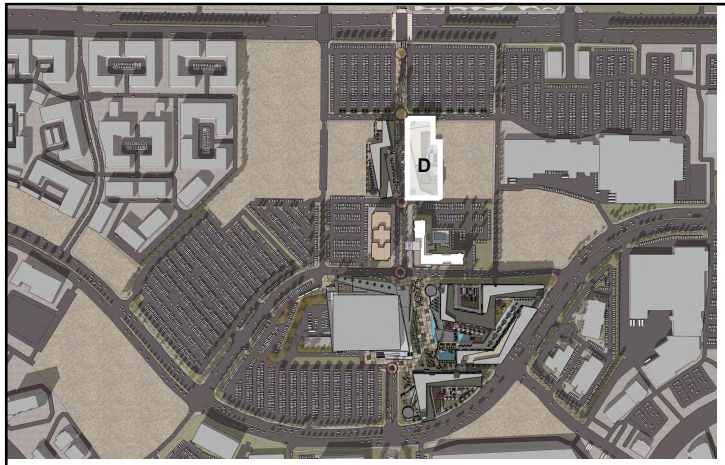

Unit Count - Total 104
58 - 2 Bedroom
42 - 1 Bedroom
4 - Studios

Parking Count - Total: 162

Retail Area: 14,095 ft²
Net Residential Area: 85,305 ft²

Figure 7: Development Concept - Lot D
Adept-Piemonte Overlay Project Addendum EIR
City of Ontario

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3.0 Environmental Analysis

3.0 ENVIRONMENTAL ANALYSIS

3.1 INTRODUCTION

Land uses and development characteristics of the proposed Project are similar in scope but lower in intensity to development of the subject site anticipated under the OCSP, the CECA, POCA, and POOC. Potential environmental impacts of the OCSP were comprehensively assessed in the Certified EIR for the Ontario Center, State Clearinghouse No. 89041009 (Certified EIR). The following discussions summarize potential environmental impacts of the proposed Project within the context of the environmental analysis presented in the Certified EIR. As demonstrated by the subsequent environmental analysis, the Project would not result in any new, different, or substantially increased impacts than those that were considered and addressed in the Certified EIR, CECA, POCA, or the POOC.

3.2 ALLOWED AND PROPOSED MAXIMUM DEVELOPMENT INTENSITY

The proposed Project will occupy a portion of Statistical Area "E" of the OCSP. The Certified EIR addressed potential impacts that would result from implementation of a calculated maximum allowable development intensity of the Statistical Area "E," as provided for under the OCSP. The referenced maximum allowable development intensity considered in the Certified EIR included up to 2,200,000 SF of regional retail center.

The proposed Project would realize a different mix of urban commercial uses than those originally envisioned under the OCSP as well as the proposed Project would incorporate multi-family residential units which is a consistent use for the site based on the previously approved CECA, POCA, and POOC. However, as demonstrated within this Addendum, development intensity of the proposed Project will not exceed the maximum allowable development intensity considered under the Certified EIR, the CECA, POCA, and POOC for both the multi-family and commercial components.

3.3 ALLOWED AND PROPOSED LAND USES

The Project site was originally designated as "Urban Commercial" by the OCSP. Permitted uses within the Urban Commercial land use designation include retail and service-oriented businesses; administrative, professional and medical offices; institutional, financial and governmental facilities; indoor and outdoor restaurants and cocktail lounges; theaters and entertainment complexes; parking lots and parking facilities; outdoor vendors; automobile services and service stations; hotels, motels and motor inns; conference and convention facilities; medical and hospital facilities; residential dwellings (above the ground floor); trade schools; and community facilities, such as libraries, police or fire stations.

As presented in Addendum Section 2.0, Project Description, the CECA, POCA, and later the POOC amended the original OCSP which proposed uses that were consistent with the Urban Commercial land use designation and intent of the OCSP to provide for an integrated mixed-use urban commercial center within the City while also adding multi-family residential uses. As such, in order to realize the Project as proposed in the POCA, certain development standards of the OCSP were amended to allow for specific facilities configurations and design elements proposed by the POCA. As discussed subsequently in this Addendum, land uses realized under the proposed Project would not generate any new or additional

environmental impacts that were not previously considered and addressed in the Certified EIR, the CECA, POCA, or the POOC.

3.4 PREVIOUS ENVIRONMENTAL DOCUMENTATION, DOCUMENTS INCORPORATED BY REFERENCE

Section 15150 of the State CEQA Guidelines permits and encourages that an environmental document incorporate by reference other documents that provide relevant data. The documents outlined in this section are hereby incorporated by reference, and the pertinent material from each is summarized throughout this Addendum. All documents incorporated by reference are available from the Planning Department at the City of Ontario, located at 303 East "B" Street, Ontario, CA 91764.

- **Ontario General Plan Final EIR/Master Environmental Assessment.** The Ontario General Plan Final EIR/Master Environmental Assessment provides an overall description of City's environmental setting; addresses potential environmental impacts associated with implementation of the City General Plan under buildout conditions; and identifies applicable policies and implementation programs which act to reduce potentially significant environmental effects resulting from General Plan implementation/buildout. Background information and areawide analyses presented in the Ontario General Plan Final EIR/Master Environmental Assessment provide context for the Piemonte at Ontario Center Project and its potential environmental effects.

- **Final Environmental Impact Report (FEIR) No. 88-2 (Certified EIR) for The Ontario Center Specific Plan (OCSP), 1990.** The Final Environmental Impact Report for the OCSP identifies anticipated environmental impacts resulting from the Specific Plan and presents a responsive Mitigation Monitoring Plan (MMP) or Mitigation Monitoring and Reporting Program (MMRP). The MMP/MMRP was developed to avoid or minimize the extent and severity of anticipated impacts of the Specific Plan.

  Information and analysis presented in the Final EIR including the MMP provide the basis and context for evaluation of the Adept-Piemonte at Ontario Center Project's (proposed Project) potential environmental impacts. As discussed in this Addendum, the proposed Project will not result in any new or substantially different environmental impacts than were previously considered and addressed in the Final EIR for the OCSP. As also presented in this Addendum, the proposed Project would comply with, and implement all applicable mitigation measures presented in the OCSP Final EIR MMP/MMRP.

- **Community Event Center Addendum to the Certified EIR.** The Community Events Center Addendum (CECA) to the Certified EIR was certified February 1, 2006, and is relevant to the proposed Project in that it was prepared in response to an application for the development of the City of Ontario Community Events Center. This project proposed the development of a 214,420 square foot multi-purpose indoor stadium and events center, with fixed seating for approximately 9,000 persons, associated pedestrian plazas, landscaping, off-street parking facilities for approximately 2,100 automobiles and a truck loading/unloading area, with related truck parking and outdoor storage areas and provides an updated description of the encompassing OCSP and establishes a general framework for comparative analysis resulting from recent and previous

amendment(s) to the Specific Plan; refer to **Figure 8, *Community Events Center Specific Plan (CECA)***. The CECA area is currently developed with the Toyota Arena and vehicle parking areas. The CECA eastern vehicle parking areas are anticipated to host the proposed Project portions identified as Lots "A and B"; refer to **Figure 9, *Project Site Plan (Lots A and B)*** and **Figure 10, *Project Site Plan (Lots C and D)***.

- **Piemonte at Ontario Center Addendum to the Certified EIR.** The Piemonte at Ontario Center Addendum (POCA) to the Certified EIR project was certified in February 2006 and is relevant to the proposed Project in that it amended Statistical Areas "D and E." In 2004, an application was made by Panattoni Development to the City of Ontario for an urban character mixed-use project, to be constructed on an approximately 88-acre site located between Fourth Street and I-10, exclusive of the then approved Fairfield/Sares-Regis residential project, and west of the existing Kohl's retail center. The POCA provides an updated description of the encompassing OCSP and establishes a general framework for comparative analysis resulting from recent and previous amendment(s) to the Specific Plan; refer to **Figure 11**, ***Piemonte at Ontario Center Addendum Specific Plan (POCA)***. The POCA encompassed a large northeast portion of the OCSP Statistical Area "E." This area is anticipated to host Lots C, D, F, and G of the proposed Project; refer to Figure 5.
- **Piemonte Overlay at OCSP (PSPA 16-003).** More recently, the Piemonte Overlay at Ontario Center (POOC) Mitigated Negative Declaration (MND) (PSPA 16-003) was certified on May 16, 2017, and is relevant to the proposed Project in that it also amended Statistical Areas "D and E." The project proponent submitted a request for approval of an amendment to the OCSP, which revised the land use map and development concept of the POCA area to facilitate the development of the balance of the 84-acre site. Like the POCA, this amendment proposed approximately 1.3 million square feet of retail, office, hotel, and entertainment uses and 791 multi-family DUs. The 791 multi-family DUs were slightly fewer DU than the quantity allowed by the POCA. The POOC amended the land use configuration of the same footprint considered in the POCA. The POCA provides an updated description of the encompassing OCSP and establishes a general framework for comparative analysis resulting from recent and previous amendment(s) to the OCSP; refer to **Figure 12, *Piemonte Overlay at Ontario Center Specific Plan (POOC)***. Identical to the POCA project area, the POOC MND encompassed the same large portion of the OCSP Statistical Areas "D and E." The portion of the OCSP that is within Statistical Area "E" is anticipated to host Lots C, D, F, and G of the proposed Project, as shown in Figure 2.

3.5 ENVIRONMENTAL TOPICS

The Certified EIR addressed the following major environmental topics: land use and planning, socioeconomics, public services, public utilities, traffic and circulation, biology, air quality, noise, aesthetics, seismicity, hydrology, and water quality. As presented in **Table 1-1** of this Addendum, the Certified EIR proposed mitigation measures for all potentially significant impacts. All applicable mitigation measures identified in **Table 1-1** will be implemented by the Adept-Piemonte at Ontario Center Project. For each environmental topic presented in the Certified EIR, the following analyses substantiate the proposed Project's consistency with development envisioned under the OCSP Project and analyzed in the Certified EIR.

3.5.1 Land Use and Planning

The Certified EIR considered potential land use/planning impacts of the OCSP. The current General Plan Land Use designation is "Mixed Use Ontario Center" and the subject site has a specific plan land use of "OCSP, Urban Commercial Land Use – Piemonte Overlay." As previously noted, under this General Plan Land Use designation, a maximum of 2,840,000 square-feet (SF) of Urban Commercial uses are permitted within Statistical Areas D and E combined or 2,200,000 SF of Urban Commercial within Statistical Area E only, of the encompassing OCSP. As discussed in the Certified EIR for the OCSP, this upper limit of development intensity is based primarily on the carrying capacities of the Specific Plan roadways and utilities systems.

The OCSP Urban Commercial land use designation provides for development of tourist-related commercial uses, high and medium-rise office buildings, entertainment/recreation clusters, and high-density residential uses integrated with adjacent uses. The Project proposes land uses and development concepts that are consistent with development envisioned under and encouraged by the Urban Commercial land use designation but would amend the OCSP to establish the definitive mix of uses in the proposed Adept-Piemonte at Ontario Center Addendum EIR Project.

3.5.1.1 Development Intensity

According to the POCA, under the adopted OCSP, the Statistical Areas D and E could accommodate up to 2,840,000 SF of development intensity.[2] Of the maximum 2,840,000 SF of development intensity allowed within Statistical Areas "D and E," an estimated 1,068,000 SF existed at the time the POCA was certified, or was anticipated under other development proposals.[3] The remaining approximately 1,772,000 SF of allowable development intensity provides a baseline for comparison of development intensities that could be realized under the current OCSP, vis-a-vis development that is proposed under the Project.

As currently envisioned, the proposed Project would realize approximately 71,200 SF of commercial and 540,373 SF of multi-family residential (694 units). Excluding the Project's proposed residential uses, the approximately 71,200 SF of commercial uses that would be realized under the Project are consistent with uses envisioned under the OCSP, and would comprise 1,700,800 SF less than the calculated 1,772,000 SF of remaining allowable maximum development intensity for Statistical Areas D and E. Therefore, because of the 694 multi-family DUs proposed, the Project is determined to be no more intense than the 1,700,800 SF balance referenced above, it can be reasonably inferred that the Project in total would not exceed the remaining allowable maximum development intensity for Statistical Areas D and E, refer to **Table 2-3**.

An approximation of relative development intensity was typically discerned by comparing defining characteristics of land uses, such as traffic generation, water demand, and wastewater generation rates. These factors were particularly appropriate when assessing the Project's relative development intensity, in that the upper limit of development intensity defined for the OCSP is founded largely on estimated

[2] Ontario Center Specific Plan, Page 15, Table 3-A "Development Intensity."

[3] Approximately 108,000 s.f. is developed as "Khol's"; an estimated 530,000 s.f. in development intensity is allocated for the 32-acre Fairfield/Sares-Regis residential project; and an estimated 430,000 s.f. is allocated for the 28.85-acre future OCEC project. Assumes an average 0.38 FAR over aggregated Statistical Areas D and E, based on maximum allowable development intensity of 2.86 million square feet on approximately 153.25 acres.

roadway and water/sewer carrying capacities. Water/sewer demands of the Project, as compared to water/sewer demands resulting from correlating maximum buildout of urban commercial uses per the adopted OCSP are summarized below.

Regarding traffic/trip generation, in response to Senate Bill (SB) 743, the California Natural Resource Agency (CNRA) certified and adopted new CEQA Guidelines in December 2018 which now identify Vehicle Miles Traveled (VMT) as the most appropriate metric to evaluate any give project's transportation impact under CEQA (Section 15064.3). Effective July 1, 2020, the previous CEQA metric of Level of Service (LOS), typically measured in terms of automobile delay, roadway capacity and congestion, generally will no longer constitute a significant environmental impact. The City of Ontario has adopted guidelines to provide recommendations in the form of and methodology and thresholds of significance for identifying VMT related impacts. The proposed Project is subject to a VMT analysis and will adhere to the recommendations and practices described in the *City of Ontario Planning Commission Resolution No. PC20-021 (May 26, 2020).*

As discussed in greater detail at Section 3.5.5, *Traffic and Circulation*, total average daily traffic that would be generated by the Project is approximately 95 percent less than would otherwise result under buildout of the subject site per the maximum development intensities allowed under the OCSP. Development intensity of the Project, as characterized by traffic generation, is therefore substantially reduced when compared to maximum allowable development intensities identified under the OCSP. This reduction in traffic generation rates is due largely to the fact that the Project will implement an integrated residential component, which would result in substantially reduced daily trips, and p.m. peak-hour trip generation rates compared to trip generation rates that would result from maximum allowable commercial intensities on the same acreage. Relative traffic generation rates would be substantially reduced because of the Project's residential component.

Similarly, because of the large difference in development intensities between the maximum allowed under the OCSP and the Certified EIR and the proposed Project, it is anticipated that water demands and wastewater generation rates when compared to maximum allowable commercial intensities on the same acreage would also be reduced. More specifically, it is anticipated that 694 multi-family units and 71,200 SF of commercial uses would result in mean annual water demands of approximately 332,729 GPD; refer to Table 2-4. In contrast, if the same acreage was developed with Urban Commercial uses at the maximum allowable development intensity of 1,772,000 SF (2,200,000 SF – 428,000 SF of existing development = 1,772,000 SF of remaining buildable SF), water demands would be approximately 855,876 GPD.

As wastewater generation is a direct function of water consumption, it can be anticipated that the Project's residential component would also result in lower wastewater generation than would result under maximum development of the same acreage with commercial uses, or under the previously approved CECA, POCA, or POOC which all assumed a higher development intensity than the proposed Project, as shown in **Table 2-2**.

If considered independently then, the Project's residential uses would result in decreased water/sewer demands compared to maximum development of the same acreage with commercial uses. When

considered in the context of the total Project, the calculated water and sewer demands resulting from the Project residential land uses are minimal relatively to the permitted development under the approved OCSP. Total water demands of the Project land uses are summarized in **Table 2-4**.

Based on the preceding discussions, development intensities realized under the proposed Project would be no greater than those anticipated under the adopted OCSP. Further, related environmental effects of the proposed Project would be no greater than, and would likely be reduced, when compared to anticipated environmental effects that would result under commercial development of the site envisioned under the adopted OCSP.

3.5.1.2 Development Standards and Land Use Compatibility

The Project proposes commercial and residential uses similar to those allowed for and envisioned under the OCSP Urban Commercial land use designation and under the POCA and POOC. Further, development concepts and plans articulated for the proposed Project are considered to be substantially consistent with the themes and standards of the approved OCSP, the General Plan, and the Zoning Ordinance. The Project does, however, propose to amend the OCSP to allow for facilities, configurations and design elements specific to the proposed Project.

As discussed previously in this Section, Statistical Areas "D and E" of the OCSP are designated as Urban Commercial land uses. Within the Urban Commercial land use designation, permitted uses include "high density residential uses integrated with adjacent uses." [*Ontario Center Specific Plan*, Page 10] The Urban Commercial land use designation does not specify an upper limit to residential development densities, other than such development may not exceed the maximum allowable development intensity for the encompassing Statistical Area.

Further, all proposed residential units will be designed and constructed to achieve noise standards contained in the Ontario Municipal Code, as required under 4.2.1.13 (B). As presented above in Addendum Section 3.5.1.1, "Development Intensity," the Project in total will not exceed the maximum allowable development intensity for Statistical Areas D and E, including water and sewer demands. Design and construction of water and sewer services available to the Project land uses will be reviewed and approved by the City Engineer prior to issuance of development permits, consistent with the requirements of 4.2.1.13 (C).

Multi-story, high-density residential development as proposed by the Project supports the intent of the OCSP to provide:

- A balance of employment, shopping, and housing opportunities, reducing the need for long commutes.

  and

- A higher density housing orientation, recognizing trends toward smaller household size.

  [*Ontario Center Specific Plan*, Page 8]

More specifically, the considered residential units will be located immediately adjacent to the commercial/retail types of uses, and in this sense, the Project provides for an integrated balance of

employment, shopping, and housing opportunities, and establishes a sense of community through collocation of residential uses and supporting retail/commercial/entertainment uses.

Association of the Project's urban residential densities with commercial uses also promotes, and makes feasible pedestrian access throughout the Project area, acting to reduce reliance on private automobiles. This is consistent with the intent of the OCSP to reduce dependence on private automobiles, with correlating reductions in VMT.

Residential development will reflect architectural themes and hardscape/landscape elements evidenced throughout the Project area, acting to visually tie these residential uses to other Project land uses. A direct visual/architectural tie is made between abutting residential areas. Multi-story residential uses will also reflect urban themes, building heights, and building masses evidenced elsewhere within the Project; refer to **Figure 13, *Elevations (Lots A and B)*** and **Figure 14**, ***Elevation (Lots C and D)***.

Lastly, it is noted that residential densities proposed by the Project (at least 40 units per acre) provide for efficient use of available land and recognize local and regional demographic trends towards smaller household sizes. As noted previously in this Section, proposed residential densities as described are achieved within the maximum allowable development intensities for Statistical Areas "D and E."

Summary

Development intensities proposed by the proposed Project are less than the maximum allowable development intensities considered in the Certified EIR. It will not be necessary for the proposed Project to modify the OCSP as the POCA was previously amended it in February 2006 and the POOC further amended it in May 2017 to allow for specific Project facilities configurations and design elements, to include certain allowances for construction of multi-story residential DUs, with ground floor units at a greater intensity than the currently proposed Project.

Land uses proposed by the proposed Project are considered to be consistent with the mix of land uses and development intent of the OCSP, POCA, and POOC, and would not result in land use impacts not already considered and addressed in the Certified EIR. On the basis of the preceding discussions, the Project will not create new, additional, or substantially different land use impacts than those identified within the Certified EIR. Therefore, no changes or additions to the Certified EIR analysis are necessary.

3.5.2 Socioeconomics

The Certified EIR considered potential socioeconomics impacts of the OCSP. As a general note, it is recognized that the *2004 CEQA Guidelines* no longer reflect "socioeconomics" as an environmental topic. The relevant areas of discussion addressed previously under the heading of socioeconomics are now reflected in consideration of potential population, housing, and jobs/housing balance impacts, and related transportation and air quality impacts. Economic effects of the proposed Project would be considered only to the extent that they may result in adverse physical impacts.

Of the above considerations, localized effects of the Project will include increased housing availability, combined with supporting commercial, office, recreation, and entertainment uses. Localized effects will

also include new employment potentials accruing from the Project's non-residential land uses. Increased employment and housing availability resulting from the Project reflect areawide projections for continuing population and jobs growth within the City and region.

By integrating residential and business/commercial land uses, the Project supports City and areawide goals and policies providing for a balance of jobs and housing. One of the primary benefits of a balanced jobs/housing ratio within the region is a potential reduction in commute distances, as places of employment will be located closer to residential areas.

As the Project proposes land uses consistent with those allowed by the OCSP and would not result in development intensities greater than those considered in the Certified EIR, the Project will not result in any new or substantially different socioeconomic considerations than were addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary, nor is there a need for any additional mitigation measures. Please also refer to Section 3.5.1, "Land Use."

3.5.3 Public Services

The Certified EIR considered potential public services impacts of the OCSP. As discussed under Addendum Section 3.5.1, "Land Use," the Project proposes land use categories and development intensities contemplated under the adopted OCSP and Certified EIR. As land use categories and development intensities largely define demands for public services, it is anticipated that public services demand from the proposed Project would not exceed, nor be substantially different than, those considered and addressed in the Certified EIR. On this basis, the Project will not result in any new or substantially different public services impacts than were addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary, nor is there a need for any additional mitigation measures. Please refer also to Addendum Section 3.5.1, "Land Use and Planning."

3.5.4 Utilities

The Certified EIR considered potential utilities impacts of the OCSP. Defining examples of utilities demands of the Project, as compared to demands anticipated under the Certified EIR are presented in Addendum Section 3.5.1, "Land Use and Planning." Under the cited topical areas of traffic generation, water demand, and wastewater generation, it is anticipated that impacts of the proposed Project would be less than those addressed under the maximum development intensities considered in the Certified EIR. It is anticipated that impacts to all other utilities would be similarly reduced under the proposed Project when compared to utilities demands resulting from maximum allowable development intensities for the subject site.

3.5.4.1 Infrastructure

Extensive utility infrastructure surrounds, and is available to, the Project site. In general, the existing infrastructure serving the Project site and vicinity has been sized to accommodate anticipated future development of the area and is adequately sized to serve the Project. Because the Project site has been previously developed with various uses, infrastructure is already in place. This section describes the existing backbone infrastructure system available to the Project site. Infrastructure systems described

within this section include wastewater collection/ treatment, potable water distribution, recycled water distribution, and stormwater management/treatment.

3.5.4.2 Wastewater

Wastewater treatment services for the City of Ontario and other nearby communities are provided by Inland Empire Utilities Agency (IEUA). This Agency is responsible for treatment of wastewater generated by the Project. Wastewater will be transported to IEUA Regional Plant No. 1 (RP-1) via the City of Ontario wastewater collection and conveyance system. IEUA Regional Plant No. 1 is located south of the Pomona Freeway (SR-60) and west of Archibald Avenue. The backbone sanitary sewer system for the Project site and vicinity is made up of private and public sewer system components. Along the Project perimeter, public streets would accommodate sewer system improvements to be implemented by the Project.

A 24-inch IEUA sewer interceptor exists in Fourth Street along the northerly boundary of the Project site. This interceptor captures all wastewater from north of Fourth Street within Rancho Cucamonga and transfers it west along Fourth Street. Therefore, the Project area does not accept any off-site wastewater from the north. All wastewater flows generated by the Project would be transported via 8-to-10- inch sewer lines to Concours Street. At Concours Street, these lines would connect to the existing 8-to-12- inch sewer mains. These mains currently connect to an 18-inch main, that in turn connects to the Inland Empire Boulevard sewer main to the south.[4]

The collection sewer main to the south of the Project site, originally called the Ontario Motor Speedway Outfall, was sized to handle flows from the site. This outfall line ultimately flows west along Inland Empire Boulevard then proceeds south beneath I-10. Sanitary sewer facilities constructed south of I-10 have previously been upgraded and sized to adequately handle development of the Project site and surrounding area.

With regard to Project-related wastewater system requirements, based on information presented in the POCA, the existing receiving wastewater transmission facilities within Concours Street have enough overall capacity to adequately convey wastewater generated by the POCA project as proposed. More specifically, as concluded in the POCA, the depth to diameter (d/D) design standard of 0.50 for these transmission facilities was maintained even with the addition of wastewater generated by the POCA project. The POCA further noted that it conservatively assumed 2.7 persons per dwelling unit, with a calculated wastewater generation rate of 100 gpd/person, or 270 gpd/DU which would have resulted in approximately 217,620 GPD of wastewater. However, approximately one-half of the Project dwelling units where originally anticipated to be of single bedroom configuration(s), and as such would have likely resulted in reduced overall resident populations with correlating reductions in wastewater generation. The Project proposes to construct 694 multi-family DU (111 DU less than the previously approved by the POCA) and at the 270 gpd/DU would equate to approximately 186,570 GPD of wastewater. Based on the previous data, the proposed Project is anticipated to generate approximately nine percent less GPD of wastewater compared to the POCA. As wastewater generation is a direct function of water consumption, it can be anticipated that the Project would similarly result in less wastewater generation than would the

[4] Final Environmental Impact Report (FEIR) No. 88-2 (Certified EIR) for The Ontario Center Specific, 1990.

maximum development of the same acreage with commercial-office uses or compared to the OCSP, POCA, and POOC since these all proposed a greater development intensity than the Project site.

3.5.4.3 Water Service

Water service to the Project site is provided by the City of Ontario. Existing water facilities include mains located in both Fourth Street and Concours Street. A 12-inch main in Fourth Street serves properties north of the Project site, in Rancho Cucamonga. An existing City of Ontario 18-inch main located in Fourth Street serves the Project site. Fourth Street also contains a 36-inch City of Ontario transmission main. Additionally, Concours Street contains a 16-inch water main that is used to serve the Project site. The POCA concludes that the existing water system infrastructure surrounding the general site is adequate to serve the Project area. Existing water infrastructure will be utilized to provide water to the proposed Project buildings.[5]

3.5.4.4 Recycled/Reclaimed Water System

Overview

The use of recycled water is regulated through the California Code of Regulations (CCR). Pertinent excerpts from Titles 17 and 22 of the CCR statutes are compiled in the California Health Laws related to Recycled Water, also referred to as "The Purple Book," which was updated in June 2001. The California Water Code (Section13550) states that use of potable water in instances where non-potable water applications are appropriate and feasible is “a waste of water if recycled water is of adequate quality and is available for these (non- potable) uses and can be furnished at a reasonable cost to the user.”

Use of recycled water is also feasible and recommended if it “is not detrimental to public health and will not adversely affect downstream water rights, degrade water quality, and is not injurious to plant life, fish, and wildlife.” In this regard, regulations and guidelines for recycled water and recycled water purveyors have been established by the California Department of Health Services (DHS) and are published in the CCR. These regulations and guidelines establish recycled water treatment requirements, quality standards, and source reliability criteria, thereby ensuring protection and preservation of the public health and welfare. The IEUA provides reclaimed water to the City of Ontario.

Water demands (potable and non-potable) are expected to increase in the City of Ontario concurrent with ongoing and increasing development pressures. Accordingly, and to release potable water supplies for applications where it is required, reclaimed water should increasingly replace use of potable water where use of non-potable water is determined to be feasible and appropriate. Non-potable water applications typically include irrigation, recreation lakes and ponds, cooling towers, air conditioners, evaporative condensers, flushing toilets, decorative fountains, commercial laundries, commercial car washes, washing down roads or sidewalks, and firefighting. The IEUA treats its wastewater to tertiary treatment standards including disinfections at four treatment plants.

[5] Final Environmental Impact Report (FEIR) No. 88-2 (Certified EIR) for The Ontario Center Specific, 1990.

Existing Reclaimed Water System

Nearest to the Project are the IUEA reclaimed water main which is installed in Sixth Street, a short segment of reclaimed water line in Haven Avenue between Sixth and Fourth Streets, with another segment located within Fourth Street west of Haven Avenue. More specifically, a 30-inch reclaimed water main exists in Haven Avenue, turning west in Fourth Street. A 12-inch reclaimed water lateral exists in Milliken that terminates near Fourth Street. An 8-inch dry reclaimed water line has been installed in the east portion of Concours, from station 65+09.72 near Founder's Park extending to Milliken Avenue. This dry reclaimed water line was installed as part of the Concours street improvements in 2002.

Reclaimed Water System Improvements

The POCA project constructed new reclaimed water facilities within the Project site, as well as construction of the remaining planned connecting segment(s) in Milliken, Concours and Haven. Reclaimed water system improvements realized under the POCA include the following:

- An extension of the reclaimed water lateral from Milliken Avenue and Fourth Street, connecting to the dry reclaimed water line in Concours Street.
- Construction of the remaining portion of the reclaimed water main in Concours Street from Haven Avenue, extending to station 65+09.72 near Founder's Fountain.
- Completed the reclaimed water loop by constructing a segment from Haven Avenue and Fourth Street extending to Concours Street.
- Construct a reclaimed water loop in Public Street "A" to each intersection of Concours Street.
- Reclaimed water distribution lines will be extended northerly from Concours Street into the Project site and will be located within Street "A" and Street "C."

Reclaimed water lines within public streets are maintained by the City of Ontario. According to the POCA, the ownership and maintenance of common reclaimed water system components and lines within the Project site will be the responsibility of the Piemonte at Ontario Center Property Owners Association, established pursuant to the Piemonte Covenants, Conditions & Restrictions (CC&R's).

3.5.4.5 Stormwater Management

The following discussions describe existing stormwater management facilities serving the Project area and identify stormwater conveyance facilities and stormwater quality treatment systems and management practices required of the Project. As a general note, Project-related improvements and connections located within public streets are maintained by the City. However, the ownership and maintenance of common stormwater system components and lines, as well as water quality treatment facilities within the Project site, are the responsibility of the Project.

3.5.4.6 Stormwater Collection and Conveyance Facilities

The proposed Project comprises the central portion of the OCSP. Drainage in the area flows in a generally north to south direction. North of the Project site, an existing storm drain is located in Fourth Street. This storm drain collects and transports all drainage flows from the north and west to Guasti Park. As such, the Project would not have to accommodate stormwater flows from the north. Stormwater runoff from the

Project site would drain southerly to Concours Street. Receiving reinforced concrete pipe(rcp) drainage facilities are located within Concours Street, and range in size from 48-inches in diameter to 72-inches in diameter. Flows from these Concours facilities empty into a 9-foot by 6-foot reinforced concrete box (rcb). Flows then continue southerly toward Inland Empire Boulevard, then westerly to Mercedes Lane, and then southerly beneath I-10 in a 12-foot by 7-foot rcb to Lower Deer Creek Channel. Lower Deer Creek Channel confluences with Cucamonga Creek Channel and flows to the Prado Basin.[6]

The POCA concluded that the existing storm drainage facilities serving the Project site and vicinity have been previously sized to accommodate the proposed development. The POCA noted that as part of the site development, there would be construction of additional internal drainage system improvements, which connect to the existing area-wide drainage system. Connection points to the existing system would have been located so as to take full advantage of available carrying capacities. Because the POCA proposed a higher intensity than the proposed Project, it is anticipated that stormwater collection and conveyance facilities would be adequate to accommodate the proposed Project.

3.5.4.7 Stormwater Treatment/Water Quality Management Plan (WQMP)

In addition to construction of required stormwater conveyance facilities described above, the City of Ontario and the governing Regional Water Quality Control Board (RWQCB) require that the Project incorporate certain stormwater quality treatment facilities and water quality management practices, as discussed below.

Overview

The Santa Ana RWQCB, under Order Number R8- 2002-0012, NPDES Permit No. CAS618036, requires post-construction Best Management Practices (BMPs) to be implemented for new development and significant redevelopment, for both private and public agency projects. The purpose of a Water Quality Management Plan (WQMP) is to develop and implement a program, including application of BMPs, which minimizes the potential detrimental effects of urban stormwater runoff on the beneficial uses of receiving waters, including potential effects of increased pollutant loads and changes in hydrology.

Potentially adverse effects on receiving waters may be minimized through the implementation of site designs which minimize impervious surface areas and maximize onsite infiltration, resulting in corollary reductions in total stormwater runoff discharge volumes and rates and associated pollutant transport. Potential impacts to receiving waters are further reduced through implementation of source control BMPs, on-site structural treatment control BMPS, and participation in regional or watershed based structural treatment control BMPs.

Previous development of the site realized under the POCA met applicable RWQCB criteria for preparation and implementation of a WQMP. In this regard, the proposed Project will also incorporate any combination of site designs, source controls, and/or treatment control BMPs. Stormwater quality and

[6] Final Environmental Impact Report (FEIR) No. 88-2 (Certified EIR) for The Ontario Center Specific, 1990.

treatment requirements may also be realized through Project participation in a regionally-based treatment program which addresses all identified pollutants and hydrologic conditions of concerns.

Project-related Stormwater Treatment Requirements

The proposed Project is located within the Santa Ana Basin, designated as Region 8 by the RWQCB, and is tributary to Lower Deer Creek, the Chris Basin, Cucamonga Creek Flood Control Channel, Mill Creek, the Prado Flood Control Basin, and finally the Santa Ana River. In accordance with the Clean Water Act, the State of California maintains a list of impaired water bodies and the pollutant causing the impairment. The Cucamonga Creek Flood Control Channel is included on the State's list of impaired water bodies because of high coliform content. Mill Creek is also included on the impaired water body's list for nutrients, suspended solids, and pathogens. Because these receiving waters (which are tributary to the Project) are impaired, the Project must incorporate BMPs that are rated high to medium in effectiveness for reducing the impairments. This assures a no net loading on the affected tributaries and ensures that there are no additional pollutants added to the already impaired water bodies. Additionally, this Project is subject to the latest trash capture requirements from the State and RWQCB.

Project-Related Stormwater Treatment Improvements

The proposed Project would accomplish mandated stormwater quality standards and mitigate pollutants of concern through the use of stormwater clarifiers and underground infiltration systems on each individual parcel. All proposed treatment facilities would be designed and implemented consistent with City and RWQCB requirements. Additionally, this Project shall implement the appropriate trash capture devices in order to comply with the latest trash capture requirements.

Based on the preceding discussion, the proposed Project would not result in any new, increased or substantially different impacts to utilities than those considered and addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary, nor is there a need for any additional mitigation measures. Please refer also to Addendum Section 3.5.1, Land Use and Planning**.**

3.5.5 Traffic and Circulation

The Certified EIR considered potential traffic/circulation impacts of the OCSP. To determine relative traffic impacts resulting from the Project vis-a-vis traffic/circulation impacts identified in the Certified EIR, a detailed analysis was conducted to determine the number of vehicular trips that will be generated by the proposed Project (please refer to the Traffic Impact Analysis prepared by RK Engineering Group, Inc., dated September 17, 2021, included in this Addendum as Appendix A). This trip generation was then compared to the potential trip generation of correlating maximum development intensities considered in the Certified EIR.

Specifically, Statistical Area "E" is listed in the OCSP as having an allowable maximum development intensity of 2,200,000 SF, while Statistical Area "D" is listed as having an allowable maximum development intensity of 640,000 SF. Land uses in both Statistical Areas are defined as "Urban Commercial." For the purposes of developing correlating trip generation rates, Project-related trip generation calculations

exclude areas within Statistical Areas E and D that are currently developed. As noted in the Statistical Areas included below:

- A 32-acre site between Fourth Street and Concours Street, on either side of Duesenberg Drive (known as the Fairfield/Sares-Regis development which includes 800 multi-family DUs located within Statistical Area D).
- An approximately 26-acre parcel (Parcel 7) north of Concours Street that has been developed by the City of Ontario with an arena within Statistical Area E.
- A site in the south-west quadrant of the intersection of Milliken Avenue and Fourth Street, which has been developed with just under 108,000 square feet of retail/restaurant uses anchored by a Kohl's' department store located within Statistical Area E.

Traffic generation for the OCSP is shown in **Table 3-1**, *Summary of OCSP Trip Generation,* below:

Table 3-1: Summary of OCSP Trip Generation

Development	Land Use (ITE Code)	Quantity	Units 2	AM			PM			Daily
				In	Out	Total	In	Out	Total	
OCSP Assumptions										
Urban Commercial (OCSP Stat. Area E)	General Retail	2,220.000	TSF	1,382	884	2,266	3,960	4,290	8,250	94,468
Urban Commercial (OCSP Stat. Area D)	General Retail	640.000	TSF	402	257	659	1,152	1,248	2,400	27,482
Specific Plan Trip Generation Total				**1,784**	**1,141**	**2,925**	**5,112**	**5,538**	**10,650**	**121,950**

1 Source:
Piemonte at Ontario Center Addendum. February 2006. Table 1, Ontario Center Specific Plan (OCSC) Project Trip Generation, page 136.

2021 ITE Trip Generation Manual (11th Edition)
2 TSF = Thousand Square Feet
DU = Dwelling Units
3 Source: 2017 ITE Trip Generation Manual (10th Edition)

As noted in **Table 3-2**, above, Statistical Areas " D and E" were anticipated to generate 121,950 weekly trips, with 2,925 Weekday AM Peak Hour trips and 10,650 Weekday PM Peak Hour trips. **Table 3-2*, Summary of OCSP Project Trip Generation Available for Future Land Uses,*** shows the trip generation assumed to be available for other/new projects to be developed within Statistical Areas "D and E" of the OCSP. In this instance, the proposed Project's forecast trip generation would be compared against the trip generation assumed to be available for other/new projects, as shown in **Table 3-2**, below.

Table 3-2: Summary of OCSP Project Trip Generation Available for Future Land Uses

Development	Land Use (ITE Code)	Quantity	Units2	AM			PM			Daily
				In	Out	Total	In	Out	Total	
OCSP Assumptions										
Urban Commercial (OCSP Stat. Area E)	General Retail	2,220.000	TSF	1,382	884	2,266	3,960	4,290	8,250	94,468
Urban Commercial (OCSP Stat. Area D)	General Retail	640.000	TSF	402	257	659	1,152	1,248	2,400	27,482
Specific Plan Trip Generation Total				**1,784**	**1,141**	**2,925**	**5,112**	**5,538**	**10,650**	**121,950**

Development	Land Use (ITE Code)	Quantity	Units2	AM			PM			Daily
				In	Out	Total	In	Out	Total	
OCSP Assumptions										
Developed / Planned Areas										
955 N. Diesenberg Dr. (Vintage Apartments)	Multifamily Housing (Low-Rise) (220)	309	DU	30	94	124	99	58	157	2,083
950 N. Diesember Dr. (Camden Landmark Apartments)	Multifamily Housing (Low-Rise) (220)	491	DU	47	149	196	158	93	251	3,309
4000 E. Ontario Center Parkway (Arena)	Arena (460)[3]	8,000	Seats	NA	NA	NA	374	666	1,040	NA
901 N. Via Piemonte (5-Story Office)	General Office (710)	125.685	TSF	168	23	191	31	150	181	1,362
900 N. Via Piemonte (Marriott - Element Ontario Hotel)	Hotel (310)	131	Rooms	34	27	61	39	38	77	1,047
1051 N. Milliken Ave. (Kohl's)	Shopping Center (820)	96.736	TSF	50	31	81	158	171	329	3,580
1041 N. Milliken Ave. (Starbucks)		1.500	TSF	1	0	1	2	3	5	56
1021 N. Milliken Ave. (Applebee's)		4.603	TSF	2	1	3	8	8	16	170
4290 E. Fourth St. (El Pollo Loco)		2.406	TSF	1	1	2	4	4	8	89
4275 E. Concours St. (Home Thai/Professional Nail/Sunrise Optometry)		8.528	TSF	4	3	7	14	15	29	316
4295 E. Concours St. (Comerica Bank)		3.262	TSF	2	1	3	5	6	11	121
4150 E. Fourth St. (Spa/Wax Center/Weight Watchers)		8.385	TSF	4	3	7	14	15	29	310
4190 E. Forth St. (Jeweler/Hair Salon/Dentist)		7.320	TSF	4	2	6	12	13	25	271
4240 E. Fourth St. (Wells Fargo)		4.845	TSF	3	2	5	8	9	17	179
4120 E. Fourth St. (Big Al's/Petsmart/DSW Shoes)		91.280	TSF	48	29	77	149	161	310	3,378
4200 E. Fourth St. (Target and Garden Center)		151.741	TSF	79	48	127	248	268	516	5,616
SWC of N. Via Alba & E. Via Villagio	Multifamily Housing (Low-Rise) (220)	72	DU	7	22	29	23	14	37	485
NEC of Ontario Center Parkway & N.	Multifamily Housing (Low-	110	DU	11	33	44	35	21	56	741

Development	Land Use (ITE Code)	Quantity	Units2	AM			PM			Daily
				In	Out	Total	In	Out	Total	
OCSP Assumptions										
Via Alba	Rise) (220)									
Used-Up Allocation of Trips Total				**495**	**469**	**964**	**1,381**	**1,713**	**3,094**	**23,113**
Trips Available for Future Uses				**1,289**	**672**	**1,961**	**3,731**	**3,825**	**7,556**	**98,837**

1 Source:
Piemonte at Ontario Center Addendum. February 2006. Table 1, Ontario Center Specific Plan (OCSC) Project Trip Generation, page 136.
2021 ITE Trip Generation Manual (11th Edition)
2 TSF = Thousand Square Feet
DU = Dwelling Units
3 Source: 2017 ITE Trip Generation Manual (10th Edition)

As shown in **Table 3-2**, above, trip generation rate available for future uses include 98,837 Weekday Daily Trips, including 1,961 Weekday AM Peak Hour Trips and 7,556 PM Peak Hour Trips.

As discussed within this Addendum Section 3.0, "Environmental Analysis," total average daily traffic that would be generated by the proposed Project is forecast at 6,447 Weekday Daily Trips which include approximately 315 AM Peak Hour Trips and approximately 575 PM Peak Hour Trips. Additionally, the proposed Project is forecast to generate approximately 6,677 Saturday daily trips which include approximately 624 Saturday Peak Hour Trips.

After accounting for internal trip capture and applicable Institute of Transportation Engineers (ITE) pass-by trip rates, the proposed Project is forecast to generate approximately 5,691 Weekday Daily Trips with 300 Weekday AM Peak Hour Trips, and approximately 458 Weekday PM Peak Hour Trips. An internal trip capture reduction is applicable when a project site has more than one destination (such as the proposed Project), in which a person visits more than one destination onsite during the same visit.

Additionally, the proposed Project is forecast to generate approximately 5,813 Saturday daily trips which include approximately 490 Saturday Peak Hour trips. Compared to the originally anticipated and approved trip generation forecast for the Certified EIR/OCSP, the proposed Project would generate approximately 4.6 percent of the overall weekday daily trips and only 4.7 percent of Saturday trips compared to the Certified EIR/OCSP approved project.

Regarding the overall development intensity, the proposed Project is anticipated to be approximately 72 percent less intense than the OCSP, or only about 28 percent of the intensity would otherwise result under buildout of the Project site under the proposed Project per the maximum development intensities allowed under the OCSP for Statistical Areas "D and E."

Development intensity of the Project site, as characterized by traffic generation and intensity, is therefore substantially reduced when compared to maximum allowable development intensities identified under the OCSP. This reduction in traffic generation rates is due largely to the fact that the Project will implement an integrated lower residential component than the originally allowed under the OCSP, the POCA and the POOC, which would result in substantially reduced Daily and, AM and PM Peak Hour Trip generation rates compared to trip generation rates that would result from maximum allowable commercial intensities on the same acreage under the Certified EIR and the subsequently approved addendums.

In accordance with the Project site plan and land use concepts, the proposed Project will realize a mixed-use development of approximately 71,200 SF of commercial and up to 694 multi-family units. Detailed trip generation calculations for the Project land uses are included in the Traffic Impact Analysis, provided as Appendix A to this Addendum, and the relevant trip generation information is summarized in **Table 3-3,** *Comparison of Weekday Peak Hour Trip Generation.*

Table 3-3: Comparison of Weekday Peak Hour Trip Generation

Trip Generation Comparison	Daily	A.M. Peak Hour	P.M. Peak Hour
Allowable trips per Ontario Center Specific Plan (OCSP) [1]	98,837	1,961	7,556
Total Net Adept-Piemonte Trips [2]	5,691	300	458
Trip Generation Difference Between OCSP and Adept-Piemonte	93,146	1,661	7,098
Percent of Trips Used by Adept-Piemonte Project	6.1%	18%	6.4%
Source: Piemonte at Ontario Center Addendum. 2006. Table 3-2, Comparison of Weekday Trip Generation. Page 3-16.			

As presented in **Table 3-3**, above, total average daily trips generated by the Project is approximately 95 percent less than would otherwise result under buildout of the subject site per the maximum development intensities allowed under the OCSP and considered in the Certified EIR. Project related AM Peak Hour Trip generation is forecast to be only 18 percent of the allowable trips or 82 percent less than the maximum allowed under the OCSP. Similarly, the PM Peak Hour Trip generation forecast for the Project is 6.4 percent of the allowable trips or 93.6 percent less than the maximum development allowed under the OCSP.

The trip generation data summarized in Table 3-3 indicates that the Project would not exceed the total daily, nor peak-hour trip generation estimates resulting from maximum allowable development intensities considered and addressed in the Certified EIR. On this basis, the Project will not generate new or additional traffic or transportation impacts that were not previously identified in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary, nor is there a need for any additional mitigation measures.

3.5.5.1 CEQA VEHICLE MILES TRAVELED ANALYSIS

In response to SB 743, the CNRA certified and adopted new CEQA Guidelines in December 2018 which now identify VMT as the most appropriate metric to evaluate a project's transportation impact under CEQA (Section 15064.3).

Effective July 1, 2020, the previous CEQA metric of LOS, typically measured in terms of automobile delay, roadway capacity and congestion, generally will no longer constitute a significant environmental impact. The City of Ontario has adopted guidelines to provide recommendations and methodology and thresholds of significance for identifying VMT related impacts. The proposed Project is subject to a VMT analysis and will adhere to the recommendations and practices described in the City of Ontario Planning Commission Resolution No. PC20-021 (May 26, 2020).

Based on the analysis methodology described in the City of Ontario's adopted Planning Commission Resolution regarding VMT, project screening procedures have been implemented to identify projects that may be presumed to have a less than significant impact absent substantial evidence to the contrary and

will be exempted from further project-level VMT assessment. According to the City's guidelines, land use projects located within a Transit Priority Area (TPA) and that have the following characteristics are presumed to have a less than significant impact absent substantial evidence to the contrary:

- Has a Floor Area Ratio of 0.75 or higher;
- Includes no more parking for residents, customers, or employees than the City Development Code mandates;
- Is consistent with the Sustainable Communities Strategy (SCS) as determined by the City with input from the Southern California Association of Governments (SCAG) or San Bernardino County Transportation Authority (SBCTA); and
- If there are existing affordable residential units, replaces those residential units with at least as many similarly affordable units and not with a smaller number of moderate or high-income residential units.

Based on the Project site plan, the proposed Project encompasses the following Assessor Parcel Numbers shown in **Table 3-4***, Parcel Numbers*.

Table 3-4: Parcel Numbers

Lot	Assessor Parcel Number (APN)
A & B	021-020-501
C	021-020-438
D	021-020-438
F	021-020-412-15
G	021-020-420-25

Hence, the VMT analysis examined in this study focuses on the land use components from Lot A, Lot B, Lot C, and Lot D. After utilizing the SBCTA VMT Screening Tool, all Project parcels, with the exception of a portion of Parcel F of the proposed Project, are located within a TPA and therefore do not require a VMT analysis.

The portion of Parcel F which is not within the TPA is not planned to consist of any trip-generating land uses as those portions of the site will only be used to relocate some of the existing parking capacity on the Project site. Hence, those non-TPA areas are not subject to VMT analysis. Additionally, the proposed Project is expected to implement the following design features identified in the Toyota Arena Mixed-Use Development Air Quality and Greenhouse Gas Impact Study, City of Ontario, California, June 4, 2021. The following Project design features are trip reduction measures to reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking:

1 Improve the walkability and design of the Project by including pedestrian and bicycling connections within the Project site and to adjacent off-site facilities (i.e., sidewalks, crosswalks, footpaths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2 Provide traffic calming measures (i.e., marked crosswalks, raised crosswalks, raised intersections, count-own signal timers, curb extensions, speed tables, median islands, tight

corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.).

3 Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

In addition, the PA VMT Per Population and PA VMT Per Worker is lower than the jurisdiction average VMT. Therefore, the proposed Project is found to have a *less than significant VMT impact.*

3.5.6 Biological Resources

The Certified EIR addressed potential biological resources impacts of the OCSP, including potential impacts to native plants and wildlife species. Due to the site's previous uses (including operation of the Ontario Motor Speedway, along with agricultural and industrial uses) the site was found to be extremely disturbed. The Certified EIR notes that "Due to the lack of native vegetation and the disturbed nature of the site, no unique (listed or candidate) species of plants or animals were observed or are anticipated." (EIR 88-2, Page III-65). No impacts were identified, and no mitigation measures were proposed.

The scope and character of the proposed Project development are consistent with the type and scope of development considered in the Certified EIR, and as such would not result in new, additional, or different impacts to biological resources than were considered and addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

3.5.7 Air Quality

A Project specific Air Quality and Greenhouse Gas Impact Study was prepared by RK Engineering Group, Inc. Findings are summarized herein, and the technical study is available as Appendix B of this Addendum.

The Certified EIR considered potential air quality impacts resulting from the OCSP. Temporary air quality impacts were anticipated to result from Project construction activities, which include preparation of the Project site, and construction of the proposed commercial, residential, and supporting facilities. During construction, air pollutants would be emitted by construction equipment. Dust (PM_{10} emissions) would also be generated by grading and site preparation activities.

The Certified EIR addresses construction-related air quality impacts as follows:

> "Construction emissions will be short-term. Pollutants from construction-related activities are from final site development on 560 acres over an undefined time period. The Ontario Center will ultimately be a mixed-use development on 700 acres. The generally referenced full buildout date is 2010. Presently, portions of the site are in varying stages of development including constructed buildings and roadways. Additionally, the entire site has already been "rough" graded, meaning approximately 75 percent of construction-related activities have been conducted (i.e., excavations, the removal and transport of material and the construction of building pads). (*The Ontario Center EIR*, page III-13)."

As noted in the discussion of traffic and circulation presented in Addendum Section 3.5.5, a reduction in traffic is projected to occur when comparing the proposed Project operations to maximum development intensities considered in the Certified EIR; thus, no increase in mobile air emissions is expected to occur.

Operational emissions resulting from the consumption of natural gas and electricity by new project-related land uses (area sources) were also estimated within the Certified EIR. As the proposed Project would realize an overall reduction in development intensity when compared to the maximum allowable intensities considered in the Certified EIR, area source emissions would be no greater than, and would likely be reduced when compared to emissions estimates presented in the Certified EIR. It is also noted that on a project-by-project basis, area source emissions are incrementally insignificant when compared to mobile source emissions, and typically account for less than one percent of a given project's total operational emissions. Therefore, any potential increase in area source emissions resulting from the proposed Project would be more than offset by the projected reduction in mobile source emissions. It is further noted, that in providing an integrated mix of residential and commercial products, the proposed Project establishes and supports land use plans that act to reduce commute distances, with correlating reductions in vehicle source emissions. The Project specific Air Quality and Greenhouse Gas Impact Study concluded the following regarding Mobile Source Emissions:

Mobile Source Emissions

Mobile source emissions are the largest source of long-term air pollutants from the operation of the Project. Mobile sources are direct sources of Project emissions that are primarily attributed to tailpipe exhaust and road dust (tire, brake, clutch, and road surface wear) from motor vehicles traveling to and from the site. Estimates of mobile source emissions require information on four parameters: trip generation, trip length, vehicle/fleet mix, and emission factors (quantity of emission for each mile traveled or time spent idling by each vehicle). The trip generation rates, trip length and trip percentages for the Project are based on the latest version of the Toyota Arena Mixed Use Development Traffic Impact Study Scoping Agreement, by RK, May 2021 and SBCTA VMT Tool7.[7]

The Emission Factors (EMFAC2017) 2017 model and off-model adjustments factors to account for the Statistical AreaFE Vehicle Rule is used to estimate the mobile source emissions that are embedded in the CalEEMod emissions model. No adjustments have been made to default emission factors. The Project's total VMT estimated by CalEEMod is shown in the **Table 3-5***, Operational Vehicle Miles Traveled,* for this project.

Table 3-5: Operational Vehicle Miles Traveled

Land Use	Annual VMT
Multi-family Mid-Rise[1]	5,682,657
Commercial/Retail Center	4,539,098
Total	**10,221,755**

Source: RK Engineering. Air Quality and GHG Analysis. *Table 10, Operational Vehicle Miles Traveled*.
[1] The VMT estimates for residential home-based trips are based on estimates from the SBCTA VMT Tool, which shows daily home-based VMT per capita for TAZ 53690101 of 7.9 VMT per population for model year 2023.

[7] SBCTA VMT Screening Tool. https://devapps.fehrandpeers.com/sbctavmt/

The operational vehicle fleet mix has been adjusted to reflect vehicle types used for typical residential home-based trips and the commercial/retail and office trips generated by the Project. The SCAG regional travel demand model does not include heavy-duty trucks, buses or other large vehicles that would require passenger car equivalent (PCE) adjustments for residential home-based trips.

The proposed Project does not consist of land uses that would typically require PCE adjustments to account for large trucks, such as warehousing. To be conservative, the Air Quality/GHG analysis has assumed that two percent of the total residential home-based trips and commercial/retail and office trips will include trucks with a gross vehicle weight rating (GVWR) of 10,000 pound or greater. This includes LHD2, MHD, HHD, OBUS, UBUS, and SBUS vehicles. The 2% mix is also consistent with the default Highway Capacity Manual (HCM) assumptions. The adjusted vehicle mix is proportioned according to the default CalEEMod vehicle mix.

Air Quality Regional Significance Thresholds

The SCAQMD has established air quality emissions thresholds for criteria air pollutants for the purposes of determining whether a project may have a significant effect on the environment per Section 15002(g) of the Guidelines for implementing CEQA. By complying with the thresholds of significance, the Project would be in compliance with the SCAQMD Air Quality Management Plan (AQMP) and the federal and state air quality standards. **Table 3-6*, SCAQMD Regional Significance Air Quality Thresholds***, lists the air quality significance thresholds for the six air pollutants analyzed in this report. Lead is not included as part of this analysis as the Project is not expected to emit lead in any significant measurable quantity.

Table 3-6: SCAQMD Regional Significance Air Quality Thresholds

Pollutant	Construction (lbs/day)	Operation (lbs/day)
NOx	100	55
VOC	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
SOx	150	150
CO	550	550
Source: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significancethresholds.pdf		

Short Term Air Quality Impacts – Construction

Daily Emissions - Construction

Daily air quality emissions include both on-site and off-site emissions associated with construction of the Project. Regional daily emissions of criteria pollutants are compared to the SCAQMD thresholds of significance.

As shown in **Table 3-7*, Daily Construction Emissions,*** daily emissions of criteria pollutants are expected to be below the allowable thresholds of significance. CalEEMod daily emissions outputs are provided in Appendix A of the Air Quality and Greenhouse Gas Emissions Impact Study, provided as Appendix B to this Addendum.

Table 3-7: Daily Construction Emissions

Maximum Daily Emissions (lbs/day)[1,2]						
Activity	**VOC**	**NOx**	**CO**	**SO_2**	**MP_{10}**	**$PM_{2.5}$**
Demolition	0.91	14.16	26.89	0.09	7.84	1.56
Site Preparation	0.55	2.08	21.68	0.04	7.78	3.98
Grading	0.85	3.36	33.90	0.06	3.85	1.56
Building Construction	4.86	17.12	60.88	0.16	11.46	3.28
Paving	1.29	1.25	17.86	0.02	0.21	0.08
Architectural Coating	70.26	0.56	8.39	0.02	1.96	0.53
Maximum[1]	**70.26**	**17.12**	**60.88**	**0.16**	**11.46**	**3.98**
SCAQMD Threshold	75	100	550	150	150	55
Exceeds Threshold?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Source: RK Engineering. Air Quality and GHG Analysis. *Table 13, Daily Construction Emissions.*
Notes:
DU: Dwelling Unit(s)
SF: Square Feet

The Project must follow mandatory SCAQMD rules and requirements with regards to fugitive dust control, as described in Section 6.1.3 of the SCAQMD rules. Compliance with the standard dust control measures is considered to be part of the conditions of approval for the Project and built into the design features. Table 3-7, above, shows that, the Project's daily construction emissions would be below the applicable SCAQMD air quality standards and thresholds of significance. As a result, the Project would not contribute substantially to an existing or projected air quality violation.

Furthermore, by complying with the SCAQMD standards, the Project would not contribute to a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors). The Project's short-term construction impact on regional air resources would be less than significant.

On the basis of the preceding discussions, the proposed Project does not create new, additional, or substantially different air quality impacts than were considered and addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

3.5.8 Noise

A Project specific Noise Impact Study was prepared by RK Engineering Group, Inc. Findings are summarized herein, and the technical study is available as **Appendix C** to this Addendum.

The Certified EIR considered potential noise impacts resulting from implementation and operations of the OCSP and identified two characteristic noise sources typically identified with land use intensification. These include construction activities, especially heavy equipment, which will create short-term noise increases, and operational noise, including noise generated by traffic (mobile sources) and on-site facilities (area sources). In addition, sources of existing noise affecting the Project area are assessed, including vehicular noise from surrounding roadways.

3.5.8.1 Potential Off-site Noise Impacts

Since the Certified EIR was adopted, numerous development projects have been approved and constructed in the Project vicinity, including residential uses, which are considered to be noise-sensitive receptors. Residential uses that may be affected by Project-related noise include the adjacent Fairfield/Sares-Regis residential project, and to lesser extent, residential uses located northerly of Fourth Street within the neighboring City of Rancho Cucamonga.

Potential Construction Noise and Vibration Impacts

Construction equipment, activities, and techniques required to construct the Project are consistent with the character and extent of construction methodologies considered in the Certified EIR. That is, the Project would not require, nor employ extraordinary construction techniques nor unusual construction equipment that would generate noise not previously considered in the Certified EIR. Nor would the Project result in construction beyond the physical limits of construction considered in the Certified EIR. As such, construction-related noise sources and noise levels would not be substantially greater, nor different than, those previously considered and addressed in the Certified EIR.

It is also important to note that noise-intensive construction activities are limited in duration to the construction period; and, except in unusual circumstances, noise-producing construction activities typically end by 4:00 p.m. The Project is also required to comply with construction time limitations established by the City Noise Ordinance, which limitations act to reduce the extent, intensity, and duration of construction noise during noise-sensitive morning and evening hours, as well as on weekends and holidays. On the basis of the preceding discussions, the proposed Project would not result in new, additional, or substantially different off-site construction-related noise impacts than were considered and addressed in the Certified EIR.

Construction and Vibration Impacts

Temporary construction noise and vibration impacts have been assessed from the Project site to the nearest sensitive residential use to the north of Lot F and Lot G. The degree of construction noise would vary depending on the type of construction activity taking place and the location of the activity relative to the surrounding properties. Chapter 29: Noise, Section 5-29.06 of the City's municipal code states that the following activities shall be exempted from the provisions of the noise code.

- Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the following provisions of § 5-29.09;
    - No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

- No landowner, construction company owner, contractor, subcontractor, or employer shall permit or allow any person or persons working under their direction and control to operate any tool, equipment, or machine in violation of the provisions of this section.

To help further assess potential construction noise level impacts under CEQA, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006) criteria is used as a referenced threshold of significance in this report. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA Leq for an 8-hour period. In compliance with the City's Municipal Code, it is assumed construction would not occur during the noise-sensitive nighttime hours.

Typical Construction Noise Levels

Table 3-8*, Typical Construction Noise Levels*, shows typical construction noise levels compiled by the Environmental Protection Agency (EPA) for common type construction equipment. Typical construction noise levels are used to estimate potential project construction noise levels at the adjacent sensitive receptors.

Table 3-8: Typical Construction Noise Levels

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 – 76
Front Loaders	73 – 84
Backhoes	73 – 92
Tractors	75 - 95
Scrapers, Graders	78 – 92
Pavers	85 – 87
Trucks	81 – 94
Materials Handling	
Concrete Mixers	72 – 87
Concrete Pumps	81 – 83
Cranes (Movable)	72 – 83
Cranes (Derrick)	85 – 87
Stationary	
Pumps	68 - 71
Generators	71 – 83
Compressors	75 - 86
Impact Equipment	
Pneumatic Wrenches	82 – 87
Jack Hammers, Rock Drills	80 – 99
Pile Drivers (Peak)	95 – 105
Other	
Vibrators	62 – 82
Saws	71 - 82

Source: RK Engineering. Noise Analysis. *Table 17, Typical Construction Noise Levels.*
Referenced Noise Levels from the Environmental Protection Agency (EPA)

Construction Noise Impact Analysis

The assessment analyzed potential noise impacts during all expected phases of construction, including: demolition, site preparation, grading, building construction, paving, and architectural coating. Construction phasing and equipment usage assumptions are referenced from the Air Quality and Greenhouse Gas Impact Study provided as Appendix B to this Addendum.

The Project's estimated construction noise levels have been calculated using the Federal Highway Administration (FHA) Roadway Construction Noise Model Version 1.1. **Table 3-9*, Project Construction Noise Levels – Residential Uses to the North,*** shows the noise level impacts to the nearest residential property lines to the north at 160 feet.

Table 3-9: Project Construction Noise Levels – Residential Uses to the North

Phase	Equipment	Quantity	Equipment Noise Level at 160 ft (dBA Leq)	Combined Noise Level (dBA Leq)
Demolition	Concrete/Industrial Saw	1	72.5	76.3
	Excavator	3	66.6	
	Rubber Tired Dozer	2	67.6	
Site Preparation	Rubber Tired Dozers	3	67.6	77.5
	Tractors/Loaders/Backhoes	4	69.9	
Grading	Excavators	2	66.6	78.1
	Graders	1	70.9	
	Rubber Tired Dozers	1	67.6	
	Scrappers	2	69.5	
	Tractors/Loaders/Backhoes	2	69.9	
Building Construction	Cranes	1	62.5	78.1
	Forklifts	3	60.9	
	Generator Sets	1	67.5	
	Tractors/Loaders/Backhoes	3	69.9	
	Welders	1	59.9	
Paving	Cement and Mortar Mixer	2	64.7	71.8
	Pavers	2	64.1	
	Paving Equipment	2	62.9	
Architectural Coating	Air Compressor	1	63.6	63.6
Worst Case Construction Phase Noise Level – Leq (dBA)				78.1
FTA Construction Noise Criteria (Detailed Assessment: 8 Hour Leq)				80.0
Noise Level Exceeds FTA Criteria?				**No**
Source: RK Engineering. Noise Analysis. *Table 18, Project Construction Noise Levels – Residential Uses to the North.*				

As shown in **Table 3-9**, above, Project construction noise levels are expected to be below the recommended 8-hour construction noise threshold provided by the FTA for adverse community reaction at the adjacent residential uses.

Construction Vibration

To determine the vibratory impacts during construction, reference construction equipment vibration levels were utilized and then extrapolated to the façade of the nearest adjacent structures. The nearest sensitive receptors are the commercial/retail structures located adjacent to the Project site. All structures surrounding the Project site are "new structures." No historical or fragile buildings are known to be located within the vicinity of the site.

The construction of the proposed Project is not expected to require the use of substantial vibration inducing equipment or activities, such as pile drivers or blasting. The main sources of vibration impacts during construction of the Project would be the operation of equipment such as bulldozer activity during demolition, loading trucks during grading and excavation, and vibratory rollers during paving. The construction vibration assessment utilizes the referenced vibration levels and methodology set forth within the Transit Noise and Vibration Impact Assessment Manual, FTA, September 2018. **Table 3-10***,* ***Typical Construction Vibration Levels,*** shows the referenced vibration levels.

Table 3-10: Typical Construction Vibration Levels

Equipment	Peak Particle Velocity (PPV) (inches/seconds) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Piledriver (impact)	1.518 (upper range)	112
	0.664 (typical)	104
Piledriver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory roller	0.210	94
Hoe ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: RK Engineering. Noise Analysis. *Table 19, Typical Construction Vibration Levels.*
[1] Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018

Table 3-11*, Construction Vibration Impact Analysis,* shows the Project's construction-related vibration analysis at the nearest structures to the Project construction area. Construction impacts are assessed from the closest area on the Project site to the nearest adjacent structure at approximately 50 feet. The worst-case vibratory impact from the site is estimated to be 0.098 PPV (in/sec) at the structures to the west. No damage potential is expected.

Table 3-11: Construction Vibration Impact Analysis

Construction Activity	Distance Nearest Structure (ft)	Duration	Calculated Vibration Level - PPV (in/sec)	Damage Potential Level	Annoyance Criteria Level
Large Bulldozer	50	Continuous/Frequent	0.042	No Impacts	Distinctly Perceptible
Vibratory Roller	50	Continuous/Frequent	0.035	No Impacts	Barely Perceptible
Loaded Trucks	50	Continuous/Frequent	0.098	Extremely Fragile Buildings, Ruins, Ancient Mountains	Distinctly Perceptible
Caisson Drilling	50	Continuous/Frequent	0.042	No Impacts	Distinctly Perceptible

Source: RK Engineering. Noise Analysis. *Table 20, Construction Vibration Impact Analysis.*

As shown in **Table 3-11**, above, Project related construction activity is not expected to cause any potential damage to the nearest structures. The annoyance potential of vibration from construction activities would range from "distinctly perceptible" to "barely perceptible." Construction vibration calculation worksheets are shown in Appendix D of the Noise Study, provided as Appendix C of this Addendum.

Operational Noise

With regard to operational noise, land uses proposed by the Project are consistent with development envisioned under the OCSP, and overall development intensities resulting from the Project are less than the maximum allowable development intensities for Statistical Areas D and E, as assessed in the Certified EIR. As such, the traffic and attendant vehicular noise from both passenger vehicles and delivery operational noise can be expected to be similar, but not greater than that presented in the Certified EIR.

Stationary Source Noise Impacts

The Project is not expected to consist of significant sources of stationary noise. The main sources of potential stationary noise impacts from the Project would mainly include on-site circulation and parking lot noise, Heating, Ventilation and Air Conditioning (HVAC) units and outdoor conversational noise.

The types of on-site noise from the Project are typically considered compatible with other adjacent commercial/mixed use and would not typically be categorized as loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness. In particular, social activities and vehicular related noise are generally substantially less during the noise sensitive nighttime hours. Although, mechanical HVAC equipment does have the potential to operate 24-hours a day.

Rooftop mechanical HVAC equipment are expected to be located at the center of each building. The nearest noise sensitive residential receptors are located approximately 750 feet away to the west of the proposed Lot C HVAC units and the noise impacts from the operation of mechanical HVAC equipment is expected to not be significant at this distance. Therefore, a preliminary evaluation of noise impacts at the adjacent commercial uses has been provided.

Parking lot noise would occur from vehicle engine idling and exhaust, doors slamming, tires screeching, people talking, and the occasional horn honking. Parking lot noise is expected to occur on Lot F and Lot G and is conservatively assessed from the first parking space to northern residential properties; approximately 160 feet away. The site plan shows commercial/retail uses would face Via Piemonte and would be mostly shielded from the line of sight from the adjacent receptor property lines. Therefore, the outdoor conversational noise from the commercial/retail uses would not substantially contribute noise impacts to adjacent properties and was not included as a part of this analysis. Refer to **Table 3-12**, ***Stationary Noise Impact Analysis***.

Table 3-12: Stationary Noise Impact Analysis[1]

Receptor			Stationary Noise Source				Combined Exterior Noise Level (Leq) dBA	
Number[2]	LU	Location	Source	Location	Distance[3]	Noise Level (Leq) dBA	Daytime[4]	Nighttime[4]
1	R	North of Lot F & G	Parking Lot	Lot F & G	160	34.8	34.8	34.8
2	R	West of Lot C	HVAC	Lot C	510	32.2	32.6	32.6
			Parking Lot	Lot F	735	21.9		
City of Ontario Residential Exterior Standard Levels							**65.0**	**50.0**
Noise Level Exceed Standard (?)							**No**	**No**
3	C	South of Lot C & D	HVAC	Lot A	213	39.6	43.7	43.7
			HVAC	Lot C	243	38.5		
			HVAC	Lot D	243	38.5		
			Parking Lot	Lot F & G	530	24.7		
4	C	East of Lot D	HVAC	Lot D	485	32.7	36.6	36.6
			Parking Lot	Lot G	170	34.3		
5	C	East of Lot A	HVAC	Lot A	213	39.6	42.4	42.4
			HVAC	Lot B	525	39.1		
6	C	South of Lot B	HVAC	Lot A	580	31.1	39.0	39.0
			HVAC	Lot B	250	38.2		
City of Ontario Residential Exterior Standard Levels							**65.0**	**60.0**
Noise Level Exceed Standard (?)							**No**	**No**

Source: RK Engineering. Noise Analysis. *Table 14, Stationary Noise Impact Analysis.*
[1] Stationary noise calculation worksheets are shown in Appendix C.
[2] Refer Exhibit A for Receptor Location.
[3] Distance from the receptor to the nearest noise source.
[4] Daytime: (7:00 A.M. to 10:00 P.M.); Nighttime: (10:00 P.M. to 7:00 A.M.

As shown in **Table 3-12**, above, operational noise levels generated by the proposed Project are not expected to exceed the City's daytime standards and nighttime noise standards at the nearest receptor property line for both commercial and residential uses. Stationary noise calculation worksheets are shown in Appendix C of the Noise Impact Study provided as Appendix C of this Addendum.

Preliminary Interior Noise Analysis

Traffic noise along the adjacent roadways is expected to be the primary source of ambient noise impacting future residents at the Project site. Traffic noise is analyzed to determine the Project's noise/land use compatibility setting and to determine future noise levels to habitable exterior and interior areas on the

Project site. This section of the analysis does not necessarily apply to CEQA, as recent court rulings have indicated that CEQA is primarily concerned with the project's impact of the environment, not the environment's impact on a Project.

Future traffic noise along the roadways is obtained from The Ontario Plan Figure S-3a, Future Roadway Noise Contours and represents the noise levels at the Project site. **Table 3-13** shows the estimated future traffic noise levels at the Project site and the noise/land use compatibly rating based on the City of Ontario General Plan Table LU-7 standards; refer to **Table 3-13, *Future Traffic Noise Levels***. The Ontario Plan Noise Level Exposure and Land Use Compatibility Guidelines is provided in Appendix A of the Noise Analysis Study, provided as **Appendix C** of this Addendum.

Table 3-13: Future Traffic Noise Levels[1]

Receptor	Exterior Noise Level (Ldn) (dBA CNEL)	Noise/Land Use Compatibility
Multifamily Residential	65-70	Normally Unacceptable
Retail	65-70	Normally Acceptable
[1] Source: The City of Ontario General Plan Table LU-7		

The Project may experience noise levels that fall within the normally unacceptable range (65-75 CNEL) for the residential part of the Project and clearly acceptable (65-70 CNEL) for the retail part of the Project. Hence, upgraded building construction techniques are expected to be required to achieve interior noise level standards for the residential uses. Based on the existing noise levels (CNEL) nearest the Project site range from 60.6 CNEL to 62.5 CNEL. It should be noted that the existing noise levels were taken during typical weekday conditions and do not include noise levels during an event at the Toyota Arena event center, which may further increase noise levels (i.e., traffic) in the area. Therefore, in order to be conservative, the higher limit of the future traffic noise levels at the Project site (70 dBA CNEL) has been utilized to conduct preliminary interior noise analysis.

A preliminary interior noise analysis has been prepared for the sensitive receptor locations using a typical "windows open" and "windows closed" condition. A "windows open" condition assumes 12 dBA of noise attenuation from the exterior noise level. A "windows closed" condition" assumes 20 dBA of noise attenuation from the exterior noise level. **Table 3-14**, ***Preliminary Interior Noise Impact Analysis***, indicates the interior noise levels for the residential uses on the Project site.

Table 3-14: Preliminary Interior Noise Impact Analysis

Receptor Location	Exterior Noise Level at Building Façade	Interior Noise Standard	Required Building Shell Noise Reduction	Interior Noise Level with Standard California Construction Windows (STC > 25)		STC Rating for Windows Facing Subject Roadway
				"Windows Open"1	"Windows Closed"2	
Multifamily Residential	70	45.0	25	58	50	28
Source: RK Engineering. Noise Analysis. *Table 16, Preliminary Interior Noise Impact Analysis.* [1] A minimum of 12 dBA noise reduction is assumed with the "windows open" condition. [2] A minimum of 20 dBA noise reduction is assumed with the "windows closed" condition.						

The Project is expected to require a "windows closed" condition and upgraded STC rated windows to meet the City/State interior noise standard of 45 dBA. To accommodate a “windows closed” conditions, all units shall be equipped with adequate fresh air ventilation, per the requirements of the California Uniform Building Code (UBC). Prior to issuance of building permits, the Project proponent should demonstrate to the City building department that the proposed building shell and window assemblies would achieve exterior to interior noise reduction necessary to meet the State of California and City of Ontario requirements. Furthermore, the Project shall comply with California Title 24 insulation building requirements for multi-family dwelling units for common separating assemblies (e.g., floor/ceiling assemblies and demising walls).

Los Angeles Ontario International Airport (LAONT)

The Los Angeles Ontario International Airport (LAONT) is centrally located in the City of Ontario. The airport is a medium-hub, full-service airport. Traffic at the airport includes general aviation, commercial passenger aviation, and air cargo freight movement. LAONT is a member of the Los Angeles World Airport (LAWA) system. LAWA is currently developing a Master Land Use Plan for LAONT that will provide a framework for the airport’s development and use through the year 2030.

The LAONT is located approximately 1.25 miles to the southwest of the Project site. A noise/land use compatibility assessment has been performed based on the Project’s location to the LAONT Airport. The noise contour maps for the LAONT Airport are provided in Exhibit D of the Noise Impact Study, provided as Appendix C of this Addendum. The Project is located outside of the 60 dB Ldn noise contour limit; therefore, the exterior noise impact from the airport would be within the allowable limits for residential land uses and the Project is considered compatible with the surrounding land use and noise environment. Noise from airport operations is expected to generate a *less than significant* on the proposed Project.

Design Features

The following recommended Project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels.

Design features are assumed to be part of the conditions of the proposed Project and integrated into its design. Design features are *not* typically considered mitigations under CEQA.

Operational Design Features

NOI-DF-1 Prior to the issuance of building permits, the Project shall prepare a final acoustical study that demonstrates building construction will achieve the minimum interior noise standard of 45 dBA CNEL for all residential units located along arterial roadways and/or adjacent to industrial uses, per the California Building Standards Code. The following noise control measures may be required for dwelling units located near adjacent roadways and industrial uses:

- Install sound barriers between residences and noise sources.
- Install double-paned or similar sound rated windows.
- Provide sound insulating exterior walls and roofing systems.

- Locate and/or design attic vents to minimize sound propagation into each home.
- Place dwelling as far as practical from the noise source.

NOI-DF-2 The Project shall comply with California Title 24 building insulation requirements for exterior walls, roofs and common separating assemblies (e.g., floor/ceiling assemblies and demising walls).

NOI-DF-3 For proper acoustical performance, all exterior windows, doors, and sliding glass doors should have a positive seal and leaks/cracks must be kept to a minimum.

NOI-DF-4 The final building plans shall ensure that HVAC units are not located within an area of the project site that would contribute to a noise level exceedance at any adjacent property line, per the City of Ontario Municipal Code requirements. To meet the City's noise standards the following measures should be followed:

- All HVAC equipment shall be shielded or enclosed from the line of sight of adjacent residential uses.

Construction Design Features

NOI-DF-5 Prepare a construction management plan and obtain a construction work permit from the City of Ontario prior to starting construction. The construction management plan shall ensure all contractors implement construction best management practices to reduce construction noise levels. Best management practices shall include the following:

- All construction equipment shall be equipped with mufflers and other suitable noise attenuation devices (e.g., engine shields).
- Grading and construction contractors shall use quieter equipment as opposed to noisier equipment (such as rubber-tired equipment rather than track equipment), to the maximum extent feasible.
- If feasible, electric hook-ups shall be provided to avoid the use of generators. If electric service is determined to be infeasible for the site, only whisper-quiet generators shall be used (i.e., inverter generators capable of providing variable load).
- Use electric air compressors and similar power tools rather than diesel equipment, where feasible.
- Locate staging area, generators and stationary construction equipment as far from the adjacent residential homes as feasible.
- Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than five minutes.
- Provide notifications and signage in readily visible locations along the perimeter of construction sites that indicate the dates and duration of construction activities, as well as provide a telephone number where neighbors can inquire about the construction process and register complaints to a designated construction noise disturbance coordinator.

- Construction activities shall not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays and Saturday or Sunday between the hours of 6:00 p.m and 9:00 a.m.

NOI-DF-6 No impact pile driving or blasting activities shall be permitted on the Project site during construction. If impact pile driving or blasting is required, a follow-up noise and vibration impact assessment shall be conducted prior to start of any activity.

3.5.9 Aesthetics

The proposed Project reflects development and design standards envisioned under the OCSP. (Please refer to the SPA document for a comprehensive listing of proposed design standards.) Prior to issuance of building permits, the City would review Project facilities' designs for consistency with the OCSP. On this basis, the Project would not result in new, additional, or different impacts than were considered and addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

3.5.10 Seismicity

In terms of seismicity, the Certified EIR indicates that although active earthquake faults are known to exist within the general Project vicinity, no known faults traverse the site. The uses proposed by the Project would result in localized increased exposure of persons and structures to potential seismic hazards. However, the risk at the Project site is considered no greater than that experienced throughout other areas of southern California.

Application of the latest applicable established uniform building code (UBC) seismic design, engineering, and construction standards would ensure that, short of a catastrophic event, Project structures and infrastructure systems would withstand anticipated seismic activity. As such, the Project would not result in new, additional, or different impacts than were considered and addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

3.5.11 Hydrology

The Certified EIR indicates that extensive regional drainage improvements had been constructed since the original approval of the OCSP. These improvements included the Day Creek Channel, Deer Creek Channel, Turner Basins, and the Fourth Street Interceptor. The Certified EIR stated that, "with the exception of Day Creek, all downstream drainage systems have been upgraded to accept the predicted fully developed runoff from The Ontario Center. Day Creek improvements were funded and scheduled to be constructed in the near future, as of the approval of the Certified EIR, which would have updated the mainline systems below The Ontario Center."

The Project developer was required to install new storm drainage facilities pursuant to adopted drainage plans if necessary, and, if modifying existing drainage facilities, must have ensured that no facility was removed without replacement by another functionally equivalent facility. Easements are required for drainage facilities placed outside of public streets. As required under adopted BMPs, temporary siltation basins and/or similar facilities would be implemented as a means of reducing siltation during construction activities.

Application of the above-noted and similar measures as required by the City and RWQCB, would ensure that storm drainage flows do not adversely affect land uses on-site, or "downstream" properties or watercourses, either through potential flooding, erosion, or water quality impacts.

Additionally, the Certified EIR addressed groundwater recharge, stating, "The proposed development will not significantly change groundwater recharge conditions. Recharge is currently limited on the site due to runoff rates and soil conditions. Overland flows across the pervious sections of the site are not expected to infiltrate to a depth where an effect on groundwater storage is significant." The Project does not propose elements or aspects that would materially affect these conclusions.

On the basis of the preceding discussions, the Project would not result in new, additional, or different hydrology impacts than were considered and addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

3.5.12 Water Quality

The Certified EIR addresses the potential for impacts to regional groundwater resulting from urbanization of the OCSP site. As noted previously, adopted BMPs require provision of temporary structural measures, (such as velocity dissipators, siltation fences or basins, and vegetative buffer zones), along with periodic cleaning of storm drains and street sweeping, thereby reducing siltation and sedimentation runoff during construction. Further, the Project would implement all long-term and operational requirements of the RWQCB, including those that may have been developed subsequent to adoption of the OCSP and Certification of the EIR. On this basis, the proposed Project would not result in new, additional, or different impacts than were considered and addressed in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

3.5.13 Alternatives

The proposed Project is consistent with the development concepts and land uses for the Project site as presented within the Certified EIR and would result in overall reduced development intensities when compared to the maximum allowable development intensities considered in the Certified EIR.

On this basis, potential impacts of the proposed Project would constitute a "Reduced Intensity Alternative," and would be considered within the scope and range of impacts that would result from the Alternatives considered in the Certified EIR. As such, implementation of the proposed Project would have no discernible effect on analyses or conclusions regarding development alternatives considered in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

3.5.14 Cumulative Impacts

As demonstrated in the preceding discussions, the proposed Project would result in comparable impacts, but in no case would exceed the scope or intensity of environmental impacts considered and addressed in the Certified EIR, the CECA, POCA, or POOC. Similarly, potential cumulative impacts of the Project would be comparable to, but no greater in scope or intensity than, cumulative impacts as presented in the Certified EIR. On this basis, the Project would have no discernible effect on analyses or conclusions

regarding cumulative impacts considered in the Certified EIR. No changes or additions to the Certified EIR analysis are necessary.

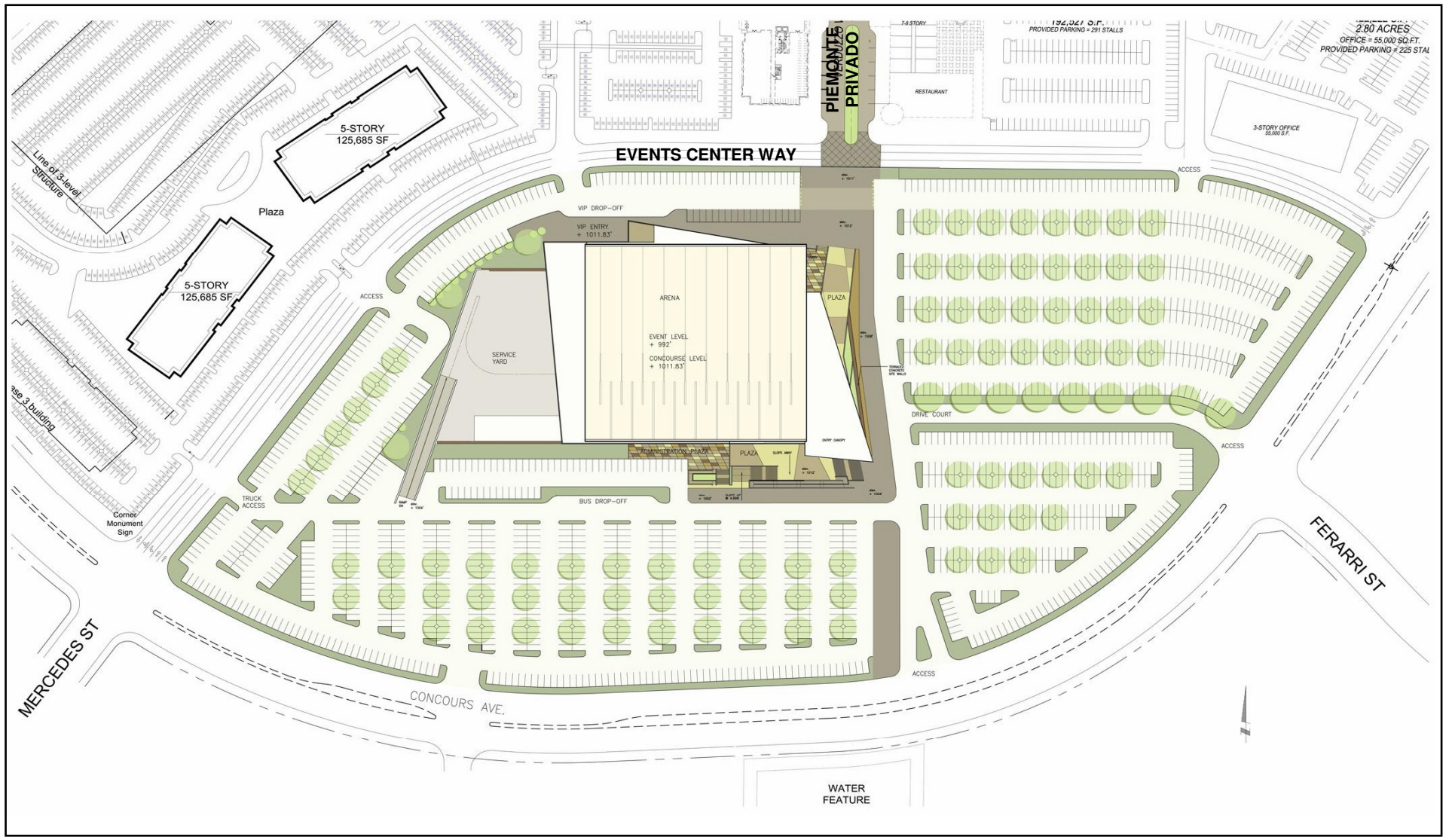


Figure 8: Community Events Center Addendum (CECA) - 2006

Adept-Piemonte Overlay Project Addendum EIR

City of Ontario

Not to Scale

Kimley»Horn

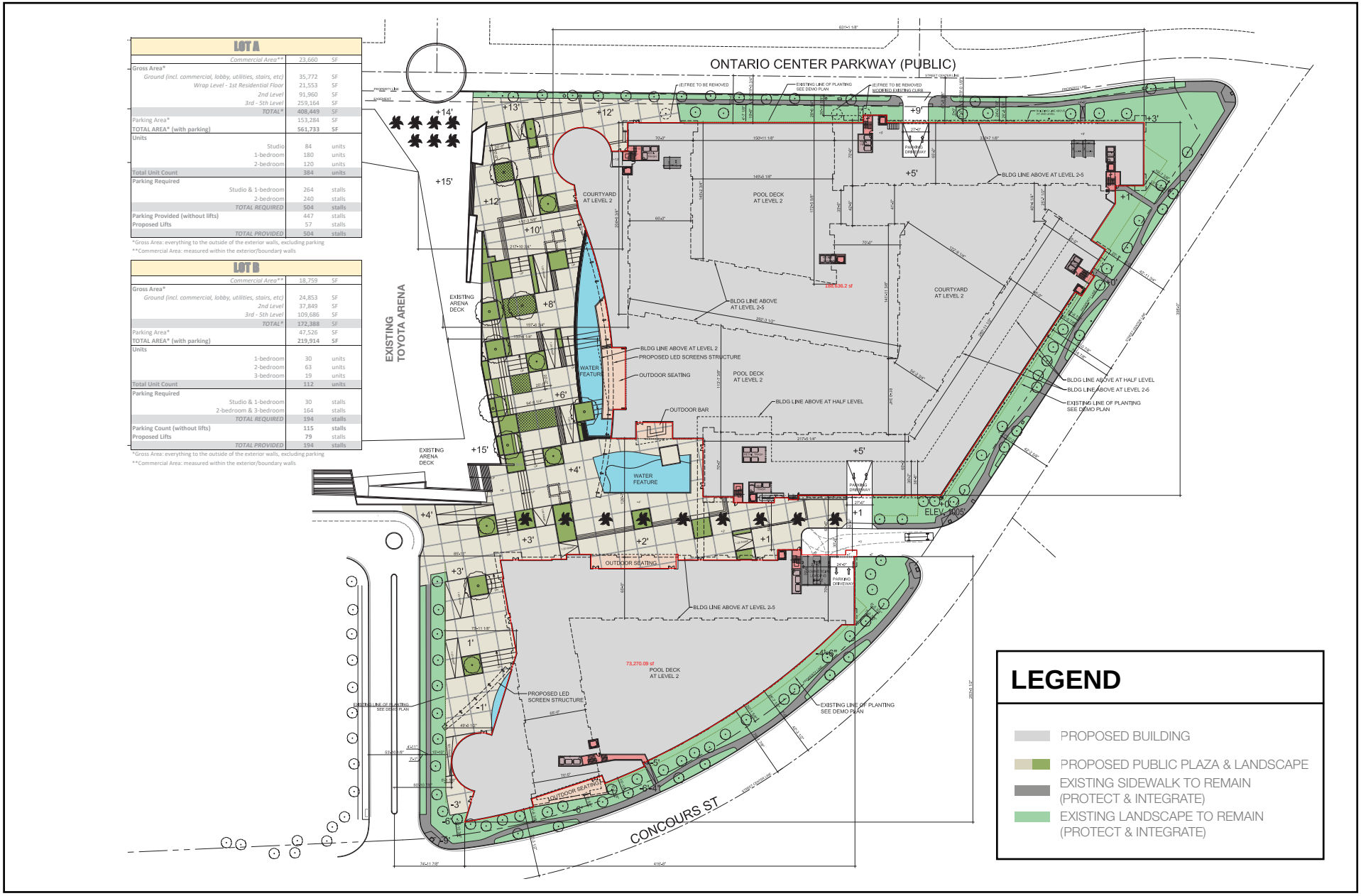


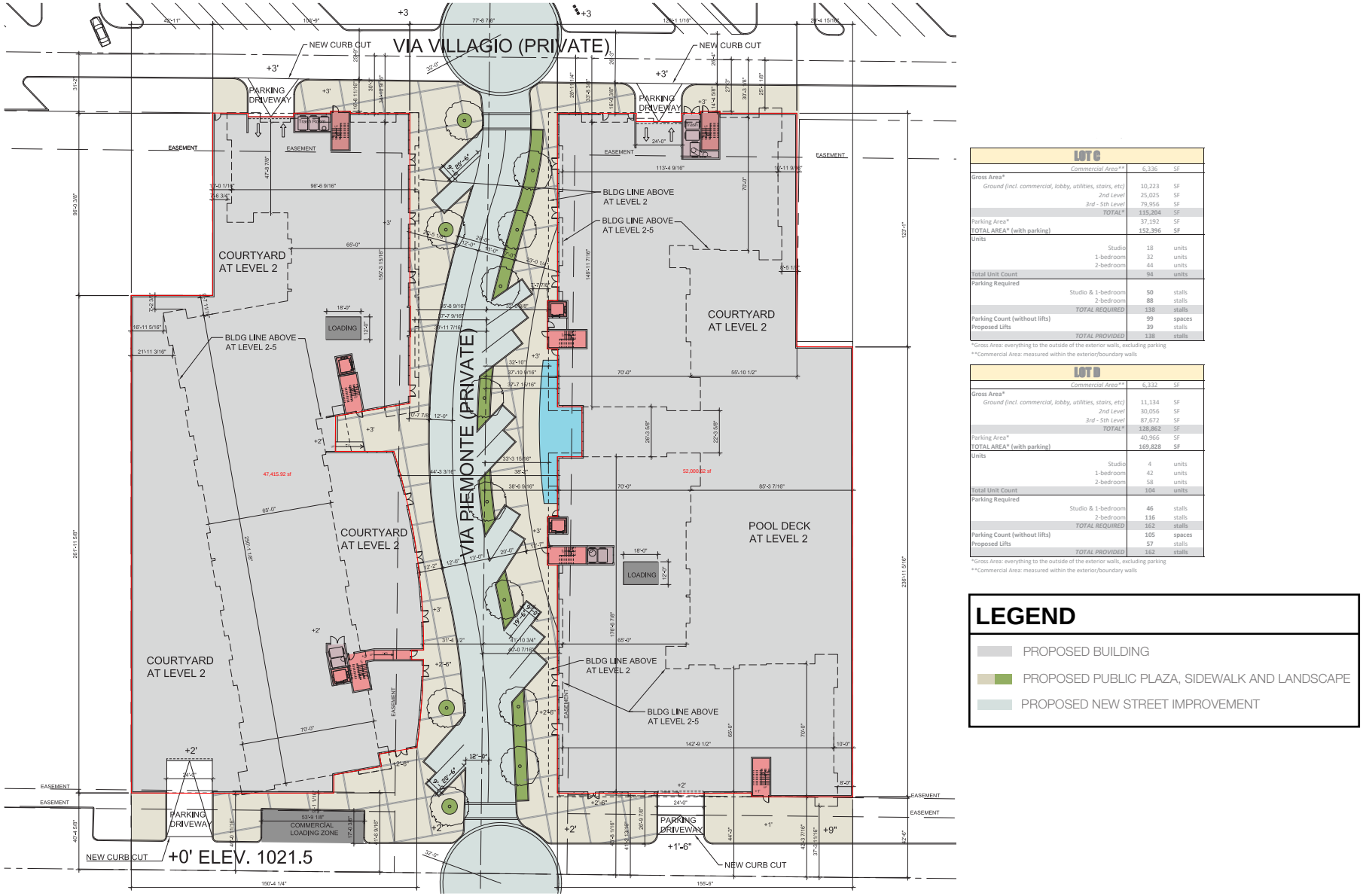
Figure 9: Site Plan (Lots A and B)

Adept-Piemonte Overlay Project Addendum EIR

City of Ontario

Not to Scale

Kimley»Horn



LOT C		
*Commercial Area***	6,336	SF
Gross Area*		
Ground (incl. commercial, lobby, utilities, stairs, etc)	10,223	SF
2nd Level	25,025	SF
3rd - 5th Level	79,956	SF
*TOTAL**	115,204	SF
Parking Area*	37,192	SF
TOTAL AREA* (with parking)	152,396	SF
Units		
Studio	18	units
1-bedroom	32	units
2-bedroom	44	units
Total Unit Count	94	units
Parking Required		
Studio & 1-bedroom	50	stalls
2-bedroom	88	stalls
TOTAL REQUIRED	138	stalls
Parking Count (without lifts)	99	spaces
Proposed Lifts	39	stalls
TOTAL PROVIDED	138	stalls

*Gross Area: everything to the outside of the exterior walls, excluding parking
**Commercial Area: measured within the exterior/boundary walls

LOT D		
*Commercial Area***	6,332	SF
Gross Area*		
Ground (incl. commercial, lobby, utilities, stairs, etc)	11,134	SF
2nd Level	30,056	SF
3rd - 5th Level	87,672	SF
*TOTAL**	128,862	SF
Parking Area*	40,966	SF
TOTAL AREA* (with parking)	169,828	SF
Units		
Studio	4	units
1-bedroom	42	units
2-bedroom	58	units
Total Unit Count	104	units
Parking Required		
Studio & 1-bedroom	46	stalls
2-bedroom	116	stalls
TOTAL REQUIRED	162	stalls
Parking Count (without lifts)	105	spaces
Proposed Lifts	57	stalls
TOTAL PROVIDED	162	stalls

*Gross Area: everything to the outside of the exterior walls, excluding parking
**Commercial Area: measured within the exterior/boundary walls

LEGEND

- PROPOSED BUILDING
- PROPOSED PUBLIC PLAZA, SIDEWALK AND LANDSCAPE
- PROPOSED NEW STREET IMPROVEMENT

Figure 10: Site Plan (Lots C and D)

Adept-Piemonte Overlay Project Addendum EIR

City of Ontario

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Not to Scale

Figure 11: Piemonte at Ontario Center Addendum (POCA) - 2006

Adept-Piemonte Overlay Project Addendum EIR

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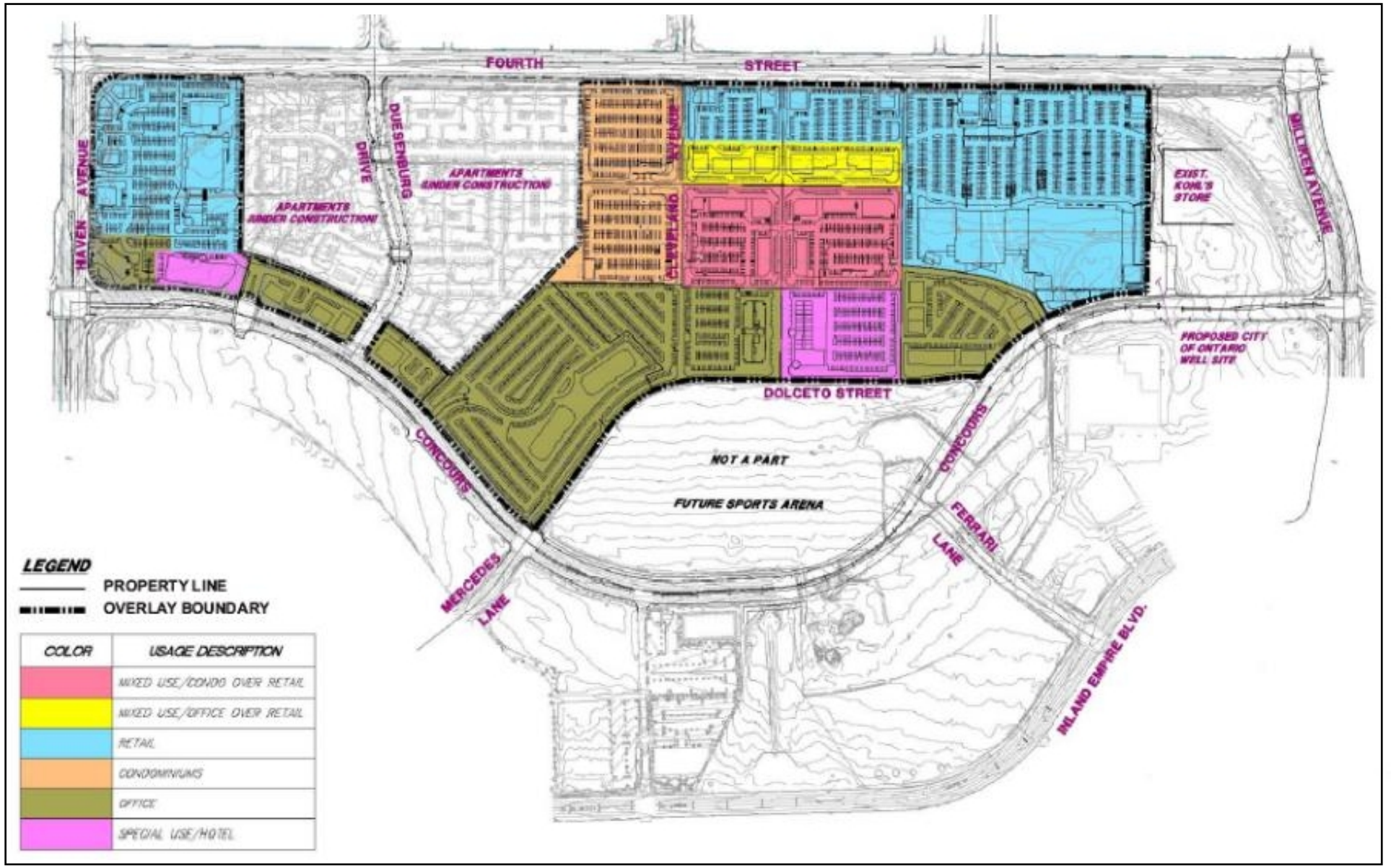

Figure 12: Piemonte Overlay at Ontario Center (POOC) - 2017

Adept-Piemonte Overlay Project Addendum EIR

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Figure 13: Elevations (Lots A and B)

Adept-Piemonte Overlay Project Addendum EIR

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Figure 14: Elevations (Lots C and D)

Adept-Piemonte Overlay Project Addendum EIR

City of Ontario

4.0 Determination

4.0 DETERMINATION

As supported by the analysis presented in this Addendum, the potential environmental effects of the Adept-Piemonte Overlay Project at the Ontario Center Specific Plan, and associated required discretionary actions, have been adequately addressed in the Certified EIR for the OCSP (EIR 88-2, SCH No. 89041009). Additionally, this Addendum to the Certified EIR provides minor changes to the Certified EIR analysis which reflect certain facilities configurations and development standards presented in the CECA, POCA, and POOC. As such, preparation of any further information and analysis (e.g., preparation of a Subsequent or Supplemental EIR) is not warranted.

Pursuant to the requirements of CEQA Section 15162 and 15164, the following determinations have been made:

Major EIR Revisions Not Required

Based on the preceding analysis and information, there is no evidence that major changes to the Certified EIR are required. Comparison of the previous project with the Project described in this Addendum indicates that there is no new significant or more severe environmental impact, and that the approval of the Project described herein would have the same or reduced impacts as those described in the Certified EIR prepared for the OCSP.

No Substantial Change in Circumstances Requiring Major EIR Revisions

There is no information in the record or otherwise available that indicates that there are substantial changes in circumstances that would require major changes to the Certified EIR.

No New Information Showing Greater Significant Effects than Identified in the EIR

This Addendum has considered all available relevant information to determine whether there is new information, that was not available at the time the OCSP EIR was certified, that may indicate that a new significant effect may occur that was not reported in the Certified EIR. As supported by the analysis presented in this Addendum, there is no substantial new information, that was not available at the time the OCSP was certified, indicating that there will be a new, significant impact requiring major revisions of the EIR.

No New Information Showing Ability to Reduce Significant Effects Identified in the EIR

The Addendum analysis substantiates that there are no significant impacts requiring identification of new or additional alternatives to the Project, or consideration of new or additional mitigation measures, in order to reduce one or more of the significant effects identified in the EIR.

APPENDIX A
TRAFFIC IMPACT ANALYSIS

APPENDIX B
AIR QUALITY AND GREENHOUSE GAS IMPACT STUDY

APPENDIX C
NOISE IMPACT STUDY

APPENDIX D
ENERGY STUDY

APPENDIX E
OTHER CEQA TOPICS/ENVIRONMENTAL ANALYSIS CHECKLIST

UPDATES TO THE CEQA GUIDELINES

The State of California adopted revisions to the CEQA Guidelines which became effective on January 1, 2019. Pursuant to CEQA Guidelines Sections 15007(d), the City of Ontario must comply with the new Guidelines 120 days after they become effective, which in this case is May 1, 2019. City staff have provided the following supplemental discussion of CEQA Guidelines Appendix G topics where appropriate. Additionally, this section includes a discussion of the CEQA Environmental Checklist.

ENVIRONMENTAL ANALYSIS CHECKLIST

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
1. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒
2. AGRICULTURE AND FOREST RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
3. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒
4. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
5. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒
6. GEOLOGY AND SOILS. Would the project:				
a) Result in potentially significant environmental impact due to the wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation:	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficient:	☐	☐	☒	☐
7. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii. Strong seismic ground shaking?	☐	☐	☐	☒
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18 1 B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
8. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of greenhouse gases?	☐	☐	☒	☐
9. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within the safety zone of the airport land use compatibility plan for ONT or Chino Airports, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
10. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any other water quality standards or waste discharge requirements or potential for discharge of storm water pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas?	☐	☒	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site or volume of storm water runoff to cause environmental harm or potential for significant increase in erosion of the project site or surrounding areas?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site or potential for significant changes in the flow velocity or volume of storm water runoff to cause environmental harm?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff during construction and/or post- construction activity?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality or potential for discharge of storm water to affect the beneficial uses of receiving water?	☐	☒	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Expose people or structures to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
11. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, airport land use compatibility plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
12. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally- important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
13. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within the noise impact zones of the airport land use compatibility plan for ONT and Chino Airports, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
14. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of road or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
15. PUBLIC SERVICES. Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i. Fire protection?	☐	☒	☐	☐
ii. Police protection?	☐	☒	☐	☐
iii. Schools?	☐	☒	☐	☐
iv. Parks?	☐	☒	☐	☐
v. Other public facilities?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
16. RECREATION. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which have an adverse physical effect on the environment?	☐	☐	☐	☒
17. TRANSPORTATION/TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
18. TRIBAL CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resources Code Section 21074?	☐	☐	☐	☒
19. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? In making this determination, the City shall consider whether the project is	☐	☒	☐	☐

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
subject to the water supply assessment requirements of Water Code Section 10910, et seq. (SB 610), and the requirements of Government Code Section 664737 (SB 221).				
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☒	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☒	☐	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒
20. WILDFIRE. Would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope, or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒
21. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?	☐	☐	☐	☒
c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current project, and the effects of probable future projects.)	☐	☐	☒	☐
d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

EXPLANATION OF THRESHOLDS

1. AESTHETICS

Would the project:

a) Have a substantial adverse effect on a scenic vista?

Discussion of Effects: The Policy Plan (General Plan) does not identify scenic vistas within the City. However, the Policy Plan (Policy CD1-5) requires all major north-south streets to be designed and redeveloped to feature views of the San Gabriel Mountains located to the east. The Project site is located south of Fourth Street, north of Concours Street, between Haven Avenue and Milliken Avenue, and less than one-quarter mile north of Interstate 10 (I-10); refer to Figure 1. The Project site is not located in a major north-south arterial street as identified in the Functional Roadway Classification Plan (Figure M-2) of the Mobility Element within the General Plan.

Additionally, implementation of the proposed Project would result in development of commercial/retail and residential uses that are similar in scale, character, and intensity to those envisioned under the adopted OCSP and assessed in the Certified EIR. On this basis, the Project is not anticipated to result in different or greater aesthetic impacts than those identified in the Certified EIR. Therefore, no adverse impacts are anticipated in relation to the Project.

Mitigation: None required.

b) Substantially damage scenic resources, including, but not limited to, tress, rock outcroppings and historic buildings within a state scenic highway?

Discussion of Effects: The City of Ontario is served by three freeways: I-10, I-15, and SR-60. I-10 and SR-60 traverse the northern and central portion of the City, respectively, in an east–west direction. I-15 traverses the northeastern portion of the City in a north–south direction. These segments of I-10, I-15, and SR-60 have not been officially designated as scenic highways by the California Department of Transportation. In addition, there are no historic buildings, or any scenic resources identified on or in the vicinity of the Project site. Therefore, it would not result in adverse environmental impacts.

Mitigation: None required.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Discussion of Effects: The proposed Project would not degrade the existing visual character or quality of the site or its surroundings. The Project site is located in an area that is characterized by a mix of commercial, entertainment retail, office, and high-density residential land uses, and is surrounded by commercial and office land uses.

The proposed Project would substantially improve the visual quality of the area through development of the site with a mix of commercial, entertainment retail, office, and high-density residential land uses, which would be consistent with the policies of the Community Design Element of the Policy Plan (General Plan) and zoning designations on the property, as well as with the commercial and office development in the surrounding area. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Discussion of Effects: New lighting would be introduced to the site with the development of the proposed Project. Pursuant to the requirements of the City's Development Code, Project on-site lighting would be shielded, diffused or indirect, to avoid glare to pedestrians or motorists. In addition, lighting fixtures would be selected and located to confine the area of illumination to within the Project site and minimize light spillage.

Site lighting plans would be subject to review by the Planning Department and Police Department prior to issuance of building permits (pursuant to the City's Building Security Ordinance). Therefore, no adverse impacts are anticipated.

Mitigation: None required.

2. AGRICULTURE AND FOREST RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

Discussion of Effects: The site is presently vacant and does not contain any agricultural uses. Further, the site is identified as "Other Land" and "Urban and Built-Up Land" on the map prepared by the California Resources Agency, pursuant to the Farmland Mapping and Monitoring Program. The "Other Land" consists of vacant and nonagricultural land that is greater than 40 acres in area and is surrounded on all sides by urban development. As a result, no adverse environmental impacts are anticipated.

Mitigation: None required.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

Discussion of Effects: The Project site is not zoned for agricultural use. The project site is zoned SP (Specific Plan) and is located within the Urban Commercial land use district and the Piemonte Overlay district of the OCSP, which is intended for development with a mix of commercial, entertainment retail, office, and high density residential land uses. The proposed Project is consistent with the development standards and allowed land uses of the proposed land use district. Furthermore, there is no Williamson Act contract in effect on the subject site. Therefore, no impacts to agricultural uses are anticipated, nor would there be any conflict with existing or Williamson Act contracts.

Mitigation: None required.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?

Discussion of Effects: The proposed Project is intended for development with a mix of commercial, entertainment retail, office, and high-density residential land uses. The proposed Project is consistent with the Land Use Element (Figure LU-6) of the Policy Plan (General Plan) and the development standards and allowed land uses of the Urban Commercial land use district and the Piemonte Overlay district of the OCSP. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

Discussion of Effects: There is currently no land in the City of Ontario that qualifies as forest land as defined in Public Resources Code section 12220(g). Neither The Ontario Plan nor the City's Zoning Code provide designations for forest land. Consequently, the proposed Project would not result in the loss or conversion of forest land.

Mitigation: None required.

e) Involve other changes in the existing environment, which, due to their location or nature, could individually or cumulatively result in loss of Farmland to non-agricultural use or conversion of forest land to non-forest use?

Discussion of Effects: The proposed Project site is not designated as Farmland is currently zoned Specific Plan, and is located within the Urban Commercial land use district and the Piemonte Overlay district of the OCSP, which is intended for development with a mix of commercial, entertainment retail, office, and high-density residential land uses. The proposed Project site is currently partly vacant, but previously graded, on the northern portion of the site and fully developed with parking areas currently utilized for the Toyota Arena. There are no agricultural uses occurring onsite. As a result, to the extent that the Project would result in changes to the existing environment those changes would not result in loss of Farmland to non-agricultural use.

Additionally, there is currently no land in the City of Ontario that qualifies as forest land as defined in Public Resources Code Section 12220(g). Neither The Ontario Plan nor the City's Zoning Code provide designations for forest land. Consequently, to the extent that the proposed Project would result in changes to the existing environment, those changes would not impact forest land.

Mitigation Required: None required.

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

Discussion of Effects: The Project would not conflict with or obstruct implementation of any air quality plan. As noted in The Ontario Plan FEIR (Section 5.3), pollutant levels in the Ontario area already exceed Federal and State standards. To reduce pollutant levels, the City of Ontario is actively participating in

efforts to enhance air quality by implementing Control Measures in the Air Quality Management Plan for local jurisdictions within the South Coast Air Basin.

The proposed Project is consistent with The Ontario Plan, for which the EIR was prepared and impacts evaluated. Furthermore, the Project is consistent with the City's participation in the Air Quality Management Plan (AQMP).

Additionally, implementation of the Project would result in the construction of commercial/retail and residential uses in a much lower scope and character to those assessed in the Certified EIR. As such, construction-related air pollutant emissions would be lower to than those considered in the Certified EIR. Further, shown in Table 3-7, the proposed Project would not exceed any construction emission thresholds. Additionally, as discussed in the Addendum, a reduction in total average daily traffic generation is anticipated under the Project. As a result, reductions in vehicle pollutant emissions are anticipated. Based on the preceding discussion, the proposed Project would not result in different or greater air quality impacts than those identified in the Certified EIR. Please refer also to Addendum Section 3.5.3, “Air Quality.” A less than significant impact would occur.

Mitigation: None required.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Discussion of Effects: Short term air quality impacts will result from construction related activities associated with construction activity, such as excavation and grading, machinery and equipment emissions, vehicle emissions from construction employees, etc. The daily emissions of nitrogen oxides and particulates from resulting grading and vehicular emissions may exceed threshold levels of the South SCAQMD.

The Project must follow mandatory SCAQMD rules and requirements with regards to fugitive dust control, as described in Section 6.1.3 of the SCAQMD rules. Compliance with the standard dust control measures is considered to be part of the conditions of approval for the Project and built into the design features. Table 3-7, shows that, the Project’s daily construction emissions would be below the applicable SCAQMD air quality standards and thresholds of significance. As a result, the Project would not contribute substantially to an existing or projected air quality violation. As noted in Table 1-1, the Certified EIR include a set of mitigation measures that are applicable to the proposed Project.

Mitigation: Air Quality

MM-AQ-1 Regular watering, paving construction roads, or other dust control measures defined in SCAQMD Rule 403 will occur during construction.

MM-AQ-2 Construction equipment will be maintained in proper tune to minimize the volume of equipment exhaust emissions.

MM-AQ-3 Comprehensive ridesharing incentive program will be developed as part of a Transportation System Management.

MM-AQ-4 Orientation of Project for transit convenience and accessibility will occur in design phase; provision of easy pedestrian access will occur in design phase; provision of bus shelters, benches and bus pockets on streets.

MM-AQ-5 Provision of traffic flow improvements will occur as buildout of project occurs.

MM-AQ-6 Inclusion of solar and other energy-saving devices in residences and businesses including:

- delamping
- increased building insulation
- heating/ventilation/air conditioning improvements
- solar heaters
- utilization of landscape features to shade buildings

MM-AQ-7 Construction activities should avoid high ozone days and discontinue construction during second stage alerts. After grading, seed and water until vegetation cover is established.

MM-AQ-8 Wet area down, sufficient enough to form a crust on the surface with repeated soakings, as necessary, to maintain the crust and prevent dust pickup by the wind.

MM-AQ-9 Use water trucks or sprinkler systems to keep all areas where vehicles move damp enough to prevent dust from being raised beyond site operations. Wet construction areas down in the late morning and after work is completed in the day.

MM-AQ-10 Use low sulfur fuel for construction equipment (0.5 percent by weight).

As noted in the Certified EIR, a less than significant impact will occur with implementation of the applicable mitigation measures.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

Discussion of Effects: The Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the region is in non-attainment under an applicable federal or state ambient air quality because of the limited size and scope of the project. Although no impacts are anticipated, the Project would still comply with the air quality standards of the TOP FEIR and the SCAQMD resulting in impacts that are less than significant [please refer also to Addendum Section 3.5.3, “Air Quality.”] A less than significant impact would occur.

Mitigation: None required.

d) Expose sensitive receptors to substantial pollutant concentrations?

Discussion of Effects: Sensitive receptors are defined as populations that are more susceptible to the effects of pollution than the population at large. The SCAQMD identifies the following as sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, childcare centers, and athletic facilities. According to the SCAQMD, projects have the potential to create significant impacts if they are located within one-quarter mile of sensitive receptors and would emit toxic air contaminants identified in SCAQMD Rule 1401.

Given the close proximity of the project to nearest sensitive receptors (residential homes to the north), several measures are provided to help ensure the potential health risk associated with Diesel Particulate Matter (DPM) during construction is reduced to the maximum extent feasible. This includes a requirement for Tier 4 engines on all diesel-powered construction equipment. Tier 4 engines, along with the latest

national fuel standards, have been shown to yield PM reductions of over 95 percent from the typical Tier 2 and Tier 3 engines[8].

It is presumed that with the recommended design features and Tier 4 engines in place that the potential short term construction health risks would be adequately reduced to be less than significant. Design features DF-3 through DF-9 are recommended to help ensure the Project does not expose receptors to substantial pollution concentrations during construction. However, these are not considered mitigation measures. A less than significant impact would occur.

Mitigation: None required.

e) Create objectionable odors affecting a substantial number of people?

Discussion of Effects: The uses proposed on the subject site, as well as those permitted within the Urban Commercial land use district and the OCSP, do not create objectionable odors. Further, the Project shall comply with the policies of the Ontario Municipal Code and the General Plan. Additionally, as noted in the Air Quality and Greenhouse Gas Analysis, the Project's operations would result in less than significant odor impacts. Therefore, no adverse impacts are anticipated.

4. BIOLOGICAL RESOURCES

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Discussion of Effects: The site is located within an area that has historically been found to contain Delhi Soils, which is potential habitat for the Delhi Sand Flower-loving Fly (DSF), a federally listed endangered species. However, as a result of previous development, grading, and land uses on the Project site, including construction and operation of the Ontario Motor Speedway (razed in 1981), and more recently, construction activity associated with the phased development of approximately 1.3 million square feet of retail, office, hotel, and entertainment uses, and 800 multiple-family dwelling units, including mass grading of the entire Project area, the installation of public utilities, and the construction of street improvements, have left the Project site in an extremely disturbed state. This determination is supported by previous environmental reports addressing the Project site, including Ontario International Centre EIR 80-3 (SCH No. 80062538), Certified EIR 88-2 (SCH No. 89041009), and the POCA, all of which have found the Project site to be in an extremely disturbed state, with no native soils or native vegetation on the site. The Project site has not been designated as a planned recovery zone for the DSF, and in its current condition, does not provide suitable habitat. No impact would occur.

Mitigation: None required.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife, or U.S. Fish and Wildlife Service?

[8] EPA. Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel; Final Rule. (40 CFR Parts 9, 69, et al.)

Discussion of Effects: The Project site does not contain any riparian habitat or other sensitive natural community identified by the California Department of Fish & Wildlife, or U.S. Fish & Wildlife Service. Therefore, no adverse environmental impacts are anticipated.

Mitigation: None required.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Discussion of Effects: No wetland habitat is present on site. Therefore, Project implementation would have no impact on these resources.

Mitigation: None required.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Discussion of Effects: The Project site is a mixed vacant and fully developed property that is bounded on all four sides by development. As a result, there are no wildlife corridors connecting this site to other areas. Therefore, no adverse environmental impacts are anticipated.

Mitigation: None required.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Discussion of Effects: The City of Ontario does not have any ordinances protecting biological resources. Further, the site does not contain any mature trees necessitating the need for preservation. As a result, no adverse environmental impacts are anticipated.

Mitigation: None required.

f) Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plan?

Discussion of Effects: The site is not part of an adopted HCP, NCCP or other approved habitat conservation plan. As a result, no adverse environmental impacts are anticipated.

Mitigation: None required.

5. CULTURAL RESOURCES

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Discussion of Effects: The Project site does not contain any buildings, structures, or objects. Additionally, as part of the Project site development during the OCSP, CECA, POCA, POOSCP, the Project site has been previously disturbed and fully graded. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Discussion of Effects: The Ontario Plan FEIR (Section 5.5) indicates no archeological sites or resources have been recorded in the City with the Archeological Information Center at San Bernardino. As noted above, because the site has been previously fully disturbed and graded and no historical structures existing on-site, no adverse change in significance or an archaeological resource is anticipated.

Mitigation: None required.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Discussion of Effects: As described in the Certified EIR, cultural resources were not anticipated to be affected by the OCSP. As previously noted, the Project site has been previously graded. As such, the proposed Project would not affect areas or resources not previously considered in the Certified EIR. No additional or different impacts have been identified based on the Project

Mitigation: None required.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Discussion of Effects: The proposed Project is in an area that has been previously disturbed by development. No known religious or sacred sites exist within the Project area. Thus, human remains are not expected to be encountered during any construction activities. However, in the unlikely event that human remains are discovered, existing regulations, including the California Public Resources Code Section 5097.98, would afford protection for human remains discovered during development activities. Furthermore, standard conditions have been imposed on the Project that in the event of unanticipated discoveries of human remains are identified during excavation, construction activities, the area shall not be disturbed until any required investigation is completed by the County Coroner and/or Native American consultation has been completed, if deemed applicable.

Mitigation: None required.

6. Energy

Would the project:

a) Result in potentially significant environmental impact due to the wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation:

A Project specific Energy Study was prepared by RK Engineering Group, Inc. Findings are summarized herein, and the technical study is available as Appendix D of this Addendum.

Discussion of Effects: As described in the Certified EIR, the Project's impact is considered less than significant with the inclusion of the mandatory requirements of California's Building Energy Efficiency Standards (Title 24, Part 6) and Green Building Standards (CALGreen, Title 24, Part 11). California's building energy efficiency standards are some of the strictest in the nation and the Project's compliance with California's building code would ensure that wasteful, inefficient or unnecessary consumption of energy

is minimized. The building standards code is designed to reduce the amount of energy needed to heat or cool a building and reduce energy usage for lighting and appliances.

The proposed Project is anticipated to have a less than significant impact on energy. The following recommended energy design features (DF) are provided to further reduce wasteful, inefficient and unnecessary consumption of energy. Design features are consistent with the recommended design features provided with Air/GHG study. These DF are not considered mitigation measures.

Construction Energy Design Features

E-DF-1 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

Operational Design Features

E-DF-2 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

E-DF-3 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

E-DF-4 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

E-DF-5 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

E-DF-6 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawnmowers and leaf blowers, wherever feasible.

E-DF-7 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

E-DF-8 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e., sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).
2. Provide traffic calming measures (i.e., marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)
3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

E-DF-9 Provide electric vehicle charging stations per the requirements of CALGreen.

A less than significant impact would occur.

Mitigation: None required.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficient:

Discussion of Effects: The proposed Project's impact is considered less than significant as the Project would purchase electricity through Southern California Edison which is subject to the requirements of California Senate Bill 100 (SB 100). SB 100 is the most stringent and current energy legislation in California; requiring that renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045.1 The Project would further comply with the mandatory requirements of California's Green Building and Building Energy Efficiency standards that promote renewable energy and energy efficiency. A less than significant impact would occur.

Mitigation: None required.

7. GEOLOGY & SOILS

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Discussion of Effects: There are no active faults known on the site and the Project site is located outside the Fault Rapture Hazard Zone (formerly Alquist-Priolo Zone). The Ontario Plan FEIR (Section 5.7/ Figure 5.7-2) identifies eight active or potentially active fault zones near the City. Given that the closest fault zone is located more than ten miles from the Project site, fault rupture within the Project area is not likely. All development would comply with the UBC seismic design standards to reduce geologic hazard susceptibility. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

ii) Strong seismic ground shaking?

Discussion of Effects: There are no active faults known on the site and the Project site is located outside the Fault Rapture Hazard Zone (formerly Alquist-Priolo Zone). The Land Use Plan (Figure LU-6) of the Policy Plan (General Plan) FEIR (Section 5.7/Figure 5.7-2) identifies eight active or potentially active fault zones near the City. The closest fault zone is located more than ten miles from the Project site. The proximity of the site to the active faults would result in ground shaking during moderate to severe seismic events. All construction would be in compliance with the California Building Code (CBC), the Ontario Municipal Code, The Ontario Plan and all other ordinances adopted by the City related to construction and safety. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

iii) Seismic-related ground failure, including liquefaction?

Discussion of Effects: As identified in the TOP FEIR (Section 5.7), groundwater saturation of sediments is required for earthquake induced liquefaction. In general, groundwater depths shallower than 10 feet to the surface can cause the highest liquefaction susceptibility. According to the POOC MND, depth to ground water at the Project site during the winter months is estimated to be between 250 to 450 feet below ground surface. Therefore, the liquefaction potential within the Project area is minimal.

Implementation of The Ontario Plan strategies, UBC and Ontario Municipal Code would reduce impacts to a less than significant level.

Mitigation: None required.

iv) Landslides?

Discussion of Effects: The proposed Project would not expose people or structures to potential adverse effects, including the risk of loss, injury, or death involving landslides because the relatively flat topography of the Project site (less than two percent slope across the City) makes the chance of landslides remote. Implementation of The Ontario Plan strategies, UBC and OMC would reduce impacts to a less than significant level.

Mitigation: None required.

b) Result in substantial soil erosion or the loss of topsoil?

Discussion of Effects: The proposed Project would not result in significant soil erosion or loss of topsoil because of the previously disturbed and developed nature of the Project site and the limited size and scope of the Project. Grading increases the potential for erosion by removing protective vegetation, changing natural drainage patterns, and constructing slopes. However, compliance with the CBC and review of grading plans by the City Engineer would ensure no significant impacts would occur. In addition, the City requires an erosion/dust control plan for projects located within this area. Implementation of a NPDES program, the Environmental Resource Element of the General Plan strategies, UBC, and OMC would reduce impacts to a less than significant level.

Mitigation: None required.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Discussion of Effects: The Project site would not result in the location of development on a geologic unit or soil that is unstable, or that would become unstable because as previously discussed, the potential for liquefaction and landslides associated with the Project site is less than significant. The Ontario Plan FEIR (Section 5.7) indicates that subsidence is generally associated with large decreases or withdrawals of water from the aquifer. The Project would not withdraw water from the existing aquifer. Further, implementation of The Ontario Plan strategies, UBC and OMC would reduce impacts to a less than significant level.

Mitigation: None required.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Discussion of Effects: The majority of Ontario, including the Project site, is located on alluvial soil deposits. These types of soils are not considered to be expansive. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Discussion of Effects: The area is served by the local sewer system and the use of alternative systems is not necessary. There would be no impact to the sewage system.

Mitigation: None required.

8. GREENHOUSE GAS EMISSIONS

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Discussion of Effects: The impact of buildout of The Ontario Plan on the environment due to the emission of greenhouse gases ("GHGs") was analyzed in the Environmental Impact Report ("EIR") for the Policy Plan (General Plan). According to the EIR, this impact would be significant and unavoidable. (Recirculated Portions of the Ontario Plan Draft Environmental Impact Report, p. 2-118). This EIR was certified by the City on January 27, 2010, at which time a statement of overriding considerations was also adopted for The Ontario Plan's significant and unavoidable impacts, including that concerning the emission of GHGs.

Pursuant to Public Resources Code section 21083.3, this impact need not be analyzed further, because (1) the proposed project would result in an impact that was previously analyzed in The Ontario Plan EIR, which was certified by the City; (2) the proposed project would not result in any greenhouse gas impacts that were not addressed in The Ontario Plan EIR; (3) the proposed project is consistent with The Ontario Plan.

A Project-specific Air Quality and Greenhouse Gas Impact Study was prepared. The results are provided herein, and the technical study is included as Appendix B of this Addendum. For purposes of this Project, the City of Ontario, Ontario County Climate Action Plan (CCAP) establishes the requirements for determining whether a project would have a significant impact to GHG emissions under CEQA.

The CCAP uses Screening Tables, which are setup similar to a checklist, with points allocated to certain elements of the Project to reduce GHG emissions. If a project garners 100 points (by including enough GHG reducing elements), then the project is consistent with CCAP and the impact may be considered less than significant for purposes of CEQA.

The proposed Project is expected to comply with the CCAP by implementing the Screening Table requirements into the Project design. To help ensure the Project adheres to the CCAP requirements, the following GHG Project DFs GHG-DF-10 through GHG-DF-17 are provided:

Design Features

GHG-DF-10 Implement the GHG Reduction Measures from the CCAP Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

As described in Appendix B of the CCAP, for mixed use projects, both the residential and non-residential screening tables shall be completed. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City's CAP and are considered less than significant for GHG emissions.

Therefore, with the implementation of the CCAP Screening Tables, the Project is not expected to generate GHG emissions, either directly or indirectly, that would cause a significant impact on the environment.

Also, by complying with the CCAP, the Project will not conflict with an applicable plan, policy or regulation for the purpose of reducing the emissions of greenhouse gases and the impact is considered less than significant.

Furthermore, since the purpose of the City's CCAP is to ensure compliance with the state's climate initiatives for reducing GHG emissions, by complying with the CCAP, the Project will also be in compliant with the broader statewide goals for combating climate change; such as those required in the CARB Scoping Plan and AB 32.

The mixed-use Project is also located within close proximity to high quality transit, located in a low VMT zone, and offers high-density residential development near commercial uses. The Project will include pedestrian friendly and walkable design that will encourage fewer auto-based trips. The following Project design features will be provided to further help reduce GHG emissions:

GHG-DF-11 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

GHG-DF-12 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

GHG-DF-13 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

GHG-DF-14 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

GHG-DF-15 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

GHG-DF-16 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e., sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).
2. Provide traffic calming measures (i.e., marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)
3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

GHG-DF-17 Provide electric vehicle charging stations per the requirements of CALGreen.

The Project is anticipated to have a less than significant impact. Additionally, with implementation of the Project DF, the Project would continue to have a less than significant impact on GHG.

9. HAZARDS & HAZARDOUS MATERIALS

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?

Discussion of Effects: The Project is not anticipated to involve the transport, use or disposal of hazardous materials during either construction or Project implementation. Typical construction activities involve the use and handling of solvents, paints, and other chemicals. However, none of the proposed uses involve the use or handling of dangerous chemicals that could create a significant hazard to the public or the environment. Additionally, the Project site have been previously graded, and no hazardous materials exist onsite. Therefore, no adverse impacts are anticipated. However, in the unlikely event of an accident, implementation of the strategies included in The Ontario Plan would decrease the potential for health and safety risks from hazardous materials to a less than significant impact.

Mitigation: None required.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Discussion of Effects: The proposed Project does not include the use of hazardous materials or volatile fuels. In addition, there are no known stationary commercial or industrial land uses within close proximity to the subject site, which use/store hazardous materials to the extent that they would pose a significant hazard to visitors/occupants to the subject site, in the event of an upset condition resulting in the release of a hazardous material. No impacts are anticipated.

Mitigation: None required

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?

Discussion of Effects: The proposed Project does not include the use, emissions or handling of hazardous or acutely hazardous materials, substances or waste. Therefore, no impacts are anticipated.

Mitigation: None required.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Discussion of Effects: The proposed Project site is not listed on the hazardous materials site compiled pursuant to Government Code Section 65962.5. Therefore, the Project would not create a hazard to the public or the environment and no impact is anticipated.

Mitigation: None required.

e) For a project located within the safety zone of the airport land use compatibility plan for ONT or Chino Airports, would the project result in a safety hazard for people residing or working in the project area?

Discussion of Effects: According to Land Use Element (Exhibit LU-06 Airport Environs) of the General Plan, the Project site is located within the airport land use plan. However, the Project would not result in a safety hazard for people working or residing in the Project area because it would not obstruct aircraft maneuvering because of the Project's low elevation and the architectural style of the Project. Additionally, the Land Use Compatibility Guidelines for Noise Impacts (Table LU-08) shows the proposed use as normally accepted in the 65 CNEL. The proposed use would comply with standards for mitigating noise. Therefore, no impacts are anticipated.

Mitigation: None required.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

Discussion of Effects: The Project site is not located within the vicinity of a private airstrip. Therefore, no impacts are anticipated.

Mitigation: None required.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Discussion of Effects: The City's Safety Element, as contained within The Ontario Plan, includes policies and procedures to be administered in the event of a disaster. The Ontario Plan seeks interdepartmental and inter-jurisdictional coordination and collaboration to be prepared for, respond to, and recover from everyday and disaster emergencies. In addition, the Project would comply with the requirements of the Ontario Fire Department and all City requirements for fire and other emergency access. Because the Project is required to comply with all applicable City codes, any impacts would be reduced to a less than significant level.

Mitigation: None required.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Discussion of Effects: The Project site is not located in or near wildlands. Therefore, no impacts are anticipated.

Mitigation: None required.

10. HYDROLOGY & WATER QUALITY

Would the project:

a) Violate any other water quality standards or waste discharge requirements or potential for discharge of storm water pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas?

Discussion of Effects: The Project site is served by City water and sewer service and would not affect water quality standards or waste discharge requirements. Discharge of storm water pollutants from areas of

materials storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing, waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work) areas could result in a temporary increase in the amount of suspended solids, trash and debris, oil and grease, organic compounds, pesticides, nutrients, heavy metals and bacteria pathogens in surface flows during a concurrent storm event, thus resulting in surface water quality impacts. The site is required to comply with the statewide National Pollutant Discharge Elimination System (NPDES) General Industrial Activities Stormwater Permit, the San Bernardino County Area-Wide Urban Runoff Permit (MS4 permit) and the City of Ontario's Municipal Code (Title 6, Chapter 6 (Stormwater Drainage System)). In addition to the NPDES, MS4, and other permits listed in this section, this site is required to comply with the latest trash capture requirements from the State and RWQCB. This would reduce any impacts to below a level of significance. However, as part of the Certified EIR, the following Mitigation Measures (MMs) were imposed as part of the development of the OCSP:

Mitigation: Hydrology

MM-HYD-1 On-site drainage plans will be designed, submitted to, and approved by the City of Ontario prior to the issuance of a grading permit.

MM-HYD-2 Proposed storm drainage facilities to be installed as The Ontario Center develops, will be placed in public streets. W here storm drains must be placed in areas other than public streets, a drainage easement will be dedicated as needed.

MM-HYD-3 Some modification will be necessary to existing drainage facilities. No existing facility will be removed without replacement by another structure to serve the particular condition.

MM-HYD-4 As development proceeds, there will be a need for temporary siltation basins to reduce sedimentation from construction activities. These will be located in specific areas of construction and sized in accordance with City of Ontario criteria.

With implementation of the applicable Certified EIR MMs, the Project would have a less than significant impact.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Discussion of Effects: No increases in the current amount of water flow to the Project site are anticipated, and the proposed Project would not deplete groundwater supplies, nor will it interfere with recharge. The water use associated with the proposed use of the property would be negligible. The development of the site would require the grading of the site and excavation is expected to be less than three feet and would not affect the existing aquifer, estimated to be about 230 to 250 feet below the ground surface. No adverse impacts are anticipated.

Mitigation: None required.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site or volume of storm water runoff to cause environmental

harm or potential for significant increases in erosion of the project site or surrounding areas?

Discussion of Effects: It is not anticipated that the Project would alter the drainage pattern of the site or area, in a manner that would result in erosion, siltation or flooding on-or-off site nor would the proposed Project increase the erosion of the subject site or surrounding areas. The existing drainage pattern of the Project site would not be altered, and it would have no significant impact on downstream hydrology. Stormwater generated by the Project would be discharged in compliance with the statewide NPDES General Construction Activities Stormwater Permit and San Bernardino County MS4 permit requirements. With the full implementation of a Storm Water Pollution Prevention Plan (SWPPP) developed in compliance with the General Construction Activities Permit requirements, the BMPs included in the SWPPP, and a stormwater monitoring program would reduce any impacts to below a level of significance. No streams or streambeds are present on the site. No changes in erosion off-site are anticipated.

Mitigation: None required.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site or potential for significant changes in the flow velocity or volume of storm water runoff to cause environmental harm?

Discussion of Effects: The proposed Project is not anticipated to increase the flow velocity or volume of storm water runoff to cause environmental harm from the site and would not create a burden on existing infrastructure. Furthermore, with the implementation of an approved Water Quality Management Plan (WQMP) developed for the site, in compliance with the San Bernardino County MS4 Permit requirements, stormwater runoff volume shall be reduced to below a level of significance.

Mitigation: None required.

e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (a&b) during construction and/or post-construction activity?

Discussion of Effects: It is not anticipated that the Project would create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or create or contribute stormwater runoff pollutants during construction and/or post-construction activity. Pursuant to the requirements of The Ontario Plan, the City's Development Code, and the San Bernardino County MS4 Permit's WQMP, individual developments must provide site drainage and WQMP plans according to guidelines established by the City's Engineering Department. If master drainage facilities are not in place at the time of Project development, then standard engineering practices for controlling post-development runoff may be required, which could include the construction of on-site storm water detention and/or retention/infiltration facilities. Therefore, no impacts are anticipated.

Mitigation: None required.

f) Otherwise substantially degrade water quality or potential for discharge of storm water to affect the beneficial uses of receiving water?

Discussion of Effects: Activities associated with the construction period, could result in a temporary increase in the amount of suspended solids in surface flows during a concurrent storm event, thus resulting in surface water quality impacts. The site is required to comply with the statewide NPDES General Construction Permit and the City of Ontario's Municipal Code (Title 6, Chapter 6 (Stormwater Drainage System)) to minimize water pollution. Thus, it is anticipated that there is no potential for discharges of stormwater during construction that would affect the beneficial uses of the receiving waters. However, with the General Construction Permit requirement and implementation of the policies in The Ontario Plan, any impacts associated with the Project would be less than significant. However, as part of the Certified EIR, the following MMs were imposed as part of the development of the OCSP:

Mitigation: Water Quality

MM-WQ-1 During construction, a variety of temporary structural measures such as velocity dissipators, siltation fences or basins and. vegetative buffer zones will be used to reduce siltation and sedimentation runoff from construction sites.

MM-WQ-2 Periodic cleaning of storm drains and inlets, construction of pervious pavement surfaces in areas designated by the City, periodic street sweeping.

MM-WQ-3 Periodic street sweeping will be conducted by the City of Ontario for streets dedicated to the City. Periodic vacuum sweeping will be conducted by the owners of individual sites.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Discussion of Effects: The project site is not located within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. Therefore, no impacts are anticipated.

Mitigation: None required.

h) Place within a 100-year flood hazard area, structures that would impede or redirect flood flows?

Discussion of Effects: As identified in the Safety Element (Exhibit S-2) of the Policy Plan (General Plan), the site lies outside of the 100-year flood hazard area. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Discussion of Effects: As identified in the Safety Element (Exhibit S-2) of The Ontario Plan, the site lies outside of the 100-year flood hazard area. No levees or dams are located near the Project site. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

j) Expose people or structures to inundation by seiche, tsunami or mudflow?

Discussion of Effects: There are no lakes or substantial reservoirs near the project site; therefore, impacts from seiche are not anticipated. The City of Ontario has relatively flat topography, less than two percent across the City, and the chance of mudflow is remote. Therefore, no impacts are anticipated.

Mitigation: None required.

11. LAND USE & PLANNING

Would the project:

a) Physically divide an established community?

Discussion of Effects: The Project site is located in an area that is currently developed with urban land uses. This Project would be of similar design and size to surrounding development. The Project would become a part of the larger commercial, entertainment retail, office, and high-density residential communities, which surround the Project site. No adverse impacts are anticipated.

Mitigation: None required.

b) Conflict with applicable land use plan, policy or regulation of agencies with jurisdiction over the project (including, but not limited to general plan, airport land use compatibility plan, specific plan, or development code) adopted for the purpose of avoiding or mitigation an environmental effect?

Discussion of Effects: The proposed Project is consistent with The Ontario Plan and does not interfere with any policies for environmental protection. As such, no impacts are anticipated.

Mitigation: None required.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

Discussion of Effects: There are no adopted habitat conservation plans in the Project area. As such no conflicts or impacts are anticipated.

Mitigation: None required.

12. MINERAL RESOURCES

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Discussion of Effects: The Project site is located within a mostly developed area surrounded by urban land uses. There are no known mineral resources in the area. Therefore, no impacts are anticipated.

Mitigation: None required.

b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Discussion of Effects: There are no known mineral resources in the area. No impacts are anticipated.

Mitigation: None required.

13. NOISE

Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Discussion of Effects: As noted in Section 3.5.8, Noise, and as shown in Tables 3-8 and 3-9, the Project would not expose people to or generate noise levels in excess of standards as established in The Ontario Plan FEIR (Section 5.12). No additional analysis would be required at the time of site development review.

Mitigation: None required.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Discussion of Effects: The uses associated with this Project normally do not induce groundborne vibrations. As such, no impacts are anticipated. Typical construction vibration is shown on Tables 3-10 and 3-11 which conclude that Project vibration would not expose persons or generate excessive groundborne vibration or noise levels.

Mitigation: None required.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Discussion of Effects: The Project would not be a significant permanent noise generator and would not cause a substantial permanent increase in ambient noise levels because of the limited size and scope of the Project. Moreover, the proposed use would be required to operate within the noise levels permitted for commercial development, pursuant to City of Ontario Development Code. The Project would create typical construction noise as shown in Tables 3-8 and 3-9. Therefore, no increases in noise levels within the vicinity of the project are anticipated.

Mitigation: None required.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Discussion of Effects: Temporary construction activities would minimally impact ambient noise levels. All construction machinery would be maintained according to industry standards to help minimize the impacts. Normal activities associated with the Project are unlikely to increase ambient noise levels. As shown in Tables 3-12, 3-13, and 3-14 show that the Project would not create substantial temporary or periodic increase in ambient noise. A less than significant impact is anticipated.

Mitigation: None required.

e) For a project located within the noise impact zones of the airport land use compatibility plan for ONT and Chino Airports, would the project expose people residing or working in the project area to excessive noise levels?

Discussion of Effects: According to the Safety Element in The Ontario Plan and the Noise Impact Analysis, the proposed site is located within the airport land use plan. However, the Project is located outside of

the 60 CNEL noise contour. Therefore, the exterior noise impact from the airport would be within the allowable limits for residential land uses and the Project is considered compatible with the surrounding land use and noise environment. Noise from airport operations is expected to generate a less than significant on the proposed Project.

Mitigation: None required.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Discussion of Effects: The Project site is not located within the vicinity of a private airstrip. Therefore, no impacts are anticipated.

Mitigation: None required.

14. POPULATION & HOUSING

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of road or other infrastructure)?

Discussion of Effects: The Project is located in a developed area and would not induce population growth as the proposed multi-family DUs have been previously analyzed as part of the OCSP development in the Certified EIR and population growth as part of the OCSP has already been assumed and accounted for in the General Plan and regionally. Therefore, no impacts are anticipated

Mitigation: None required.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

Discussion of Effects: The Project site is currently undeveloped. Therefore, no impacts are anticipated.

Mitigation: None required.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

Discussion of Effects: The Project site is currently undeveloped. Therefore, no impacts are anticipated.

Mitigation: None required.

15. PUBLIC SERVICES

Would the project:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i) Fire protection?

Discussion of Effects: The site is in a developed area currently served by the Ontario Fire Department. As previously noted, the site has already been accounted for in the General Plan that it will be developed to include a greater amount of commercial SF and a larger amount of multi-family DUs. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities. No impacts are anticipated. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: Fire Protection

MM-PS-1 The developer will pay a fair share of "in-lieu" fees to subsidize additional facilities and equipment as mutually agreed upon by both the developer and the City of Ontario.

MM-PS-2 All new development will participate in updating the City of Ontario Water Master Plan and will contribute on a "fair share" basis toward implementation of Master Plan programs.

MM-PS-3 Ontario Fire Department and project developer Will provide, in writing, assurance of water supply adequacy from local water purveyor.

MM-PS-4 Design features at the site plan level will reduce risk of fire hazard. Site plan proposals will be reviewed during site plan review by Ontario Fire Department (OFD). Protection measures recommended by the OFD will be implemented by project proponent.

With implementation of MMs PS-1 through PS-4, a less than significant impact on fire services would occur.

ii) Police protection?

Discussion of Effects: The site is in a developed area, currently served by the Ontario Police Department. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities and no impact are anticipated on police protection services. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: Law Enforcement

MM-PS-5 If a proposed ordinance is adopted, the regional center builder/developer may be required to pay a one-time developer assessment fee to the Police Department at the time of issuance of a building permit. This developer fee will mitigate the fiscal impact incurred by the Police Department.

Due to the projected increase in police calls for service to be generated by the development. The amount of this fee will be established by the Ontario Police Department based on land use and projected calls-for-service from that use.

MM-PS-6 Each individual project within The Ontario Center will incorporate on-site security measures. These measures will be reviewed by the Ontario Police Department. They will include, but not be limited to, limited-height landscaping, exterior lighting, security hardware.

MM-PS-7 In addition to these physical security and lighting requirements, the Police Department requests that the developer submit a plan delineating which functions are to be addressed by on-site private security and what functions are to be served by the Police Department. This

plan may include personnel selection and training and physical security measures, i.e., video surveillance, emergency call boxes, communication and alarms. This plan shall be approved by the Police Department prior to implementation.

With implementation of MMs PS-5 through PS-7, a less than significant impact on police services would occur.

iii) Schools?

Discussion of Effects: The Project would be required to pay school fees as prescribed by state law prior to the issuance of building permits. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: School

MM-PS-8 Developers of residential projects within The Ontario Center will pay required school impact mitigation fees of $29,000 gross acre to Cucamonga School District per agreement reached between the District and the developer dated December 31, 1986.

MM-PS-9 Developers of projects within The Ontario Center will pay fees, as noted below, to the Chaffey Joint Unified School District:

Residential $.48/square foot

Commercial/Industrial/Office $.08/square foot

iv) Parks?

Discussion of Effects: The site is in a developed area, currently served by the City of Ontario. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: Parks and Recreation

MM-PS-10 Regional Parks: The responsibility for rehabilitating existing regional parks and/or building new facilities, rests with the County of San Bernardino Parks Department. A Draft Ordinance has been prepared by the County Parks Department which will require developers to pay fees for future parks and open space. Developers within The Ontario Center shall comply with the City of Ontario's implementation of the County's fee ordinance for the collection of development fees for regional parks, trails, and open space if and when it is enacted.

MM-PS-11 Local Parks: A Park Development Fund Fee of $802/single family detached unit and $700/multiple family unit will be paid at the time of issuance of building permits.

MM-PS-12 Private recreational opportunities shall be encouraged for the commercial retail/industrial use areas.

v) Other public facilities?

Discussion of Effects: The site is in a developed area, currently served by the City of Ontario. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities. No impacts are anticipated.

Mitigation: None required.

16. RECREATION

Would the project:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that have an adverse physical effect on the environment?

Discussion of Effects: This Project is not proposing any significant new housing or large employment generator that would cause an increase in the use of neighborhood parks or other recreational facilities that have not already been analyzed as part of the OCSP or the Certified EIR and/or considered in the General Plan. Implementation of the proposed Project would not require the construction of neighborhood parks or other recreational facilities. No impacts are anticipated.

Mitigation: None required.

17. TRANSPORTATION/TRAFFIC

Would the project:

A Project-specific Traffic Impact Analysis was prepared by RK Engineering Group. The results are provided herein, and the technical study is included as Appendix A of this Addendum.

a) Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

Discussion of Effects: The Project is in an area that is mostly developed with all street improvements existing. As noted in Table 3-3, the number of vehicle trips per day is forecast at 5,691 daily trips or 5.4 percent compared to the allowable 105,332 daily trips allowable per the OCSP for the site. Therefore, as noted in Section 3.5.5, Traffic and Circulation, the Project would not create a substantial increase in the number of vehicle trips, traffic volume or congestion at intersections and would not conflict with an applicable plan, ordinance, or policy addressing the circulation system, transit, roadway, bicycle, or pedestrian facilities. Less than significant impacts are anticipated. However, as part of the Certified EIR, the following MMs were imposed as part of the development of the OCSP:

Mitigation: Traffic and Transportation

MM-TRF-1 Buildout in the project vicinity of the proposed circulation system defined in the Specific Plan Amendment will occur.

MM-TRF-2 Development and implementation of a Transportation Systems Management (TSM) program with a goal of a ten percent reduction in peak hour trips will occur as defined the Specific Plan Amendment.

MM-TRF-3 Applicants for all future specific plans and specific plan amendments in the vicinity of The Ontario Center project will be required to complete traffic impact and mitigation studies to ensure that the forty (40) intersections studied this EIR will not exceed an intersection capacity utilization greater than Level of Service E.

With implementation of the applicable Certified EIR MMs, the Project would have a less than significant impact.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Discussion of Effects: As noted in Section 3.5.5.1, CEQA Vehicle Miles Traveled, the Project is found to have a less than significant impact regarding VMT.

Mitigation: None required.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Discussion of Effects: The Project would not create a substantial safety risk or interfere with air traffic patterns at Ontario International Airport as it either is outside of areas with FAA-imposed height restrictions or is under such height restrictions. No impacts are anticipated.

Mitigation: None required.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Discussion of Effects: The Project is in an area that is mostly developed. All street improvements are complete, and no alterations are proposed for adjacent intersections or arterials. The Project would, therefore, not create a substantial increase in hazards due to a design feature. No impacts are anticipated.

Mitigation: None required.

e) Result in inadequate emergency access?

Discussion of Effects: The Project would be designed to provide access for all emergency vehicles and would therefore not create an inadequate emergency access. No impacts are anticipated.

Mitigation: None required.

18. TRIBAL CULTURAL RESOURCES

Would the project:

a) Cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resources Code Section 21074?

Discussion of Effects: The proposed Project is in an area that has been previously disturbed by development. No known Tribal Cultural Resource sites exist within the Project area. Thus, tribal artifacts are not expected to be encountered during any excavation, grading, or construction activities.

Mitigation: None required.

19. UTILITIES AND SERVICE SYSTEMS

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Discussion of Effects: The proposed Project is served by the City of Ontario sewer system, which has waste treated by the Inland Empire Utilities Agency at the RP-1 and/or RP-5 treatment plant. The Project is required to meet the requirements of the Ontario Engineering Department regarding wastewater. Additionally, as noted in Section 2.3, Land Use and Development, the proposed Project would implement a Project at a much lower development intensity than the originally approved project under the OCSP and the Certified EIR. As such, no impacts are anticipated.

Mitigation: None required.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Discussion of Effects: The proposed Project is served by the City of Ontario sewer system and which has waste treated by the Inland Empire Utilities Agency at the RP-1 and/or RP-5 treatment plant. RP-1 and/or RP-5 is not at capacity and this Project would not cause RP-1 and/or RP-5 to exceed capacity. The Project would, therefore, not require the construction of new wastewater treatment facilities, or the expansion of existing facilities. No impacts are anticipated.

Mitigation: None required.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Discussion of Effects: The proposed Project is served by the City of Ontario. The Project is required to meet the requirements of the Ontario Engineering Department regarding storm drain facilities. Because the Project is much less intense than the previously approved project on the same footprint, no impacts are anticipated.

Mitigation: None required.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? In making this determination, the City shall consider whether the project is subject to the water supply assessment requirements of Water Code Section 10910, et seq. (SB 610), and the requirements of Government Code Section 664737 (SB 221).

Discussion of Effects: The Project is served by the City of Ontario water system. There is currently a sufficient water supply available to the City of Ontario to serve this project. Additionally, as noted in Table 2-4, the Project is anticipated to require 316,027 GPD compared to the 727,888 GPD of the originally approved project and analyzed under Certified EIR. The proposed Project would require approximately 54 percent of the originally accounted for water demand. Although a less than significant impact is anticipated in this regard, the Certified EIR included the following MMs as part of the original OCSP analysis.

Mitigation: Water Supply

MM-UTL-1 All existing and future users will share in costs of supplemental city-wide water supply system.

MM-UTL-2 Reclaimed water, as it is available from CBMWD Regional Plant No. 4, will be used for open space irrigation when economically feasible.

MM-UTL-3 Cooperation between CBMWD, the City of Ontario, developers of The Ontario Center and other landowners will be necessary to ensure adequate capacity.

A less than significant impact would occur with implementation of MMs UTL-1 through UTL-3.

e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Discussion of Effects: The proposed Project is served by the City of Ontario sewer system, which has waste treated by the Inland Empire Utilities Agency at the RP-1 and/or RP-5 treatment plant. RP-1 and/or RP-5 is not at capacity and this project would not cause RP-1 and/or RP-5 to exceed capacity. Although no impact is anticipated in this regard, the Certified EIR included the following MMs as part of the original OCSP analysis.

Mitigation: Wastewater

MM-UTL-4 Design and construction of wastewater collection facilities within the Ontario Center will be completed under the jurisdiction of the City of Ontario.

MM-UTL-5 Any plans for use of the non-reclaim able waste line (NRW) system will be made known to the City and CBMWD.

MM-UTL-6 Wastewater collection facilities will be designed so that all parcels can be served by gravity mains without pumping.

MM-UTL-7 The Ontario Center project development will coordinate construction activities with the City of Ontario and CBMWD to assure adequate interceptor, trunk sewer and treatment plant capacity is available as development proceeds.

MM-UTL-8 Continued coordination between CBMWD, the City, developers of The Ontario Center, and other property owners/developers will occur to assure adequate capacity is available in the Cucamonga Interceptor as development occurs within the tributary area.

A less than significant impact would occur with implementation of MMs UTL-4 through UTL-8.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Discussion of Effects: City of Ontario serves the proposed Project. Currently, the City of Ontario contracts with a waste disposal company that transports trash to a landfill with sufficient capacity to handle the City's solid waste disposal needs. No impacts are anticipated. Although no impact is anticipated in this regard, the Certified EIR included the following MM as part of the original OCSP analysis.

Mitigation: Solid Waste

MM-UTL-9 Solid waste will be disposed of in Milliken Landfill. Upon closing of the Milliken Landfill, waste will be disposed of at the San Timoteo Landfill. A transfer station for the City will be constructed by the City in the next 2 to 3 years to transport waste from Ontario to the San Timoteo Landfill.

A less than significant impact would occur with implementation of MM UTL-9.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

Discussion of Effects: This Project would comply with federal, state, and local statutes and regulations regarding solid waste. Therefore, no impacts are anticipated.

Mitigation: None required.

20. Wildfire

Would the project:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Discussion of Effects: According to the General Plan and CAL FIRE, the Project site is not located within a Very High, High, or Medium Fire Hazard area. The Project would not interfere with the City's Emergency Management Plan because it does not contain any features that would prohibit the execution of such plans. The Project would maintain the existing ingress and egress which were designed to accommodate existing and future growth of the site. No impacts are anticipated.

Mitigation: None required.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Discussion of Effects: Like most of southern California, the City of Ontario faces a diverse array of potential natural hazards. The General Plan notes that severe windstorms can pose a significant risk to property and life in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds, including Santa Ana winds, can cause damage to homes, businesses, landscaping, public property, and utilities, and pose threats to public safety, including accelerating a fire. The alluvial sand that underlies the majority of Ontario is generally granular, poorly consolidated, and very susceptible to erosion. In strong winds this sand can impact property, air quality and visibility. However, no special circumstances occur on the Project that do not occur in the rest of the City of region. No impact from wind hazards is anticipated to occur.

Mitigation: None required.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Discussion of Effects: All proposed Project components would be within the Project site property lines, and impacts associated with the development of the Project within this footprint area analyzed throughout this document and has been previously analyzed in the Certified EIR. No impacts are anticipated to occur.

Mitigation: None required.

d) Expose people or structures to significant risks, including downslope, or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Discussion of Effects: As previously analyzed in the Certified EIR, the Project site is not located in a landslide hazard area or a floodplain. No changes in findings in this regard would occur compared to those findings in the Certified EIR for the Project site. As such, no impact in this regard would occur.

Mitigation: None required.

21. MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat or a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Discussion of Effects: The site is located within an area that has been previously heavily disturbed, mass graded, and partially developed with various uses including multi-family residential DUs and commercial. The Project is not anticipated to have the potential to degrade the quality of the environment or reduce the overall habitat as there is no native habitat.

b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?

Discussion of Effects: The Project does not have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals. As shown throughout this addendum, the Project would not cause any more intense impacts than those already previously considered in the Certified EIR, CEA, POCA, and POOC environmental documents.

Mitigation: None required.

c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current project, and the effects of probable future projects.)

Discussion of Effects: The Project does not have impacts that are cumulatively considerable that have not already been considered in the Certified EIR, CEA, POCA, and POOC environmental documents.

Mitigation: None required.

d) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

Discussion of Effects: The Project does not have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly.

Mitigation: None required.

APPENDIX A
TRAFFIC IMPACT ANALYSIS

TOYOTA ARENA MIXED-USE DEVELOPMENT
TRAFFIC IMPACT ANALYSIS
City of Ontario, California

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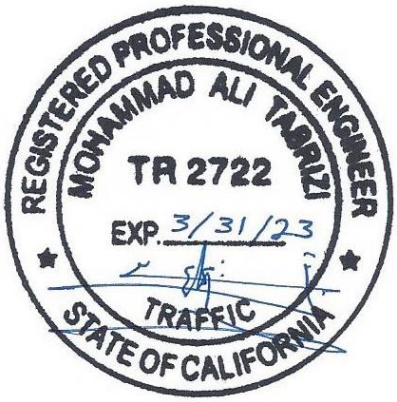

September 17, 2021

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With Projects Conditions Traffic Volumes – Weekday 4-16

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1.0 Introduction

1.1 Purpose of Report and Study Objectives

The purpose of this traffic study is to assess the impacts of the proposed Toyota Arena Mixed-Use Development (hereinafter referred to as project) from a traffic and circulation stand point.

This study has been conducted in accordance with the guidelines detailed in *The Ontario General Plan Update Transportation Technical Report (March 19, 2009)* and recommendations and practices described in the *City of Ontario Planning Commission Resolution No. PC20-021 (May 26, 2020).*

The study has been prepared in accordance with the scope of work discussed and approved by City staff prior to initiating the analysis.

1.2 Site Location & Project Description

The proposed project is located adjacent to the Toyota Arena, north of Concours Street and south of 4th Street, in the City of Ontario.

The land uses surrounding the site include residential uses to the north, commercial uses to the south and west, and commercial and retail uses to the east at the Ontario Mills Shopping Center. The proposed project consists of the construction and operation of a mixed-use town center development with residential and commercial/retail land uses. The following is a breakdown of the project's development plan:

Proposed Development Plan

Lot	Dwelling Units (DU)	Retail (SF)	Parking Spaces
A	359	25,256	477*
B	98	20,802	130*
C	107	11,047	142*
D	127	14,095	170*
F & G	- -	- -	1,170
Total	**691**	**71,200**	**2,089**

* Parking structure

Main access for the project is planned via the following:

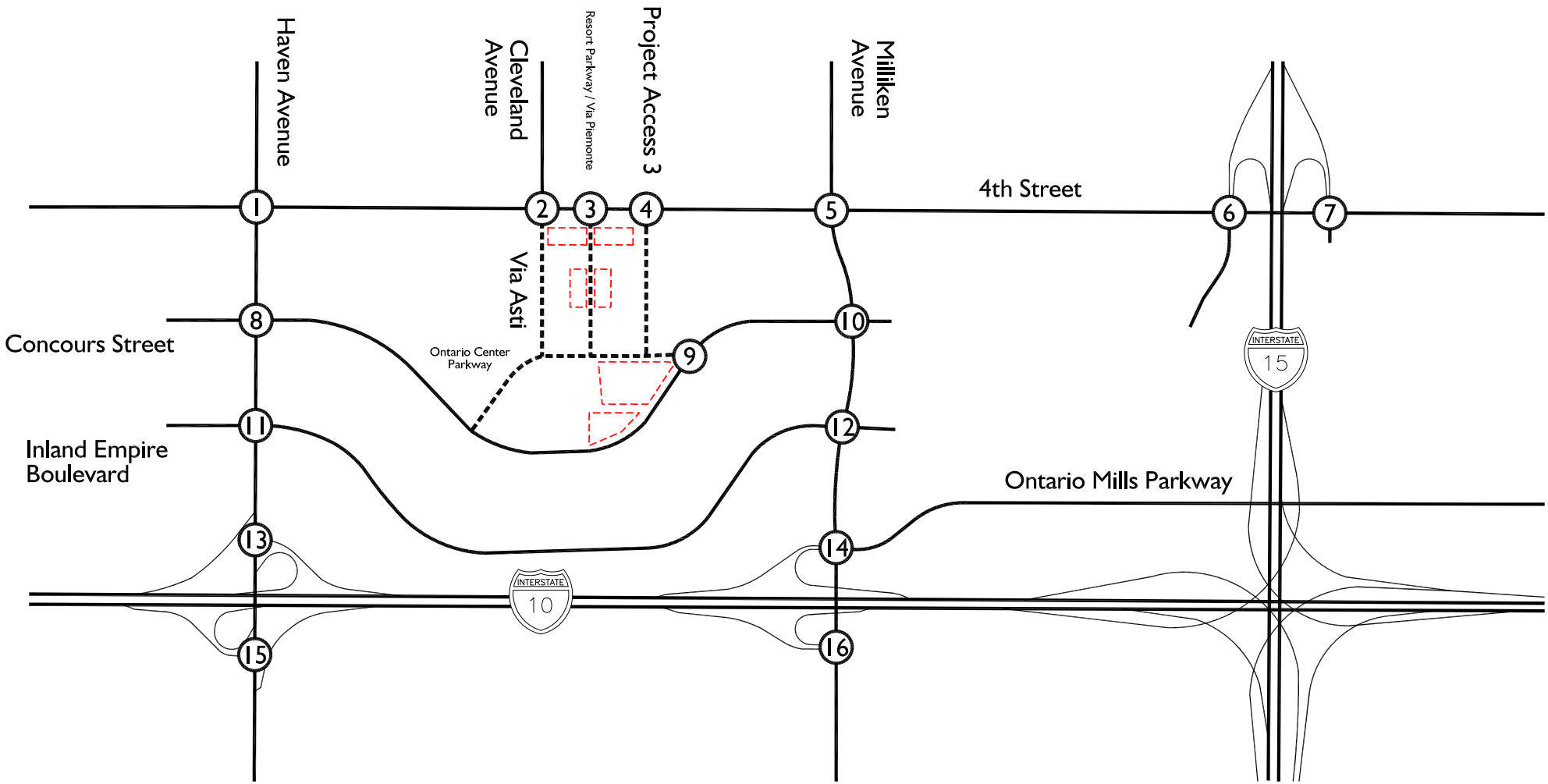
- One (1) signalized intersection at Cleveland Avenue – Via Asti / 4th Street;
- One (1) signalized intersection at Resort Parkway – Via Piemonte / 4th Street;
- One (1) right-in/right-out access driveway along 4th Street; and

The project is planned to open in 2023 and will be evaluated in one single phase.

The project site's location map is shown in Exhibit 1-1. The project site plan is shown in Exhibit 1-2.

Exhibit 1-1

Location Map



Legend:

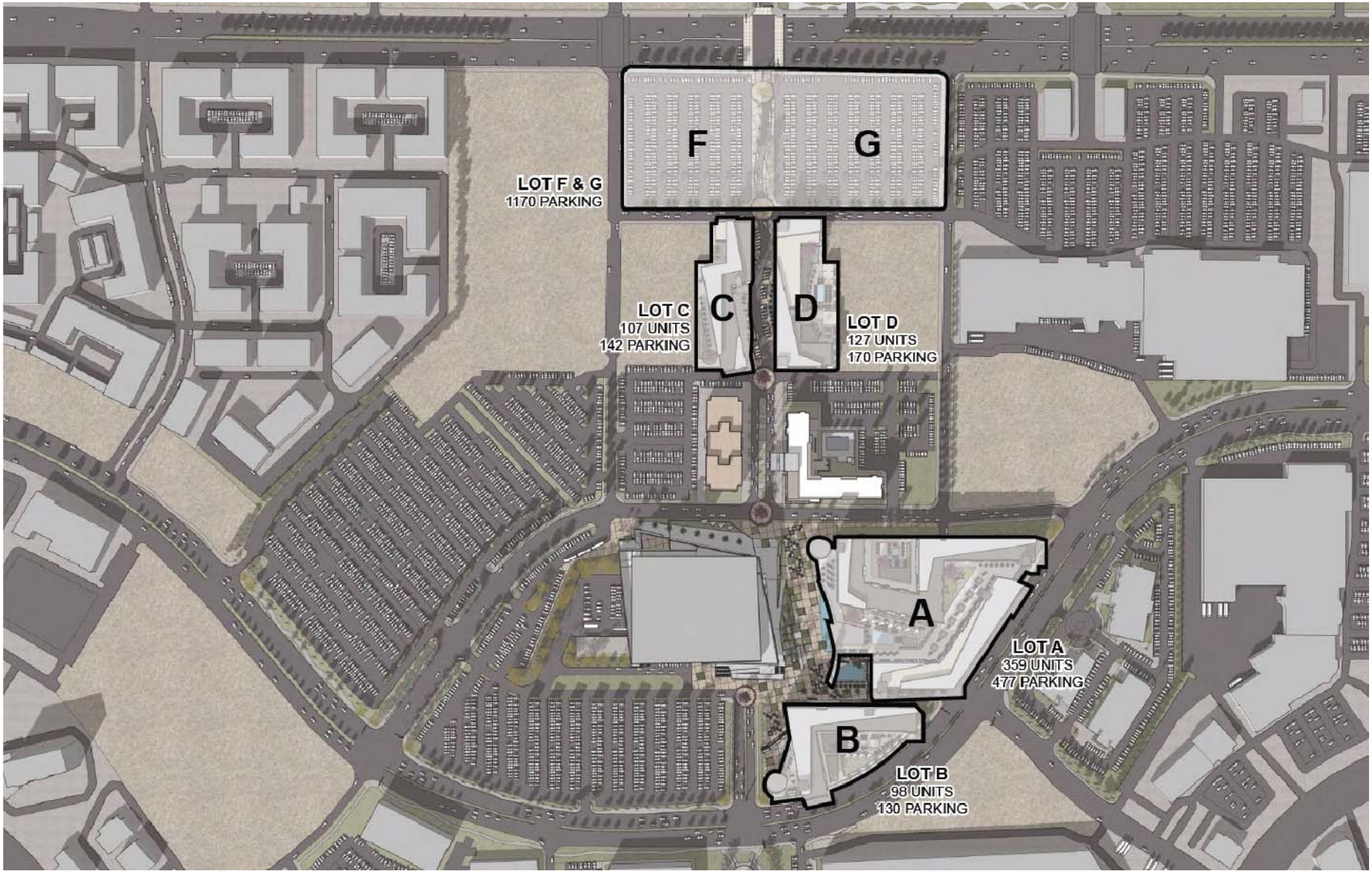
(1) = Study Area Intersections

---- = Project Site Boundary

▬ ▬ = Project Access Way

N

Exhibit 1-2
Site Plan



2.0 Study Area & Analysis Methodologies

This section of the report presents the analysis study area and the methodologies used to perform the traffic analyses summarized in this report in accordance with the City of Ontario requirements.

Furthermore, this section of the report also discusses the agency-established performance criteria and thresholds of significance for the study facilities.

2.1 Study Area

The traffic analysis study area includes intersections where the proposed project may potentially create traffic impacts to traffic operations and conditions.

The traffic impact analysis evaluates the following study area intersections:

1. Haven Avenue (NS) / 4TH Street (EW);
2. Cleveland Avenue – Via Asti (NS) / 4th Street (EW);
3. Resort Parkway – Via Piemonte (NS) / 4th Street (EW);
4. Project Access 3 (NS) / 4th Street (EW);
5. Milliken Avenue (NS) / 4th Street (EW);
6. I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW);
7. I-15 NB Ramps (NS) / 4th Street (EW);
8. Haven Avenue (NS) / Concours Street (EW);
9. Concours Street (NS) / Ontario Center Parkway (EW);
10. Milliken Avenue (NS) / Concours Street (EW);
11. Haven Avenue (NS) / Inland Empire Boulevard (EW);

12. Milliken Avenue (NS) / Inland Empire Boulevard (EW);

13. Haven Avenue (NS) / I-10 WB Ramps (EW);

14. Milliken Avenue (NS) / Ontario Mills Parkway – I-10 WB Ramps (EW);

15. Haven Avenue (NS) / I-10 EB Ramps (EW); and

16. Milliken Avenue (NS) / I-10 EB Ramps (EW).

The study evaluates the following study scenarios for AM, PM, and Saturday peak hour conditions:

- Existing Conditions;
- Existing Plus Project Conditions;
- Project Opening Year Without Related Projects Without Project Conditions;
- Project Opening Year Without Related Projects With Project Conditions;
- Project Opening Year With Related Projects Without Project Conditions;
- Project Opening Year With Related Projects With Project Conditions;
- Horizon Year (2040) Without Project Conditions; and
- Horizon Year (2040) With Project Conditions.

The analysis evaluates the following time frames:

- Weekday AM peak period of 7:00 AM to 9:00 AM
- Weekday PM peak period of 4:00 PM to 6:00 PM
- Saturday mid-day peak period of 12:45 PM to 2:45 PM (Saturday peak period of traffic was determined by review of existing 24-hour volumes in the project site vicinity)

2.2 Study Intersection Peak Hour Level of Service Analysis Methodology

In accordance with *The Ontario General Plan Update Transportation Technical Report (March 19, 2009)*, the Highway Capacity Manual Sixth Edition (HCM 6) is utilized as the technical guide in the evaluation of traffic operations.

The HCM defines level of service as a qualitative measure which describes operational conditions within a traffic stream, generally in terms of factors such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate LOS (Level of Service) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted.

The definitions of level of service for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- **LOS A** represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

- **LOS B** is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.

- **LOS C** is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.

- **LOS D** represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.

- **LOS E** represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.

- **LOS F** is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations.

The level of service is typically dependent on the quality of traffic flow at the intersections along a roadway. The HCM methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control. The levels of service determined in this study are calculated using the HCM methodology.

For signalized intersections, average control delay per vehicle is used to determine the level of service. Levels of service at signalized study intersections have been evaluated using the HCM intersection analysis program.

Study area intersections, which are stop sign controlled with stop control on the minor street only, have been analyzed using the unsignalized intersection methodology of the HCM. For these intersections, the calculation of level of service is dependent on the occurrence of gaps occurring in the traffic flow of the main street. Using data collected, describing the intersection configuration and traffic volumes at these locations, the level of service has been calculated. The level of service is determined based on the worst individual movement or movements sharing a single lane. The relationship between level of service and delay is different than for signalized intersections.

Table 2-1 shows the level of service criteria based on the HCM methodology.

Table 2-1
HCM Level of Service – Vehicle Delay

LOS	Intersection LOS Criteria	
	Signalized Delay (Seconds)	Unsignalized Delay (Seconds)
A	0.00 - 10.00	0.00 - 10.00
B	10.01 - 20.00	10.01 - 15.00
C	20.01 - 35.00	15.01 - 25.00
D	35.01 - 55.00	25.01 - 35.00
E	55.01 - 80.00	35.01 - 50.00
F	>80.01	>50.01

This analysis also utilizes recommended saturation flow rate described in the *San Bernardino County Congestion Management Program 2016 Update, June 2016, 2021*. The

following saturation flow rates were utilized in the evaluation of LOS for Existing, Opening Year, and Horizon Year (2040) scenarios:

Existing and Opening Year Scenarios

- Exclusive Thru: 1,800 vehicles per hour green per lane (vphgpl)
- Exclusive Left: 1,700 vphgpl
- Exclusive Right: 1,800 vphgpl
- Exclusive Double Left: 1,600 vphgpl
- Exclusive Triple Left: 1,500 vphgpl

Horizon Year (2040) Scenarios

- Exclusive Thru: 1,900 vphgpl
- Exclusive Left: 1,800 vphgpl
- Exclusive Right: 1,900 vphgpl
- Exclusive Double Left: 1,700 vphgpl
- Exclusive Triple Left: 1,600 vphgpl

2.3 Study Intersection Level of Service (LOS) Performance Criteria & Thresholds for Requiring Improvements

The following is a summary of the performance criteria adopted by the City of Ontario.

Performance Criteria:

The acceptable LOS for intersections in the City of Ontario is **LOS E or better** as established in the City's General Plan. Any intersection operating at a LOS F is considered deficient.

Threshold for Requiring Level of Service Improvements:

Any study intersection operating at a deficient LOS (LOS F) will require improvements to restore the intersection to acceptable conditions (LOS E).

2.4 VMT Analysis Methodology, Performance Criteria, & Thresholds of Significance

Effective July 1st, 2020, the longstanding metric of roadway level of service (LOS), which is typically measured in terms of vehicle delay, roadway capacity and congestion, will no longer be considered a significant impact under the California Environmental Quality Act (CEQA). Pursuant to CEQA Guidelines, Section 15064.3, VMT is now the most appropriate measure of transportation impacts.

The City of Ontario follows the guidelines detailing the appropriate VMT methodologies, thresholds of significance, and feasible mitigation measures as described in the *City of Ontario Planning Commission Resolution No. PC20-021 (May 26, 2020).*

This analysis follows the practices and recommendations in the *City of Ontario Planning Commission Resolution No. PC20-021 (May 26, 2020).*

3.0 Existing Traffic Volumes & Circulation System

This section provides a discussion of existing study area conditions and traffic volumes.

3.1 Existing Traffic Controls and Intersection Geometrics

Exhibit 3-1 identifies the existing roadway conditions within the study area. The number of through traffic lanes for existing roadways and existing intersection controls are identified. The type of traffic control and number of lanes at an intersection are key inputs for the calculation of level of service.

3.2 Existing Traffic Volumes

Due to the effects of the COVID-19 pandemic, collection of new and valid traffic counts may not be feasible. After discussions with City staff, methodologies were approved to utilize historical traffic data that predate the impacts of the COVID-19 pandemic after application of a two percent (2%) growth rate per year to derive existing (2021) traffic conditions.

As previously noted, the analysis evaluates the following time frames:

- Weekday AM peak period of 7:00 AM to 9:00 AM
- Weekday PM peak period of 4:00 PM to 6:00 PM
- Saturday mid-day peak period of 12:45 PM to 2:45 PM (Saturday peak period of traffic was determined by review of existing 24-hour volumes in the project site vicinity)

Existing Conditions – Weekday:

After reviewing available pre-pandemic traffic count data provided by RK's traffic count sub-consultants, pre-pandemic traffic counts (years vary) were identified for all study area intersections with exception to the following. For all the locations that pre-pandemic data was available, RK derived Existing 2021 non pandemic conditions traffic volumes by applying an annual growth rate of 2 percent per year to bring the older counts to 2021 conditions.

- Cleveland Avenue – Via Asti (NS) / 4th Street (EW);
- Resort Parkway – Via Piemonte (EW);
- Project Access 3 (NS) / 4th Street (EW); and
- Concours Street (NS) / Ontario Center Parkway (EW).

As a result, the following methodology was performed to derive valid weekday conditions existing (2021) traffic count data for the aforementioned study intersections.

1. ***Collect 2021 Field Counts:*** Existing (2021) traffic count data were collected at the following intersections:
    - Cleveland Avenue – Via Asti (NS) / 4th Street (EW);
    - Resort Parkway – Via Piemonte (NS) / 4th Street (EW);
    - Project Access 3 (NS) / 4th Street (EW);
    - Concours Street (NS) / Ontario Center Parkway (EW); and
    - The nearby intersection of Milliken Avenue (NS) / 4th Street (EW)
2. ***Derive 2021 Counts from Pre-Pandemic Counts:*** Using the available pre-pandemic conditions traffic counts from 2016 at the nearby Milliken Avenue / 4th Street intersection, RK projected 2021 traffic count data for the Milliken Avenue / 4th Street intersection from the 2016 pre-pandemic counts by applying a growth rate of two percent (2%) per year for five (5) years.
3. ***Determine Adjustment Factor for Converting Pandemic Conditions to Non-pandemic Conditions:*** RK compared the 2021 field collected counts at the nearby intersection of Milliken Avenue / 4th Street as part of Step 1 to the derived 2021 traffic count volumes at this intersection from Step 2 and determine an appropriate adjustment factor to convert between pandemic and non-pandemic conditions.

4. ***Derive 2021 Non-Pandemic Conditions Counts at the Study Intersection:*** Using the adjustment factor derived as part of Step 3, RK converted the 2021 counts collected at the other four (4) study intersections defined in Step 1 into non-pandemic traffic volumes for 2021.

Exhibit 3-2 shows the weekday conditions existing (2021) conditions traffic volumes for the study area.

Existing Conditions – Saturday:

No historical pre-pandemic traffic count data was available for Saturday Conditions. As a result, the following methodology was performed to derive valid Saturday conditions existing (2021) traffic count data.

In order to determine the Saturday two-hour timeframe to evaluate traffic conditions for the proposed project, a newly collected 24-hour Saturday ADT was obtained along the segment of:

- 4th Street from Haven Avenue to Milliken Avenue.

The Saturday peak two-hour time frame was identified from the newly collected 24-hour Saturday ADT, RK utilized the following methodology in order to derive valid existing Saturday (2021) traffic count data for the sixteen (16) study area intersections.

1. **Collect 24-Hour ADT Counts:** A newly collected 24-hour ADT along the segment of *4th Street from Haven Avenue to Milliken Aven*ue was performed to determine the Saturday two-hour timeframe of analysis.

2. ***Collect 2021 Field Counts:*** Existing Saturday (2021) traffic count data was newly collected at all study area intersections.

3. ***Utilize Adjustment Factor for Converting Pandemic Conditions to Non-pandemic Conditions:*** Utilizing the adjustment factor derived in Step 3 of the weekday conditions traffic count methodology, RK converted the newly collected existing Saturday (2021) pandemic conditions counts to existing Saturday (2021) non-pandemic conditions.

Exhibit 3-3 shows the Saturday conditions existing (2021) conditions traffic volumes for the study area.

The weekday and Saturday traffic count worksheets are included in Appendix A.

3.3 City of Ontario Circulation Element

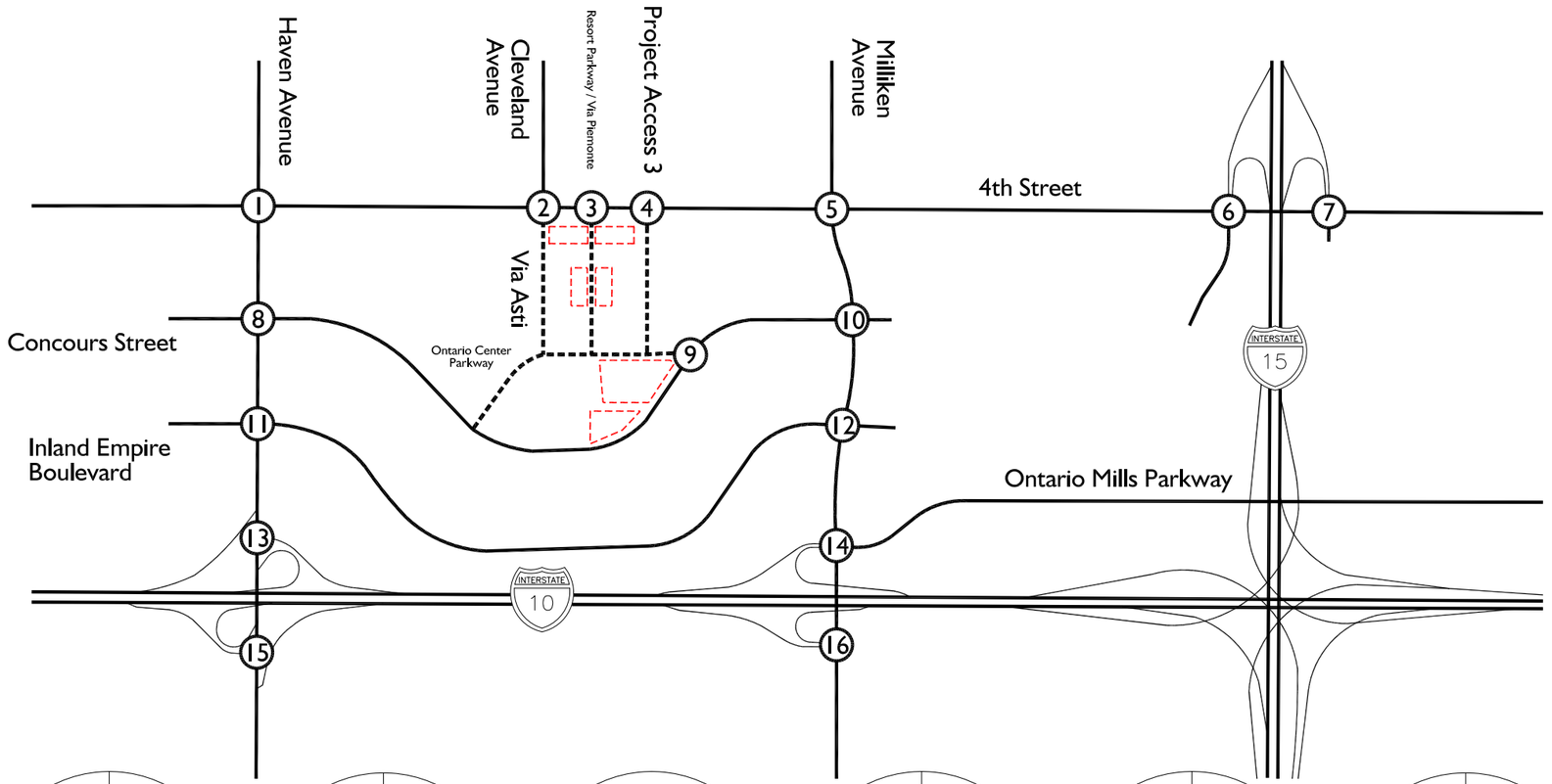
The City of Ontario Typical Street Cross Sections are shown in Exhibit 3-4.

The City of Ontario Master Plan of Streets and Highways are shown in Exhibit 3-5.

The City of Ontario Trucks Routes are shown in Exhibit 3-6.

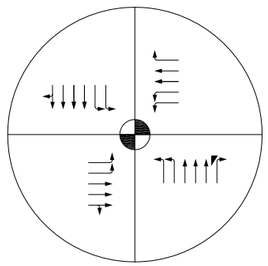
Exhibit 3-1

Existing Lane Geometry & Traffic Controls

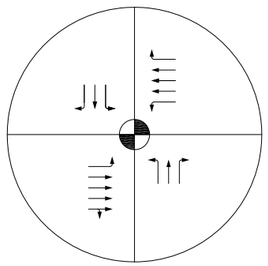


Legend:

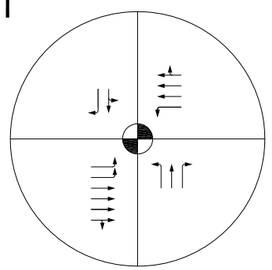
- = Traffic Signal
- RTO = Right Turn Overlap
- = Free Right Turn
- = Defacto Right Turn
- = Stop Sign



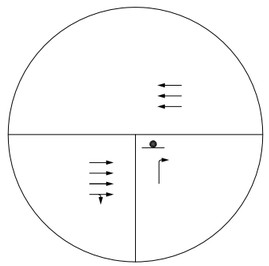
1. Haven Street (NS) & Fourth Street (EW)



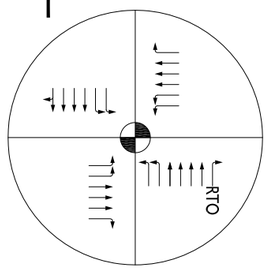
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



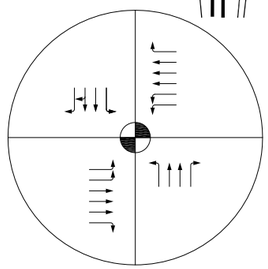
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



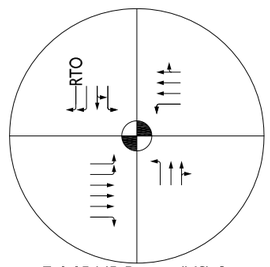
4. Project Street Access 3 (NS) & Fourth Street (EW)



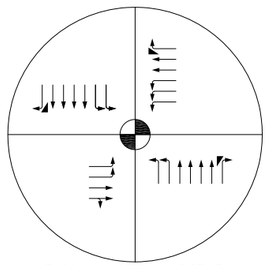
5. Milliken Avenue (NS) & Fourth Street (EW)



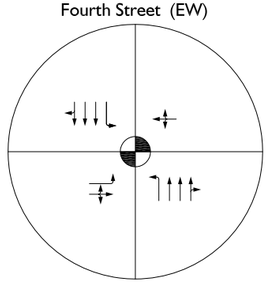
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



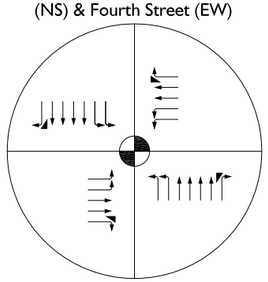
7. I-15 NB Ramps (NS) & Fourth Street (EW)



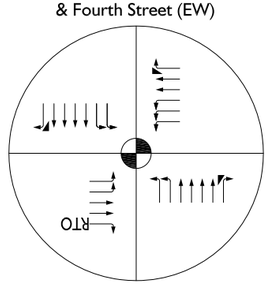
8. Haven Avenue (NS) & Concours Street (EW)



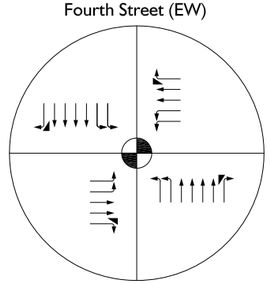
9. Concours Street (NS) & Ontario Center Parkway (EW)



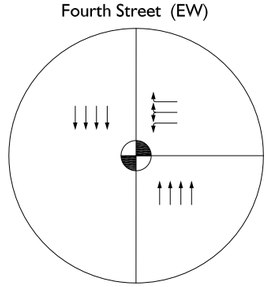
10. Milliken Street (NS) & Concours Street (EW)



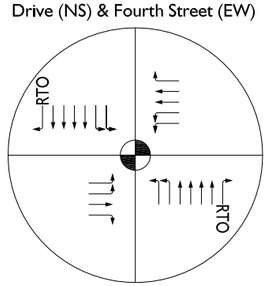
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



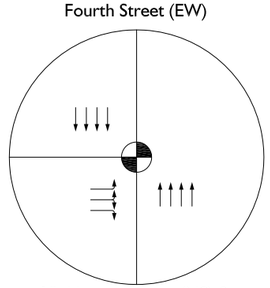
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



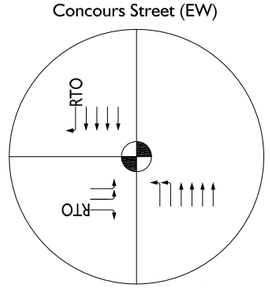
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

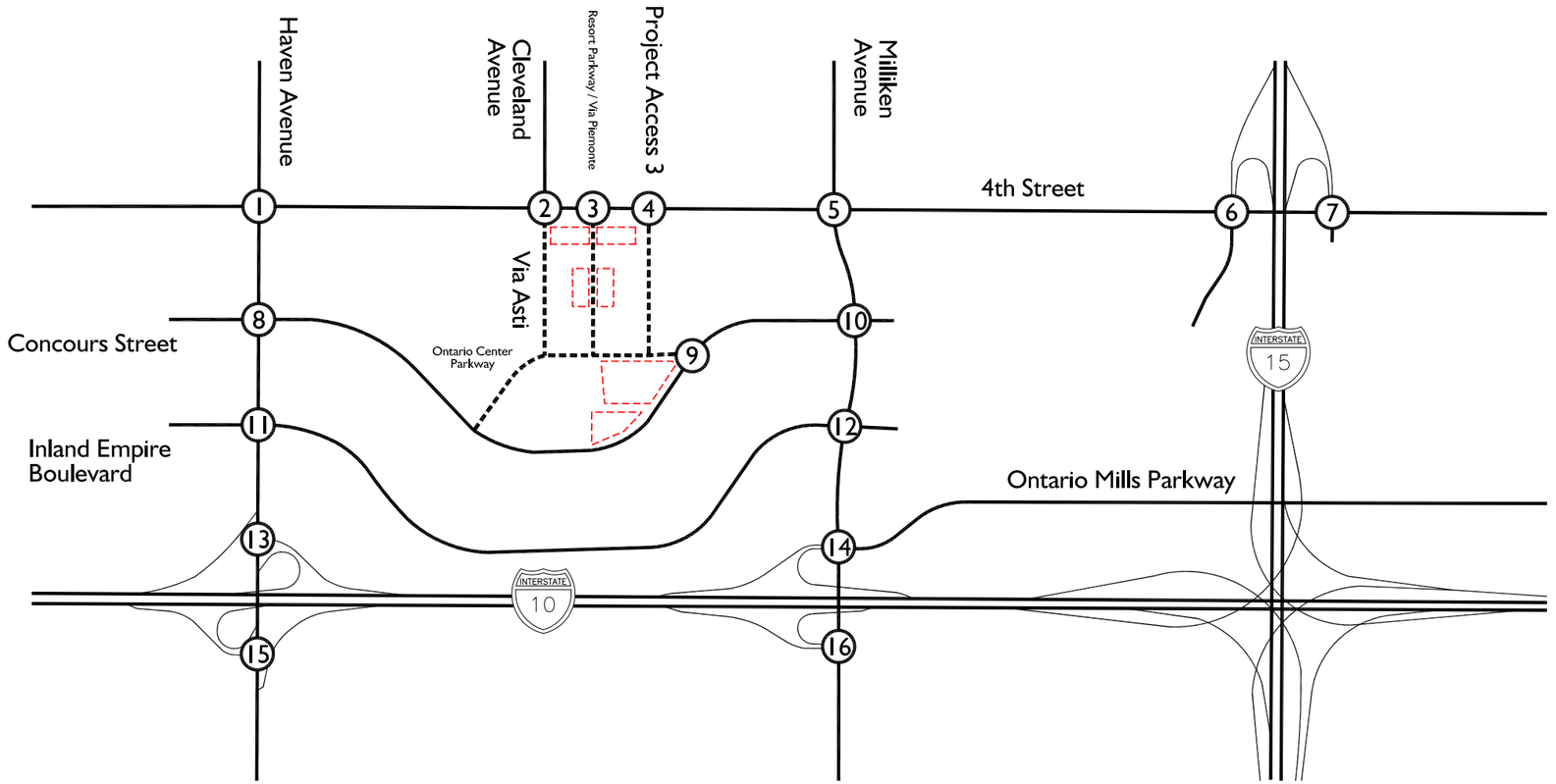


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

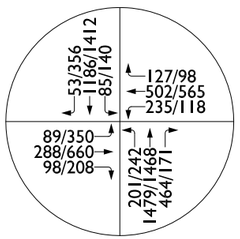
Exhibit 3-2

Existing Conditions Traffic Volume - Weekday

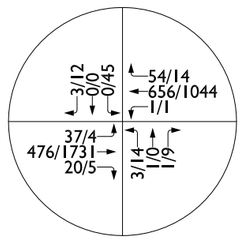


Legend:

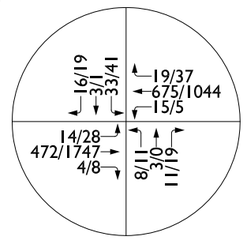
10/20 = AM/PM Peak Hour Volumes



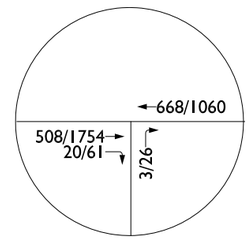
1. Haven Street (NS) & Fourth Street (EW)



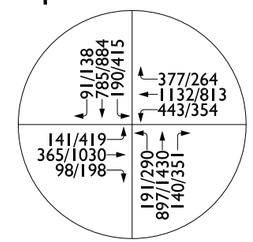
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



4. Project Street Access 3 (NS) & Fourth Street (EW)



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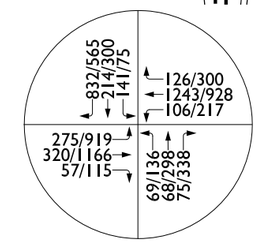
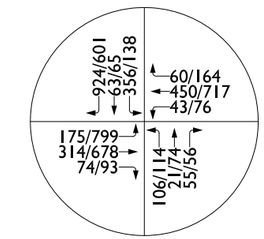
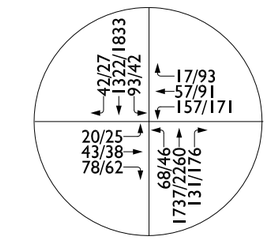


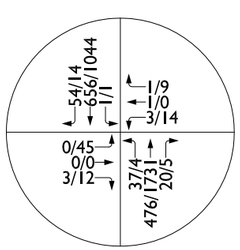
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



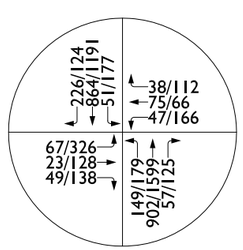
7. I-15 NB Ramps (NS) & Fourth Street (EW)



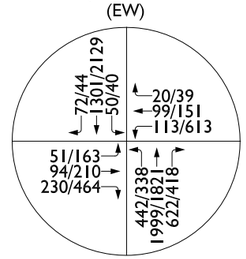
8. Haven Avenue (NS) & Concours Street (EW)



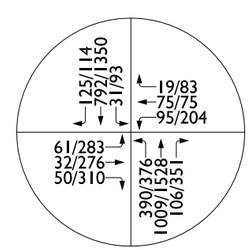
9. Concours Street (NS) & Ontario Center Parkway (EW)



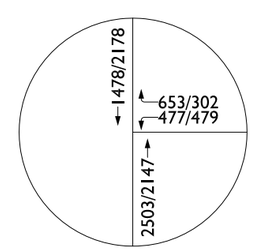
10. Milliken Street (NS) & Concours Street (EW)



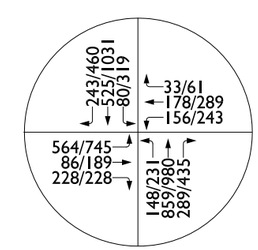
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



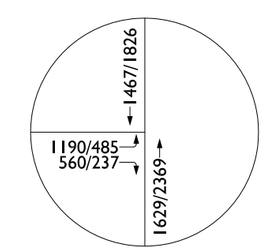
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



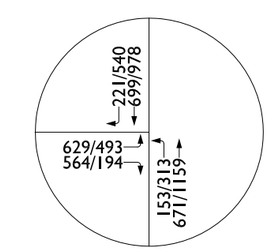
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

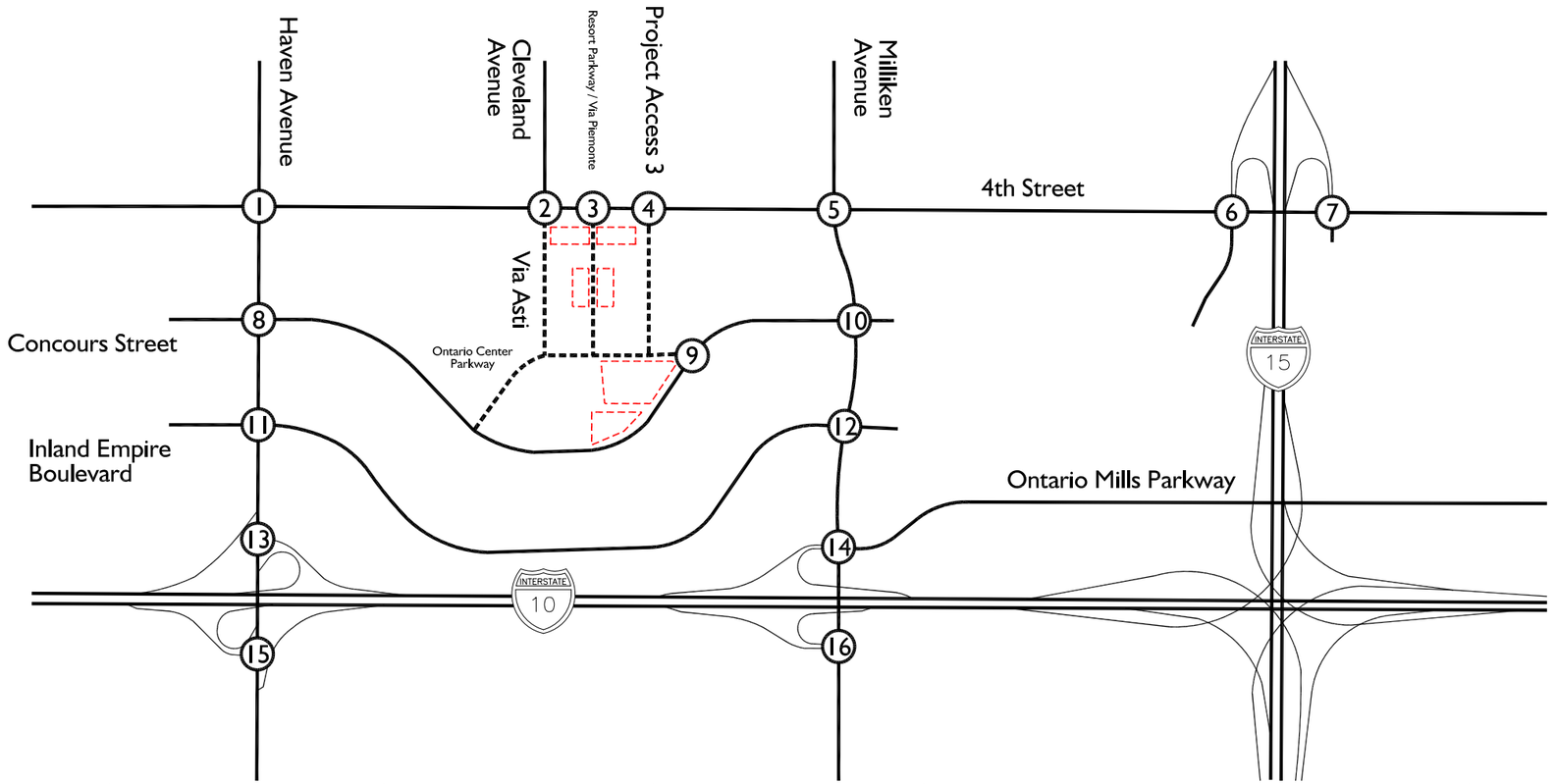


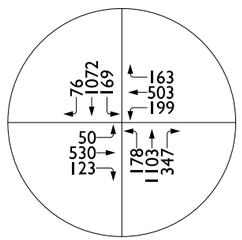
16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

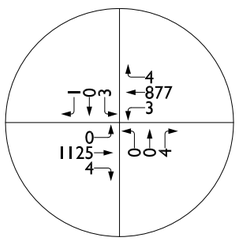
Exhibit 3-3

Existing Conditions Traffic Volume - Weekday Saturday

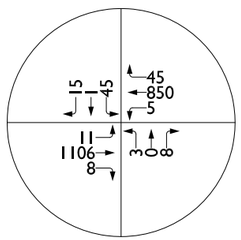




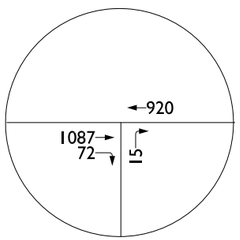
1. Haven Street (NS) & Fourth Street (EW)



2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



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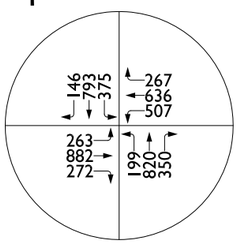
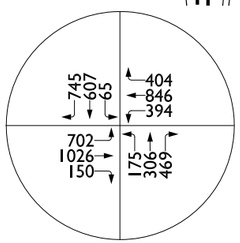
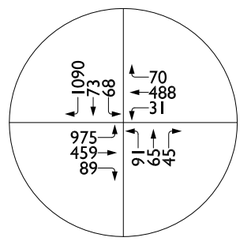


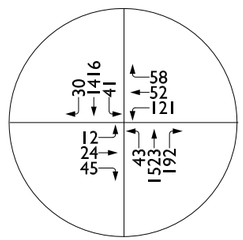
5. Milliken Avenue (NS) & Fourth Street (EW)



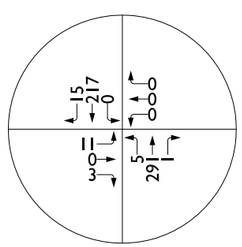
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



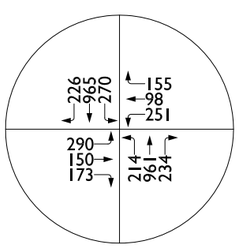
7. I-15 NB Ramps (NS) & Fourth Street (EW)



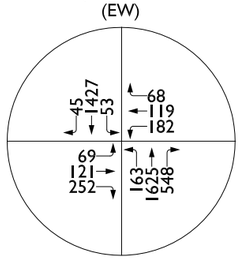
8. Haven Avenue (NS) & Concours Street (EW)



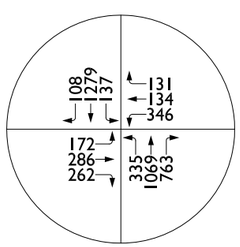
9. Concours Street (NS) & Ontario Center Parkway (EW)



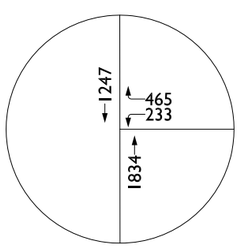
10. Milliken Street (NS) & Concours Street (EW)



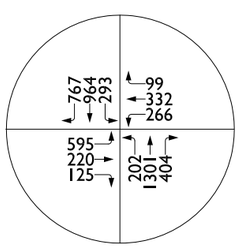
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



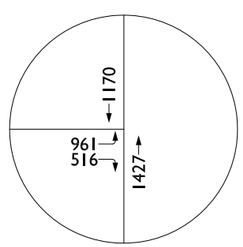
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



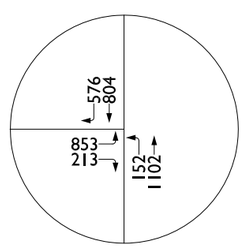
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

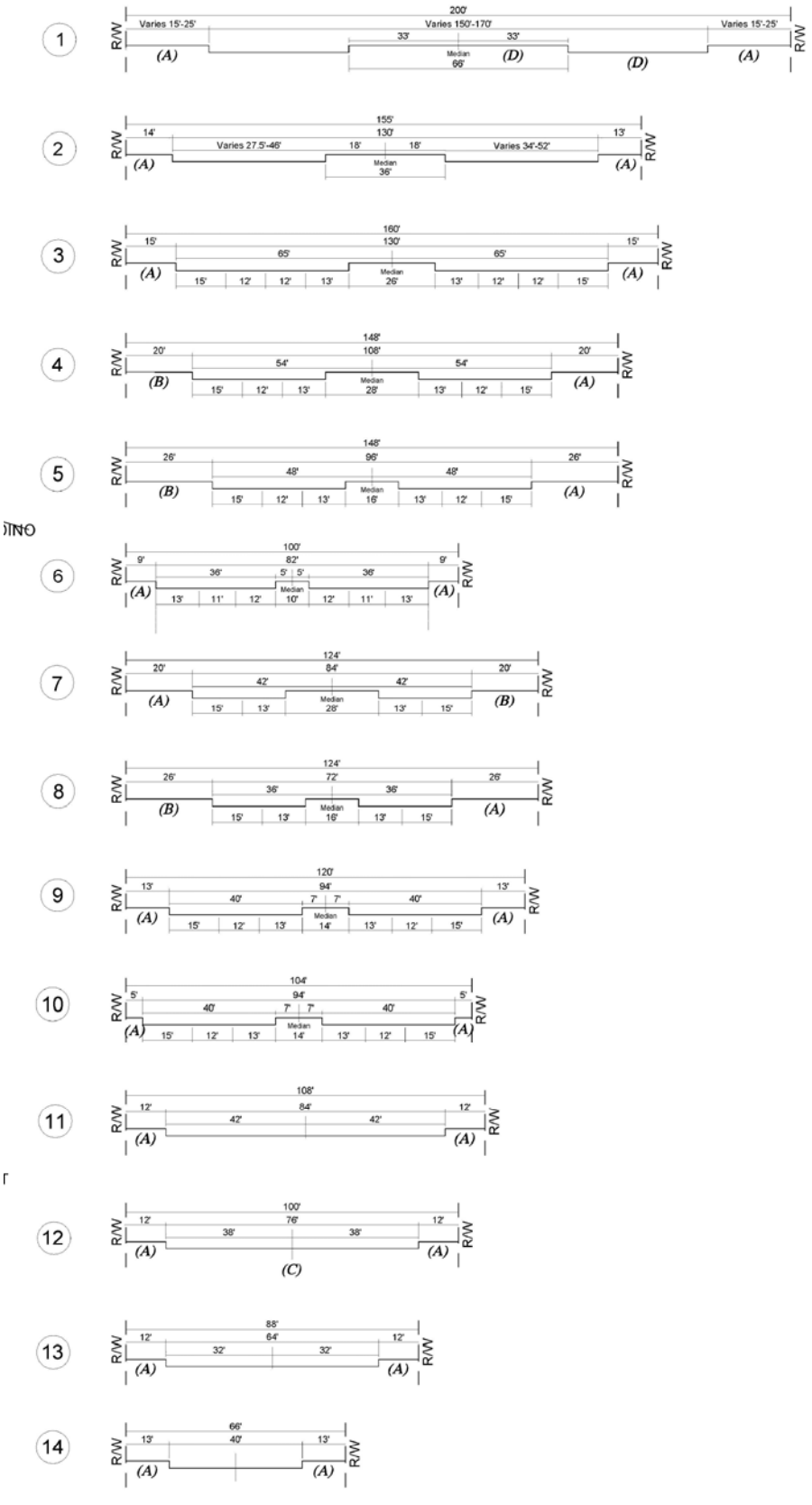
Legend:

10 = Saturday Peak Hour Volumes

N

City of Ontario Typical Street Cross Sections

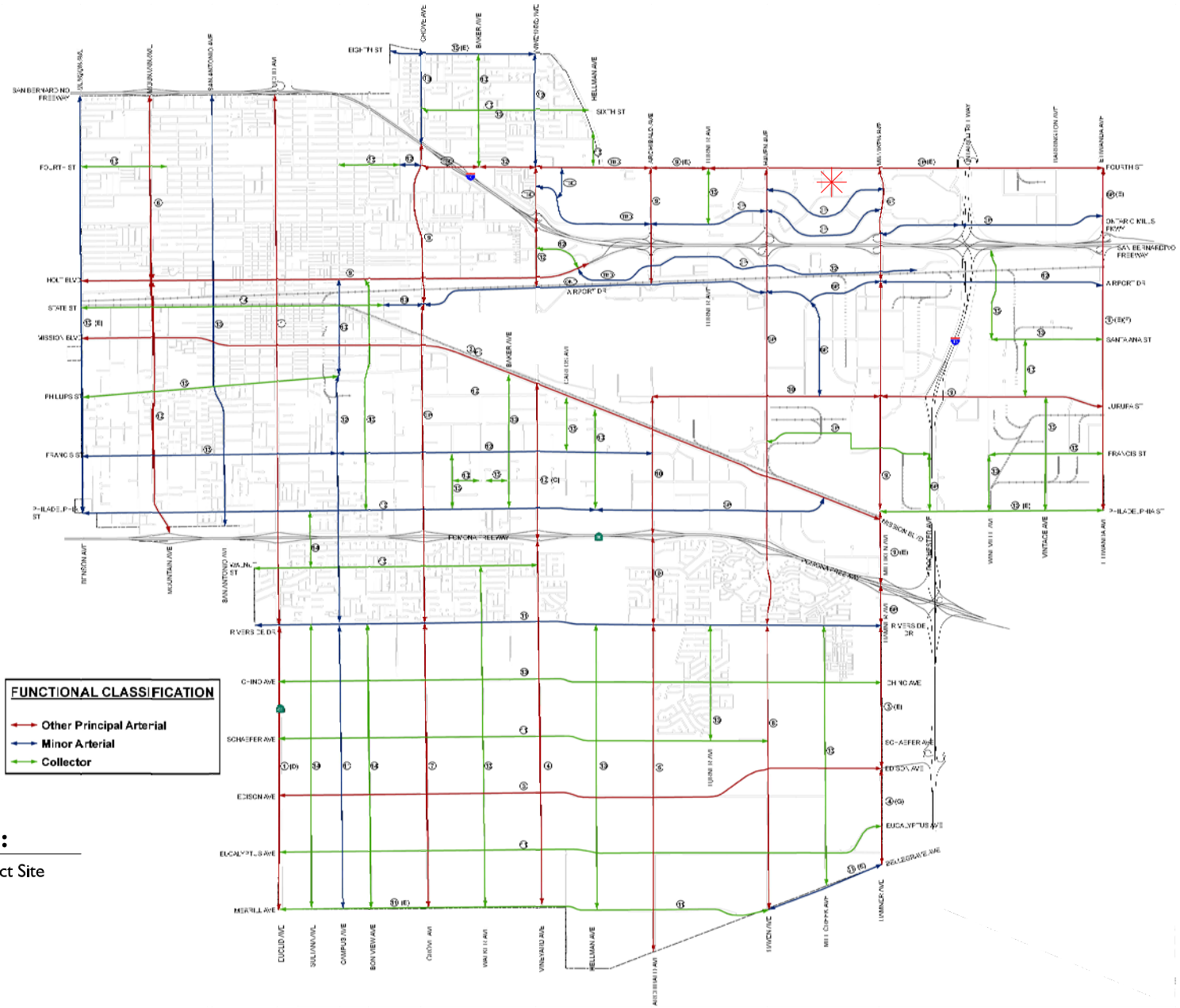
SECTIONS



N

Exhibit 3-5

City of Ontario Master Plan of Streets



City of Ontario Truck Routes

4.0 Projected & Future Traffic Volumes

This section of the report provides a discussion on methodologies utilized to derive future traffic volumes for the study area.

4.1 Project Traffic Conditions

4.1.1 Trip Generation

Trip generation represents the amount of traffic that is attracted and produced by a development. The trip generation for the project is based upon the specific land uses that have been planned for this development.

Trip generation is typically estimated based on the trip generation rates from the latest *Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017)*. This publication provides a comprehensive evaluation of trip generation rates for a variety of land uses.

Table 4-1 shows the ITE trip generation rates for the trip generation analysis of the project land uses.

Utilizing the trip generation rates from Table 4-1, Table 4-2 summarizes the daily and peak hour trip generation for weekday and Saturday conditions for the proposed project.

As shown in Table 4-2, based on the ITE trip generation rates:

- The proposed project is forecast to generate approximately 6,447 weekday daily trips which include approximately 315 weekday AM peak hour trips, approximately 575 weekday PM peak hour trips.

- The proposed project is forecast to generate approximately 6,677 Saturday daily trips which include approximately 624 Saturday peak hour trips.

An internal trip capture reduction is applicable when a project site has more than one destination (such as the proposed project), in which a person visits more than one destination onsite during the same visit. The project site's retail component will

provide various land uses which will allow a patron to visit more than one destination on a single trip.

Furthermore, a portion of these trips (pass-by trips) are already on the roadway network making an intermediate stop on their way to a primary destination. Therefore, as also shown in Table 4-2, *after accounting for internal trip capture and applicable ITE pass-by trips rates*:

- The proposed project is forecast to generate approximately 5,691 weekday daily trips which include approximately 300 weekday AM peak hour trips, approximately 458 weekday PM peak hour trips.

- The proposed project is forecast to generate approximately 5,813 Saturday daily trips which include approximately 490 Saturday peak hour trips.

4.1.2 Trip Distribution

Trip distribution represents the directional orientation of traffic to and from the project site. Trip distribution is heavily influenced by the geographical location of the site and the proximity to the regional freeway system. The directional orientation of traffic was determined by evaluating existing and proposed land uses and highways within the study area.

The project outbound trip distribution is shown in Exhibit 4-1.

The project inbound trip distribution is shown in Exhibit 4-2.

4.1.3 Modal Split

Modal split denotes the proportion of traffic generated by a project that would use any of the transportation modes, namely buses, cars, bicycles, motorcycles, trains, carpools, etc. The traffic-reducing potential of public transit and other modes is significant. However, the traffic projections in this study are conservative in that public transit and alternative transportation may be able to reduce the traffic volumes, but, no modal split reduction is applied to the projections. With the implementation of transit service and provision of alternative transportation ideas and incentives, the automobile traffic demand can be reduced significantly.

4.1.4 Project Traffic Volumes/Assignment

The assignment of project traffic to the adjoining roadway system is based upon the project's trip generation, trip distribution, arterial highway, and local street systems that would be in place by the time of initial occupancy of the site.

Weekday project traffic volumes are shown in Exhibit 4-3. Saturday project traffic volumes are shown in Exhibit 4-4.

4.2 Existing Plus Project Conditions Traffic Volumes

Weekday Existing Plus Project Conditions traffic volumes consist of the summation of the weekday existing traffic volumes shown in Exhibit 3-2 and the weekday project traffic volumes shown in Exhibit 4-3.

Weekday Existing Plus Project Conditions traffic volumes are shown on Exhibit 4-5.

Saturday Existing Plus Project Conditions traffic volumes consist of the summation of the Saturday existing traffic volumes shown in Exhibit 3-3 and the Saturday project traffic volumes shown in Exhibit 4-4.

Saturday Existing Plus Project Conditions traffic volumes are shown on Exhibit 4-6.

4.3 Background Traffic

4.3.1 Method of Projection

To assess future conditions, project traffic is combined with existing traffic and area-wide growth. As directed by City staff, to account for area-wide/ambient growth in the study area, an annual growth rate of two percent (2%) per year has been applied to the existing (2021) traffic volumes over a 2-year period from 2021 to opening year (2023). Similarly, an annual growth rate of two percent (2%) per year has been applied to the existing (2021) traffic volumes over a 19-year period from 2021 to horizon year (2040).

4.3.2 Cumulative Projects Traffic

Information on future projects in the vicinity of the study area has been provided by City of Ontario and City of Rancho Cucamonga staff for inclusion in this analysis and is shown in Table 4-3.

The list of cumulative projects provided are for projects that have been officially submitted for land use review, are waiting public hearing approval, or have been approved by the public hearing body.

Table 4-3 shows the land uses, weekday and Saturday trip generation for the nearby cumulative projects provided by the public agencies.

A location map of the cumulative projects is shown in Exhibit 4-7.

Weekday cumulative projects traffic volumes are shown in Exhibit 4-8. Saturday cumulative projects traffic volumes are shown in Exhibit 4-9.

In reality, some of the cumulative projects may be downsized or may not be developed by project opening year (2023). In addition, many of the related projects have been or will be subject to a variety of mitigation measures that will reduce the potential environmental impacts associated with those projects. However, those mitigation measures have not been taken into account in projecting the environmental impact of the related projects.

Therefore, the cumulative analyses set forth below are conservative and could result in greater impacts than actually anticipated. Additionally, the analysis utilizes a growth rate of two percent (2%) per year for project opening year (2023) conditions, which would already capture and account for most projects in the area. The growth rate methodology is considered conservative since it is applied to all movements in all the study intersections.

4.4 Opening Year Without Related Projects Without Project Conditions Traffic Volumes

Opening Year Without Related Projects Without Project Conditions traffic volumes consist of two (2) years of annual growth on top of existing (2021) traffic volumes at two percent (2%) per year.

Weekday Opening Year Without Related Projects Without Project Conditions traffic volumes are shown on Exhibit 4-10.

Saturday Opening Year Without Related Projects Without Project Conditions traffic volumes are shown on Exhibit 4-11.

4.5 Opening Year Without Related Projects With Project Conditions Traffic Volumes

Opening Year Without Related Projects With Project Conditions traffic volumes consist of two (2) years of annual growth on top of existing (2021) traffic volumes at two percent (2%) per year, plus the traffic generated by the proposed project.

Weekday Opening Year Without Related Projects With Project Conditions traffic volumes are shown on Exhibit 4-12.

Saturday Opening Year Without Related Projects With Project Conditions traffic volumes are shown on Exhibit 4-13.

4.6 Opening Year With Related Projects Without Project Conditions Traffic Volumes

Opening Year With Related Projects Without Project Conditions traffic volumes consist of two (2) years of annual growth on top of existing (2021) traffic volumes at two percent (2%) per year, plus the traffic generated by the cumulative projects.

Weekday Opening Year With Related Projects Without Project Conditions traffic volumes are shown on Exhibit 4-14.

Saturday Opening Year With Related Projects Without Project Conditions traffic volumes are shown on Exhibit 4-15.

4.7 Opening Year With Related Projects With Project Conditions Traffic Volumes

Weekday Opening Year With Related Projects With Project Conditions traffic volumes consist of two (2) years of annual growth on top of existing (2021) traffic volumes at two

percent (2%) per year, plus the traffic generated by the cumulative projects and proposed project.

Weekday Opening Year With Related Projects With Project Conditions traffic volumes are shown on Exhibit 4-16.

Saturday Opening Year With Related Projects With Project Conditions traffic volumes are shown on Exhibit 4-17.

4.8 Horizon Year (2040) Without Project Conditions Traffic Volumes

Horizon Year (2040) Without Project Conditions traffic volumes consist of nineteen (19) years of annual growth on top of existing (2021) traffic volumes at two percent (2%) per year.

Weekday Horizon Year (2040) Without Project Conditions traffic volumes are shown on Exhibit 4-18.

Saturday Horizon Year (2040) Without Project Conditions traffic volumes are shown on Exhibit 4-19.

4.9 Horizon Year (2040) With Project Conditions Traffic Volumes

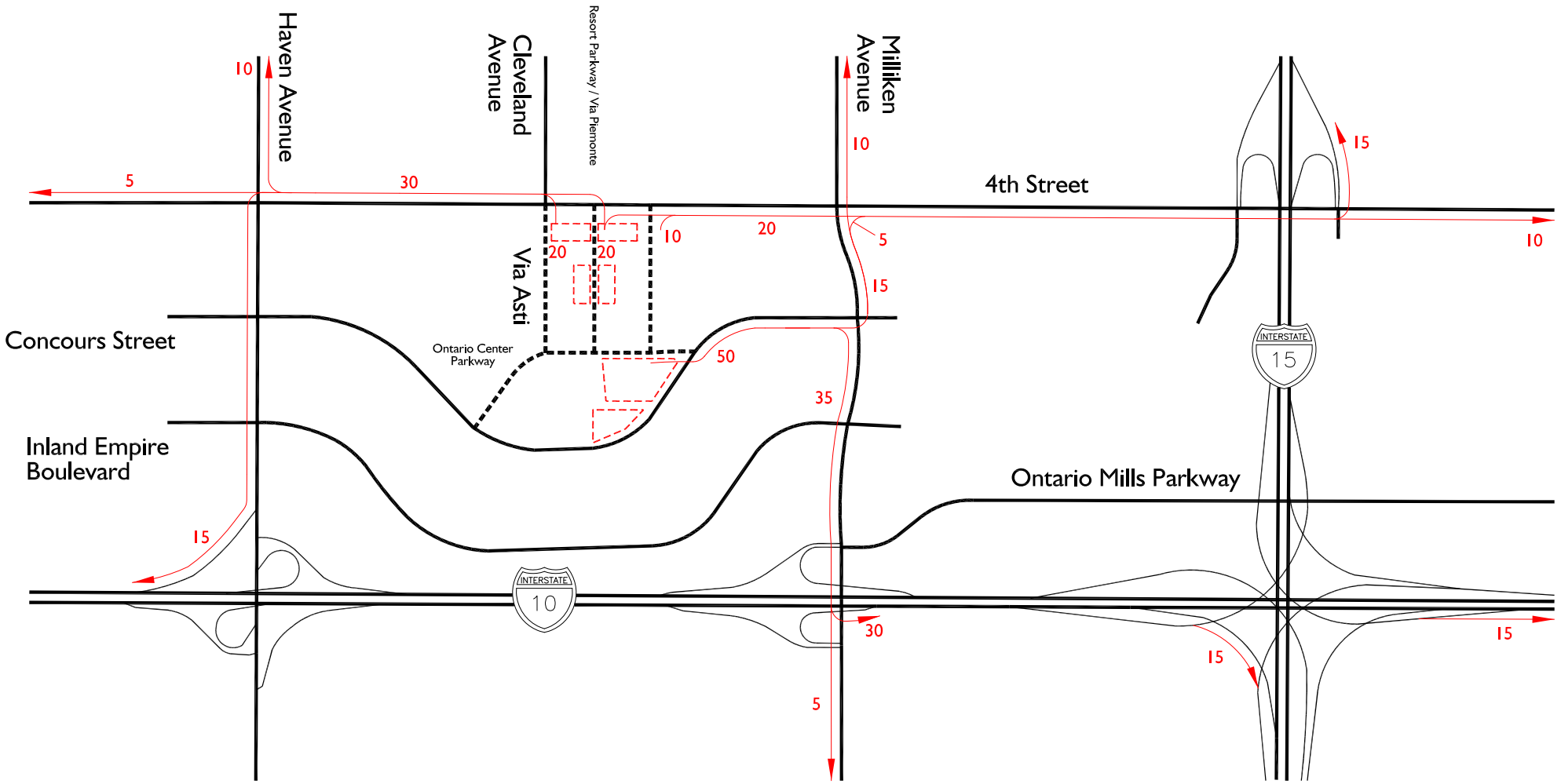
Horizon Year (2040) With Project Conditions traffic volumes are derived by adding the project-generated traffic to Horizon Year (2040) Without Project Conditions traffic volumes.

Weekday Horizon Year (2040) With Project Conditions traffic volumes are shown on Exhibit 4-20.

Saturday Horizon Year (2040) With Project Conditions traffic volumes are shown on Exhibit 4-21.

Exhibit 4-1

Outbound Project Trip Distribution



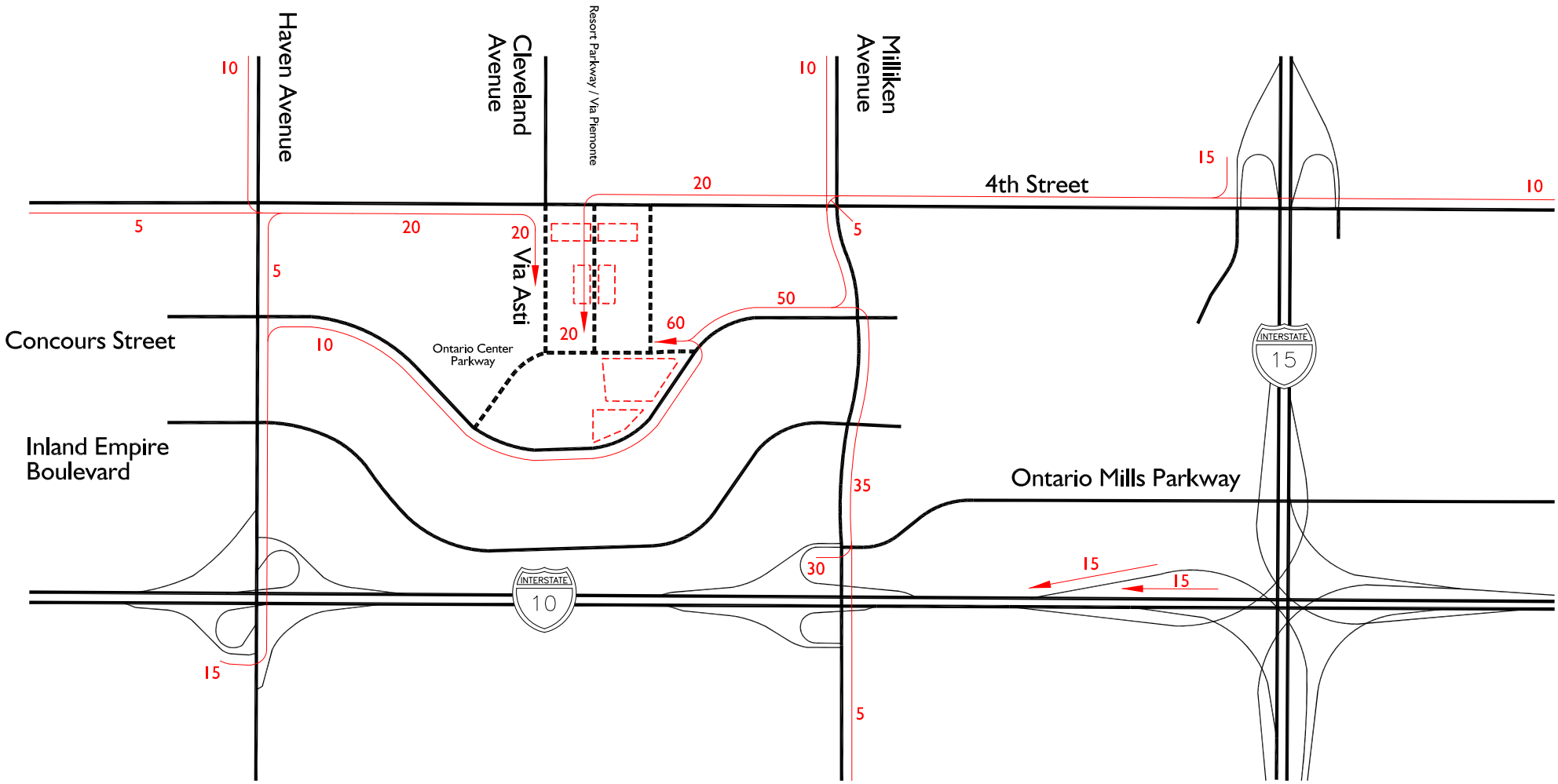
Legend:

10 = Percent from Project

N

Exhibit 4-2

Inbound Project Trip Distribution



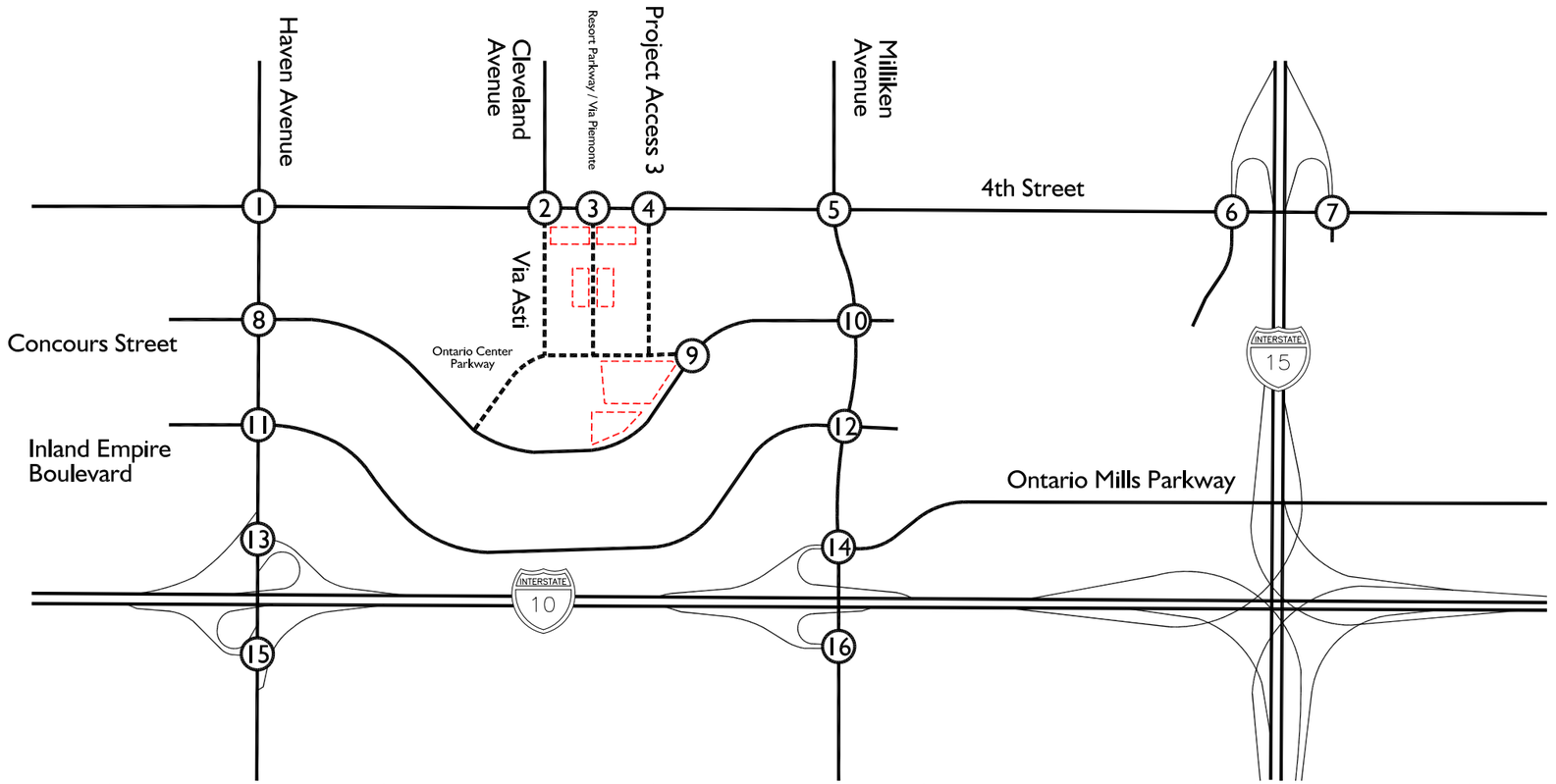
Legend:

10 = Percent to Project

N

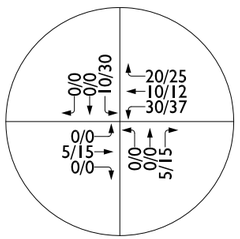
Exhibit 4-3

Project Traffic Volumes - Weekday

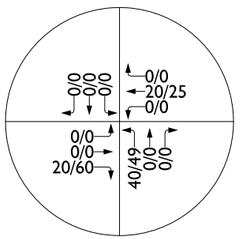


Legend:

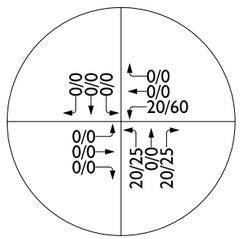
10/20 = AM/PM Peak Hour Volumes



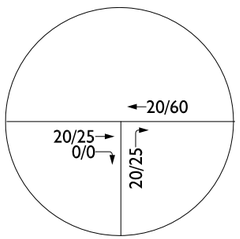
1. Haven Street (NS) & Fourth Street (EW)



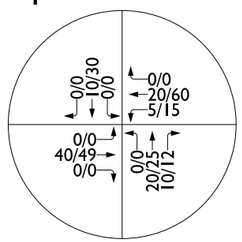
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



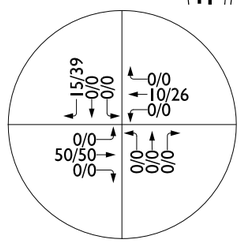
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



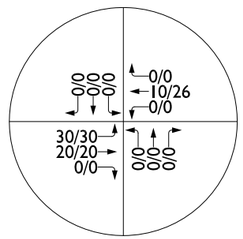
4. Project Street Access 3 (NS) & Fourth Street (EW)



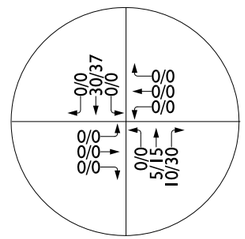
5. Milliken Avenue (NS) & Fourth Street (EW)



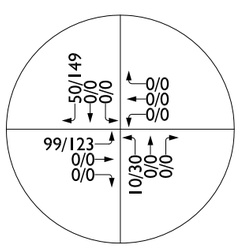
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



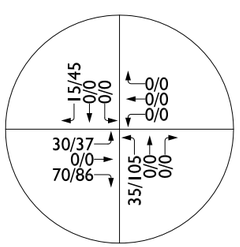
7. I-15 NB Ramps (NS) & Fourth Street (EW)



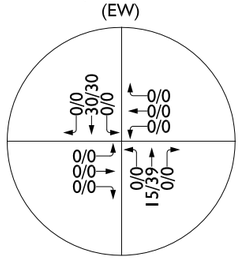
8. Haven Avenue (NS) & Concours Street (EW)



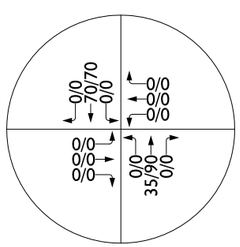
9. Concours Street (NS) & Ontario Center Parkway (EW)



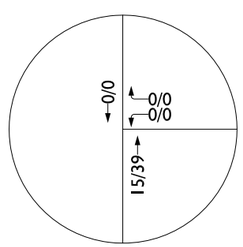
10. Milliken Street (NS) & Concours Street (EW)



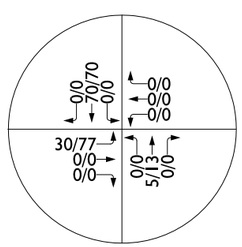
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



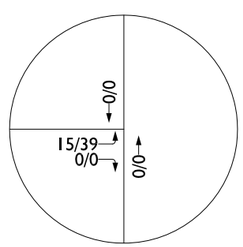
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



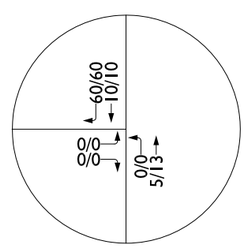
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

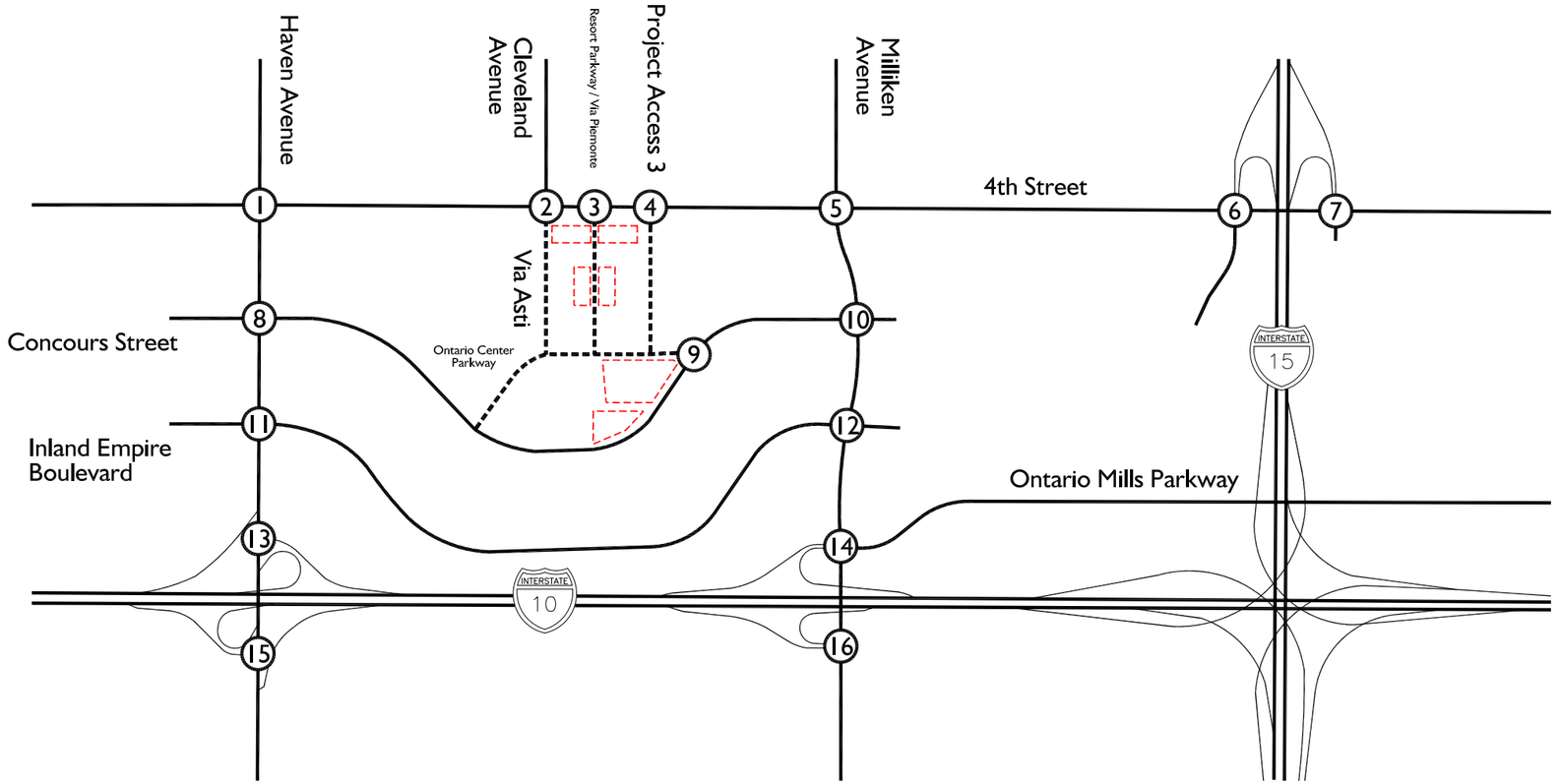


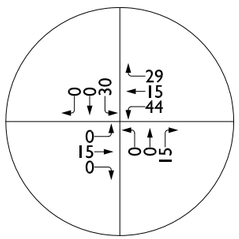
16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

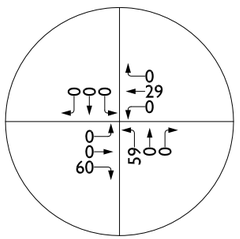
Exhibit 4-4

Project Traffic Volumes - Saturday

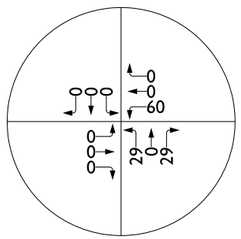




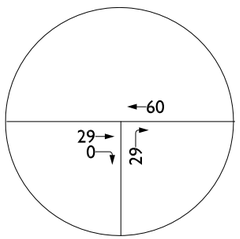
1. Haven Street (NS) & Fourth Street (EW)



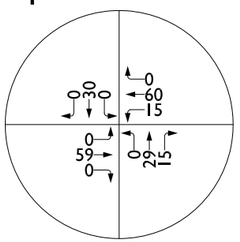
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



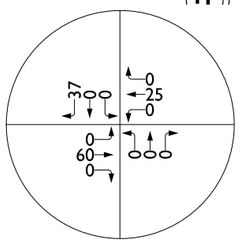
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



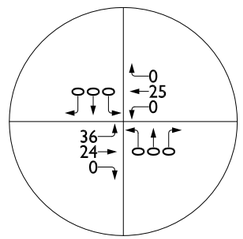
4. Project Street Access 3 (NS) & Fourth Street (EW)



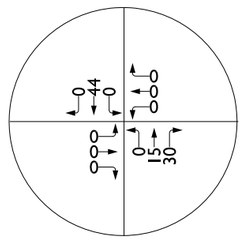
5. Milliken Avenue (NS) & Fourth Street (EW)



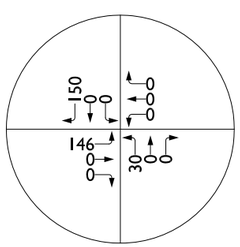
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



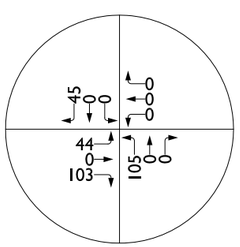
7. I-15 NB Ramps (NS) & Fourth Street (EW)



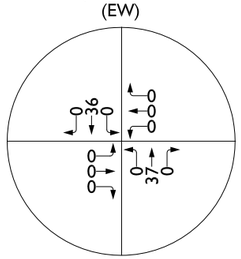
8. Haven Avenue (NS) & Concours Street (EW)



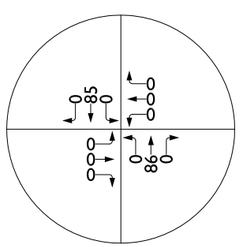
9. Concours Street (NS) & Ontario Center Parkway (EW)



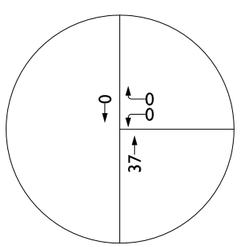
10. Milliken Street (NS) & Concours Street (EW)



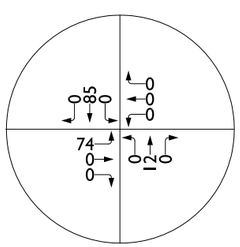
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



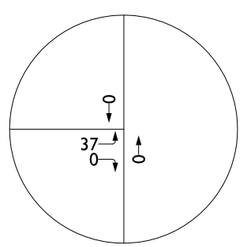
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



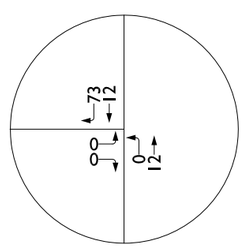
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

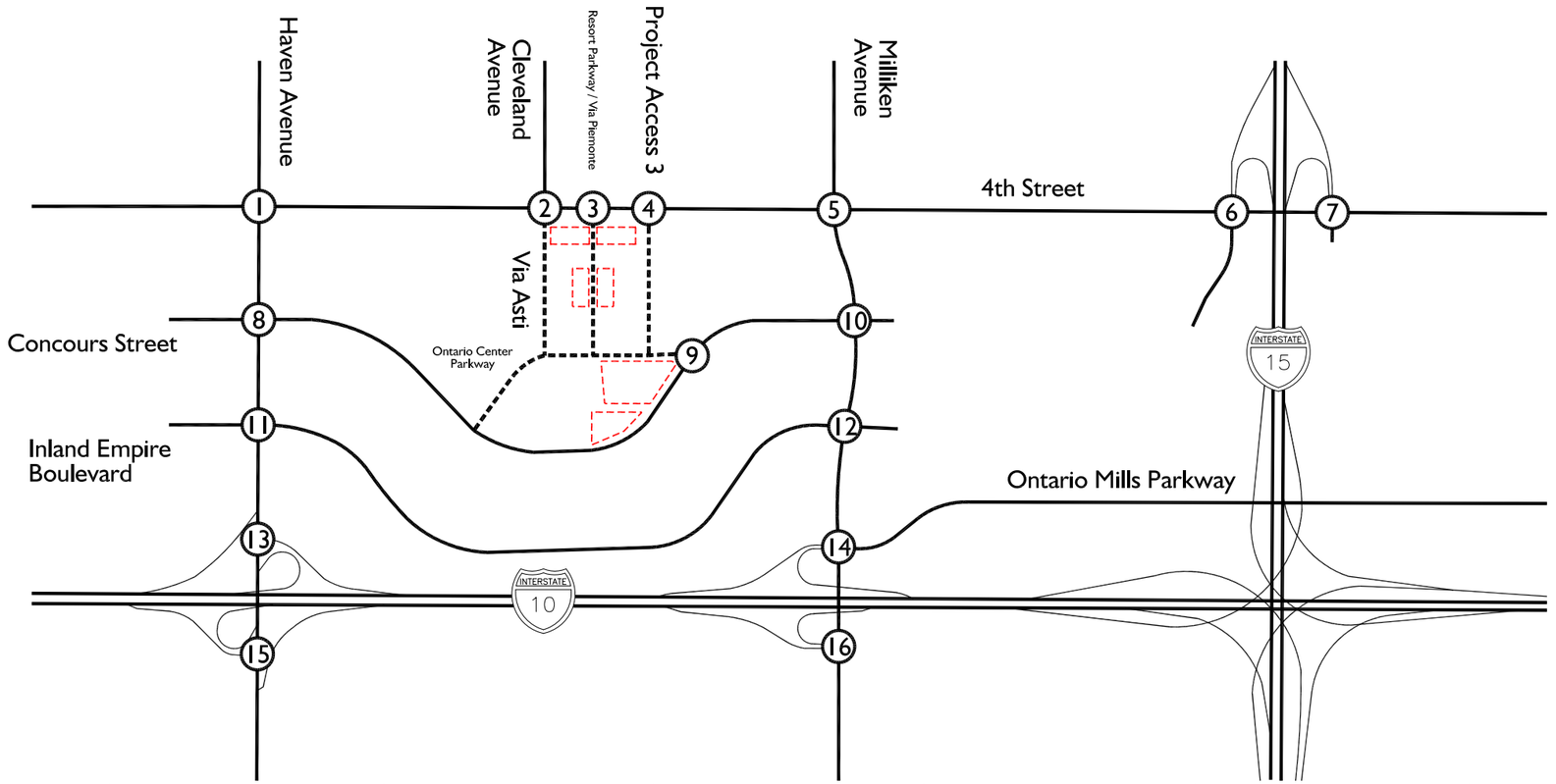
Legend:

10 = Saturday Peak Hour Volumes

N

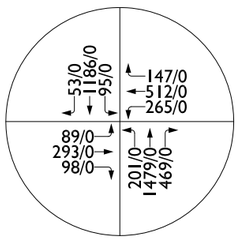
Exhibit 4-5

Existing Plus Project Conditions Traffic Volumes - Weekday

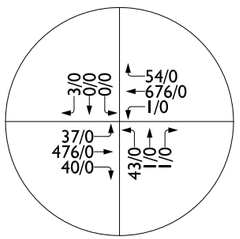


Legend:

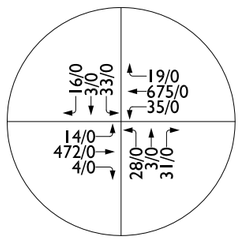
10/20 = AM/PM Peak Hour Volumes



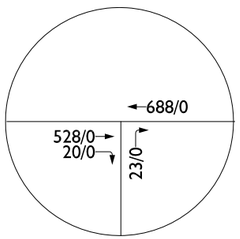
1. Haven Street (NS) & Fourth Street (EW)



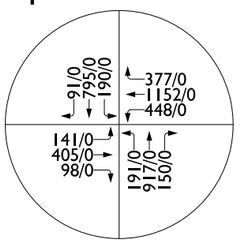
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



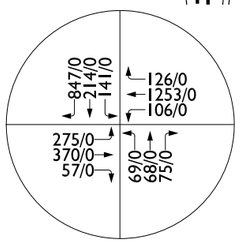
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



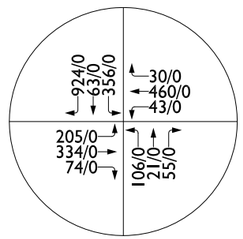
4. Project Street Access 3 (NS) & Fourth Street (EW)



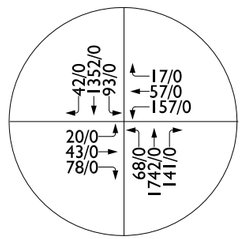
5. Milliken Avenue (NS) & Fourth Street (EW)



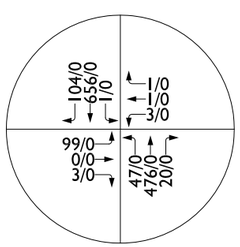
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



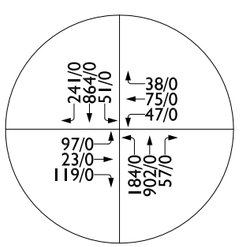
7. I-15 NB Ramps (NS) & Fourth Street (EW)



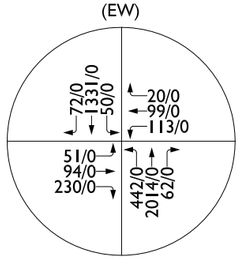
8. Haven Avenue (NS) & Concours Street (EW)



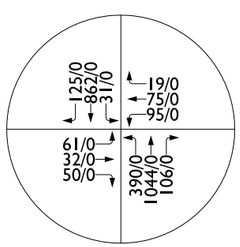
9. Concours Street (NS) & Ontario Center Parkway (EW)



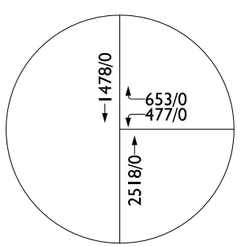
10. Milliken Street (NS) & Concours Street (EW)



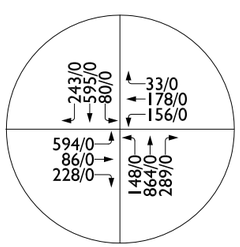
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



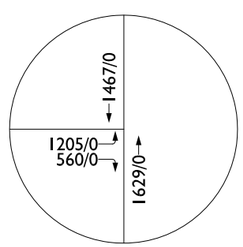
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



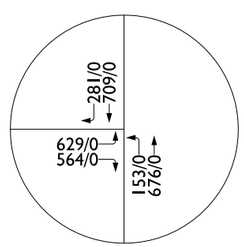
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

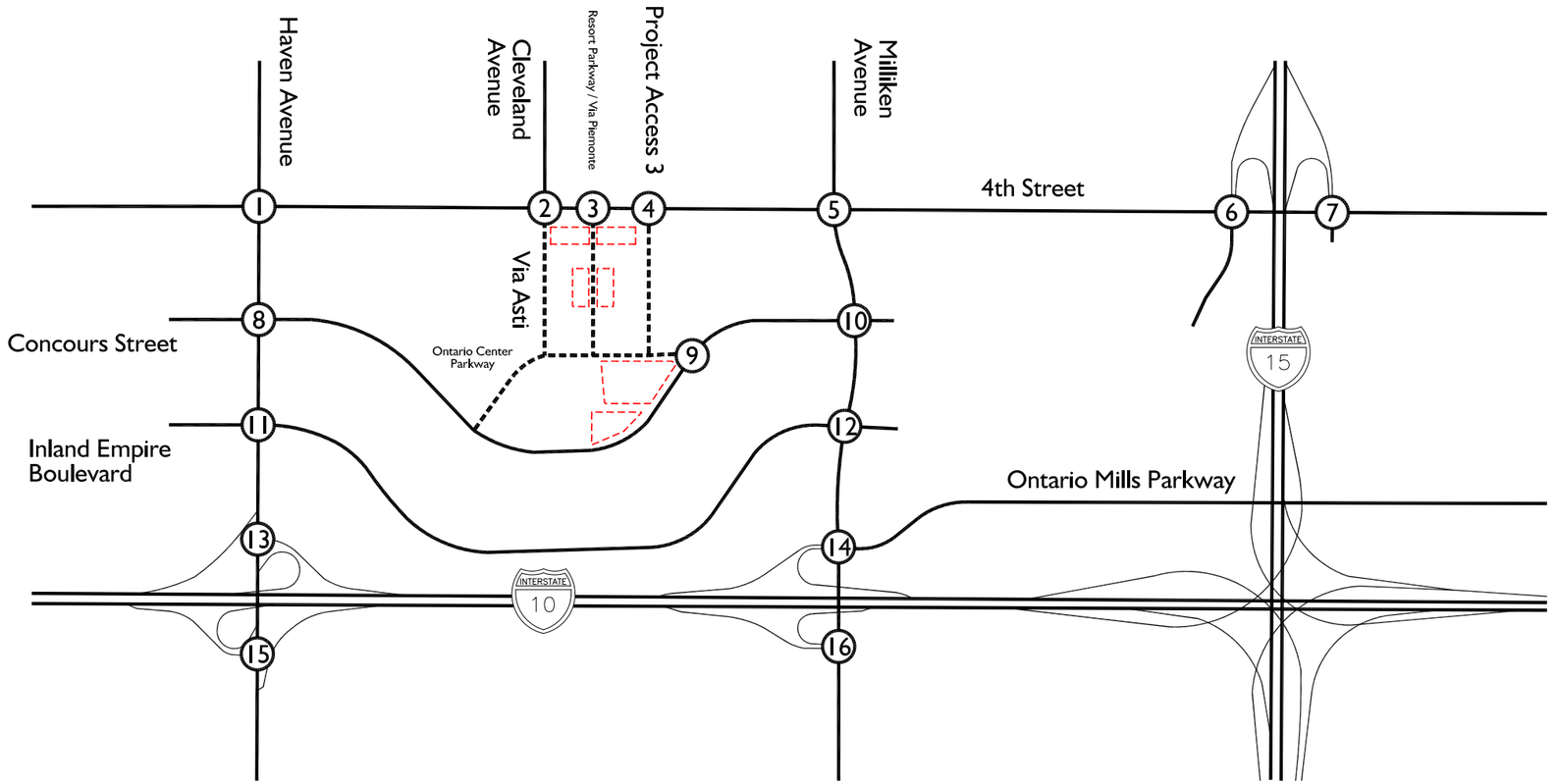


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

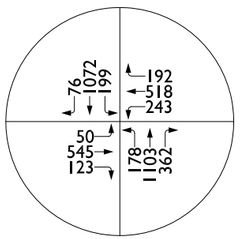
Exhibit 4-6

Existing Plus Project Conditions Traffic Volumes - Saturday

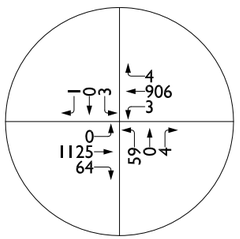


Legend:

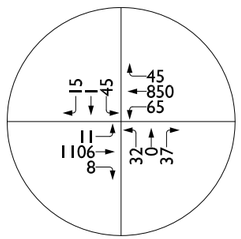
10 = Saturday Peak Hour Volumes



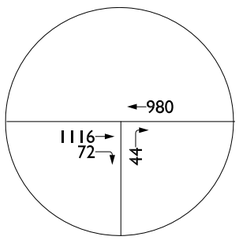
1. Haven Street (NS) & Fourth Street (EW)



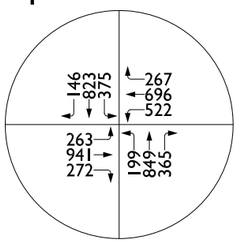
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



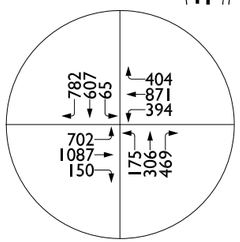
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



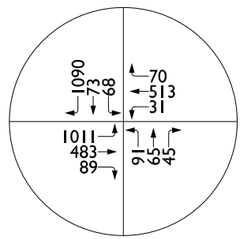
4. Project Street Access 3 (NS) & Fourth Street (EW)



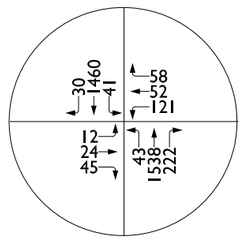
5. Milliken Avenue (NS) & Fourth Street (EW)



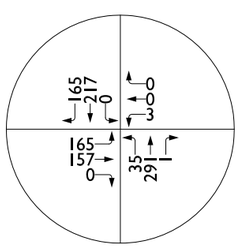
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



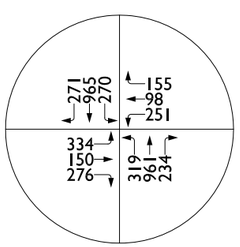
7. I-15 NB Ramps (NS) & Fourth Street (EW)



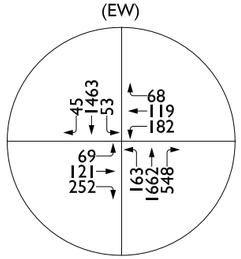
8. Haven Avenue (NS) & Concours Street (EW)



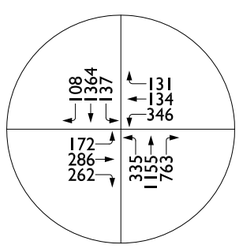
9. Concours Street (NS) & Ontario Center Parkway (EW)



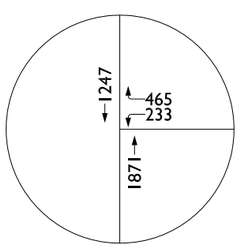
10. Milliken Street (NS) & Concours Street (EW)



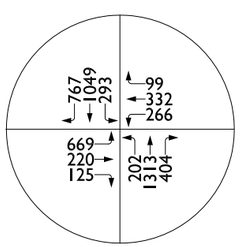
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



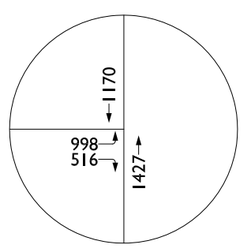
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



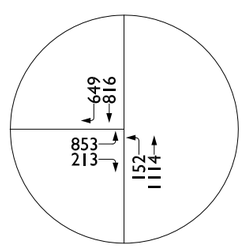
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

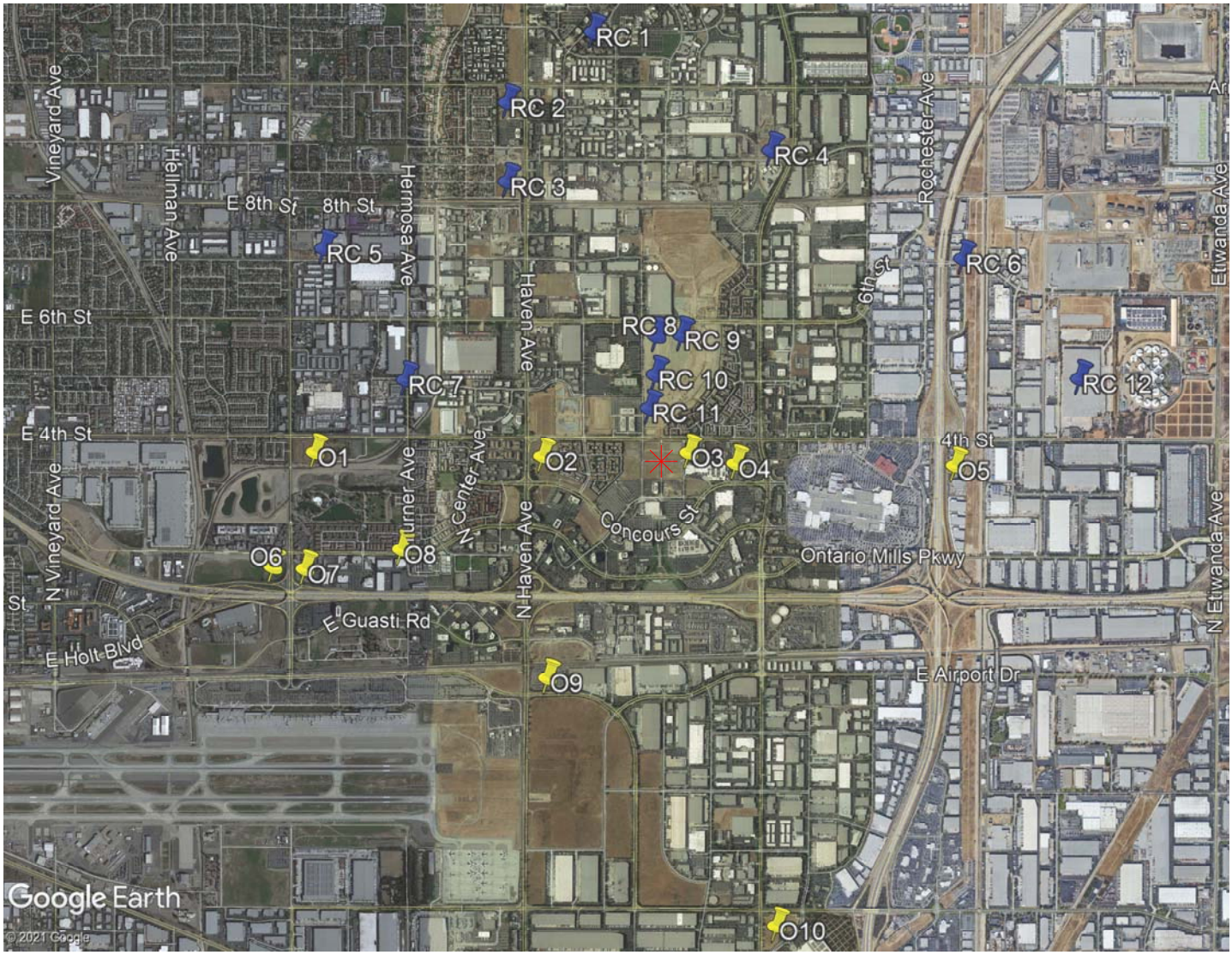


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

Exhibit 4-7

Cumulative Projects Location Map



NOTE: See report for full list of cumulative projects and traffic analysis zones (TAZ).

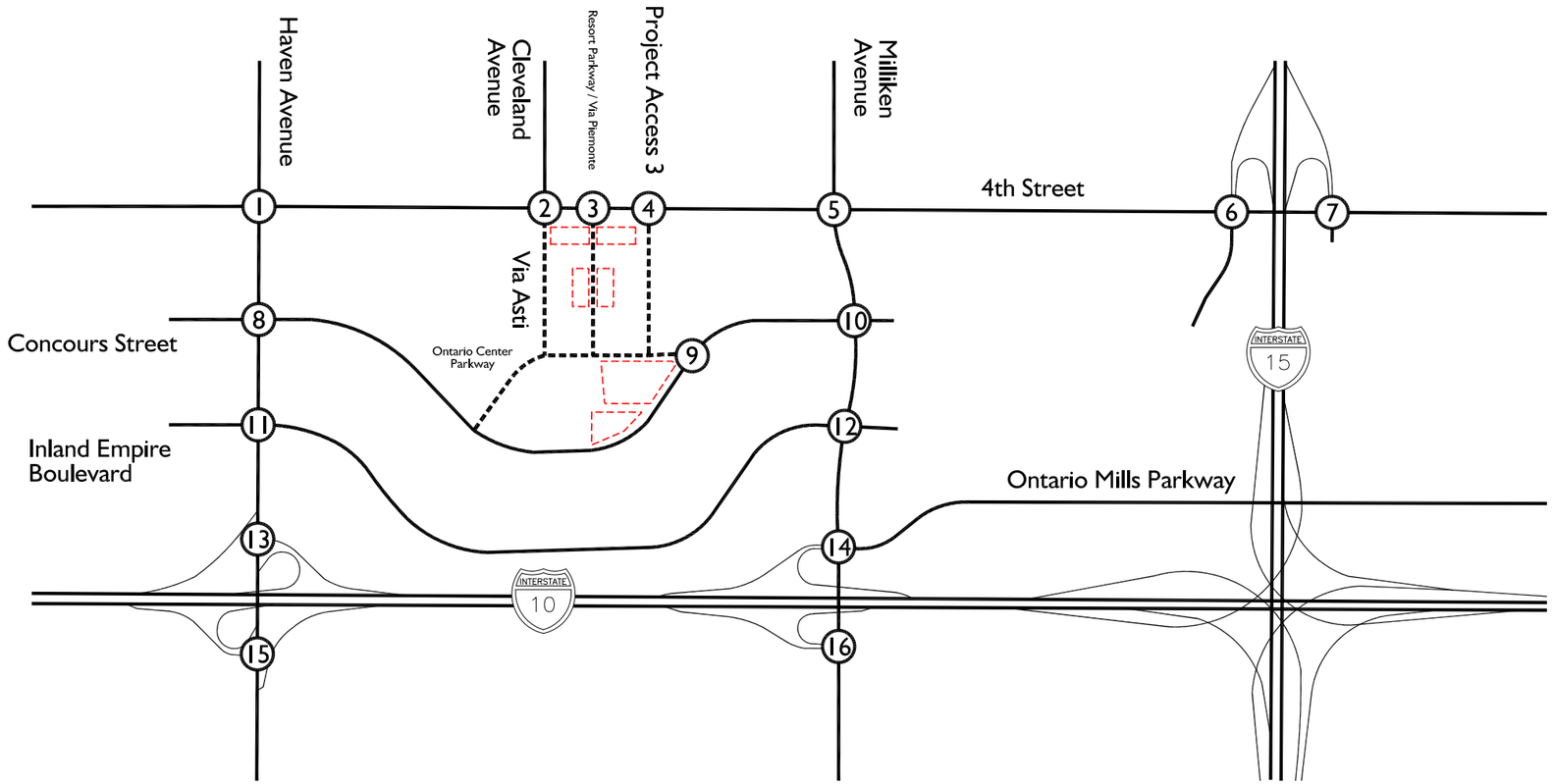
Legend:

- = City of Rancho Cucamonga Cumulative Project
- = City of Ontario Cumulative Project

N

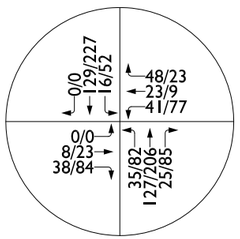
Exhibit 4-8

Cumulative Projects Traffic Volumes - Weekday

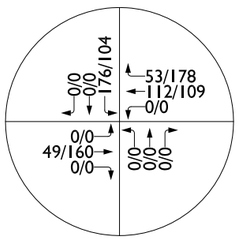


Legend:

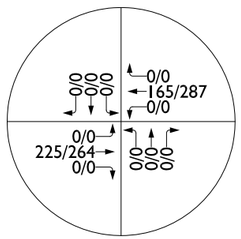
10/20 = AM/PM Peak Hour Volumes



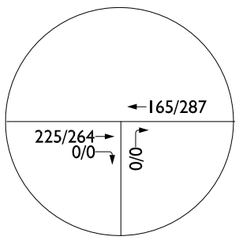
1. Haven Street (NS) & Fourth Street (EW)



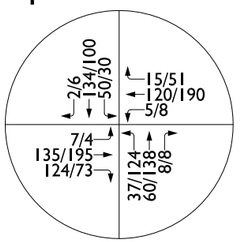
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



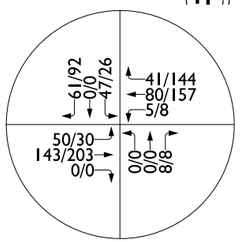
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



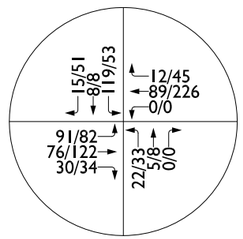
4. Project Street Access 3 (NS) & Fourth Street (EW)



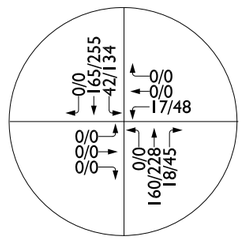
5. Milliken Avenue (NS) & Fourth Street (EW)



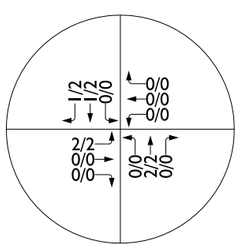
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



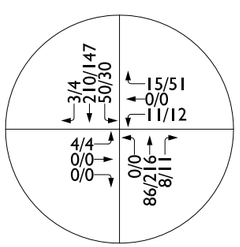
7. I-15 NB Ramps (NS) & Fourth Street (EW)



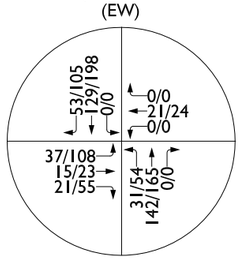
8. Haven Avenue (NS) & Concours Street (EW)



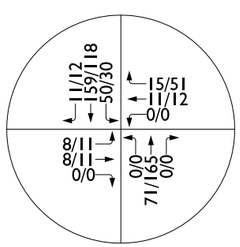
9. Concours Street (NS) & Ontario Center Parkway (EW)



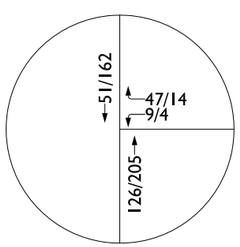
10. Milliken Street (NS) & Concours Street (EW)



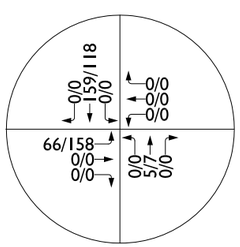
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



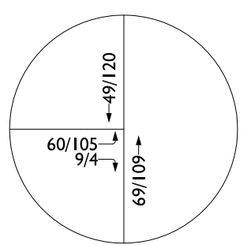
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



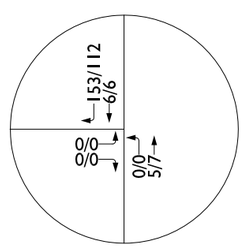
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

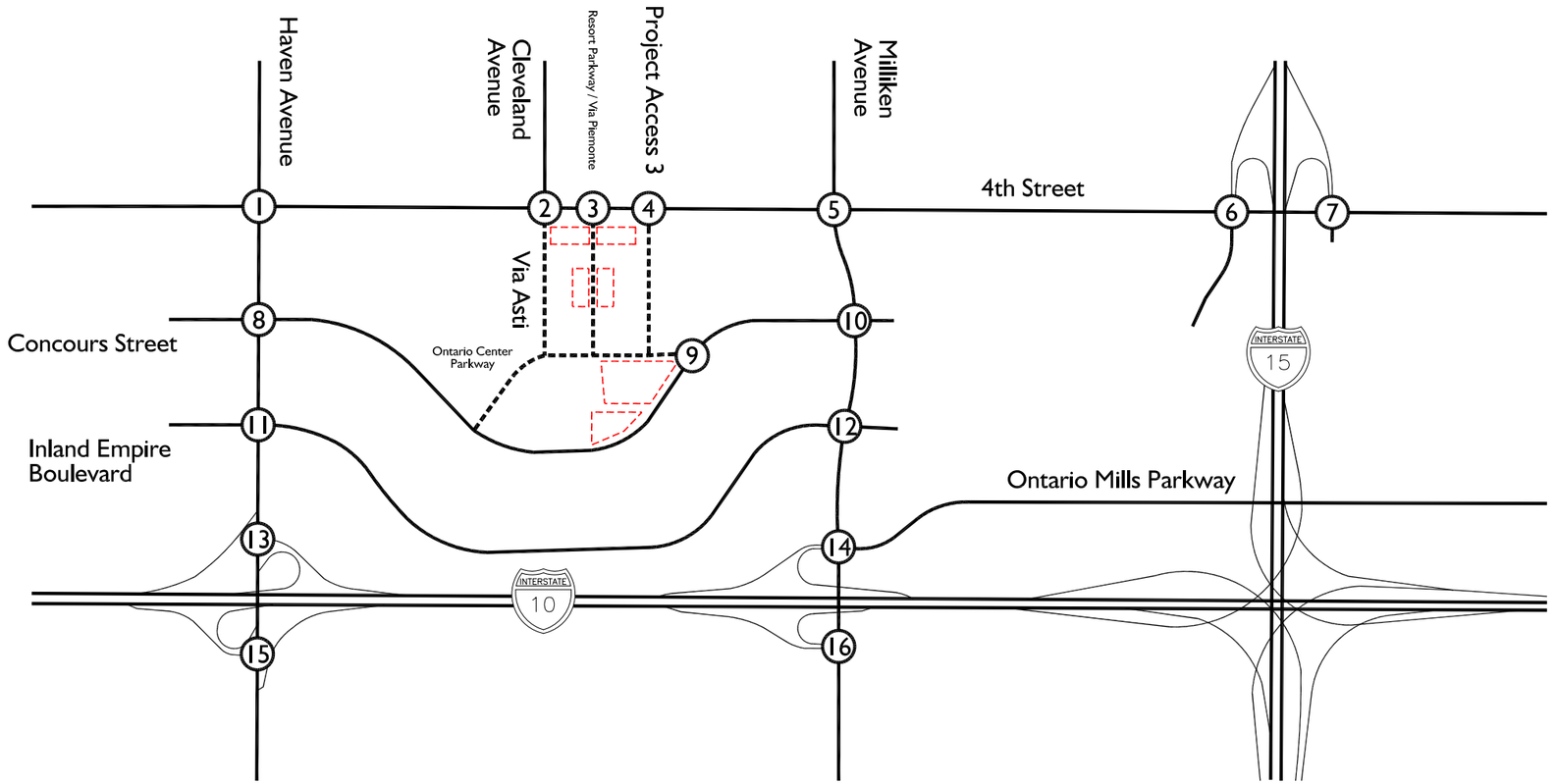


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

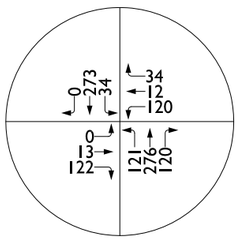
Exhibit 4-9

Cumulative Projects Traffic Volumes - Saturday

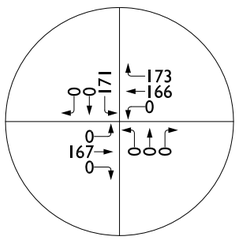


Legend:

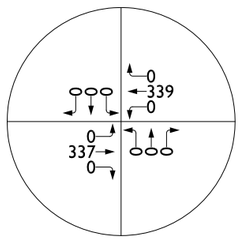
10 = Saturday Peak Hour Volumes



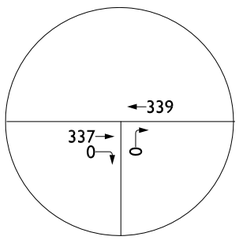
1. Haven Street (NS) & Fourth Street (EW)



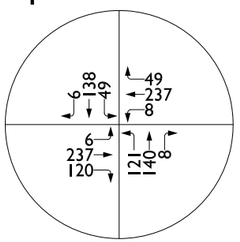
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



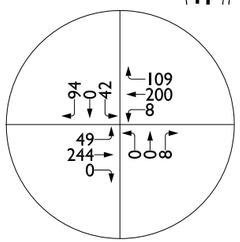
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



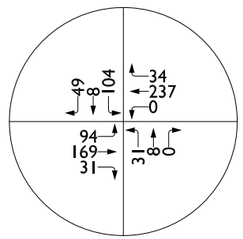
4. Project Street Access 3 (NS) & Fourth Street (EW)



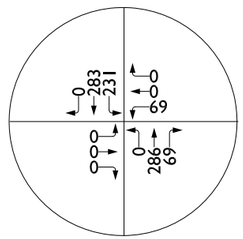
5. Milliken Avenue (NS) & Fourth Street (EW)



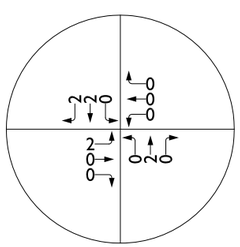
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



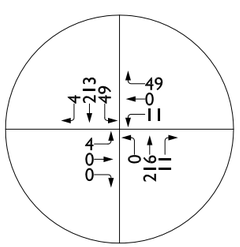
7. I-15 NB Ramps (NS) & Fourth Street (EW)



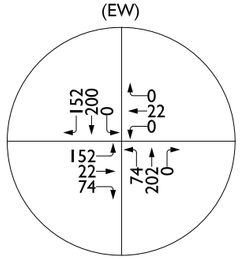
8. Haven Avenue (NS) & Concours Street (EW)



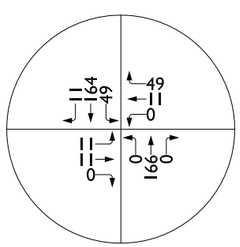
9. Concours Street (NS) & Ontario Center Parkway (EW)



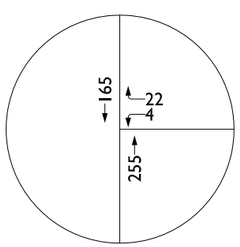
10. Milliken Street (NS) & Concours Street (EW)



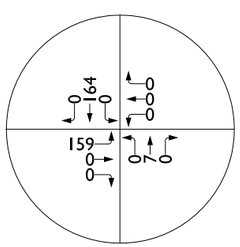
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



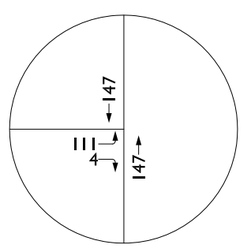
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



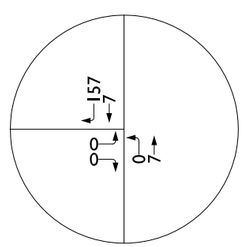
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

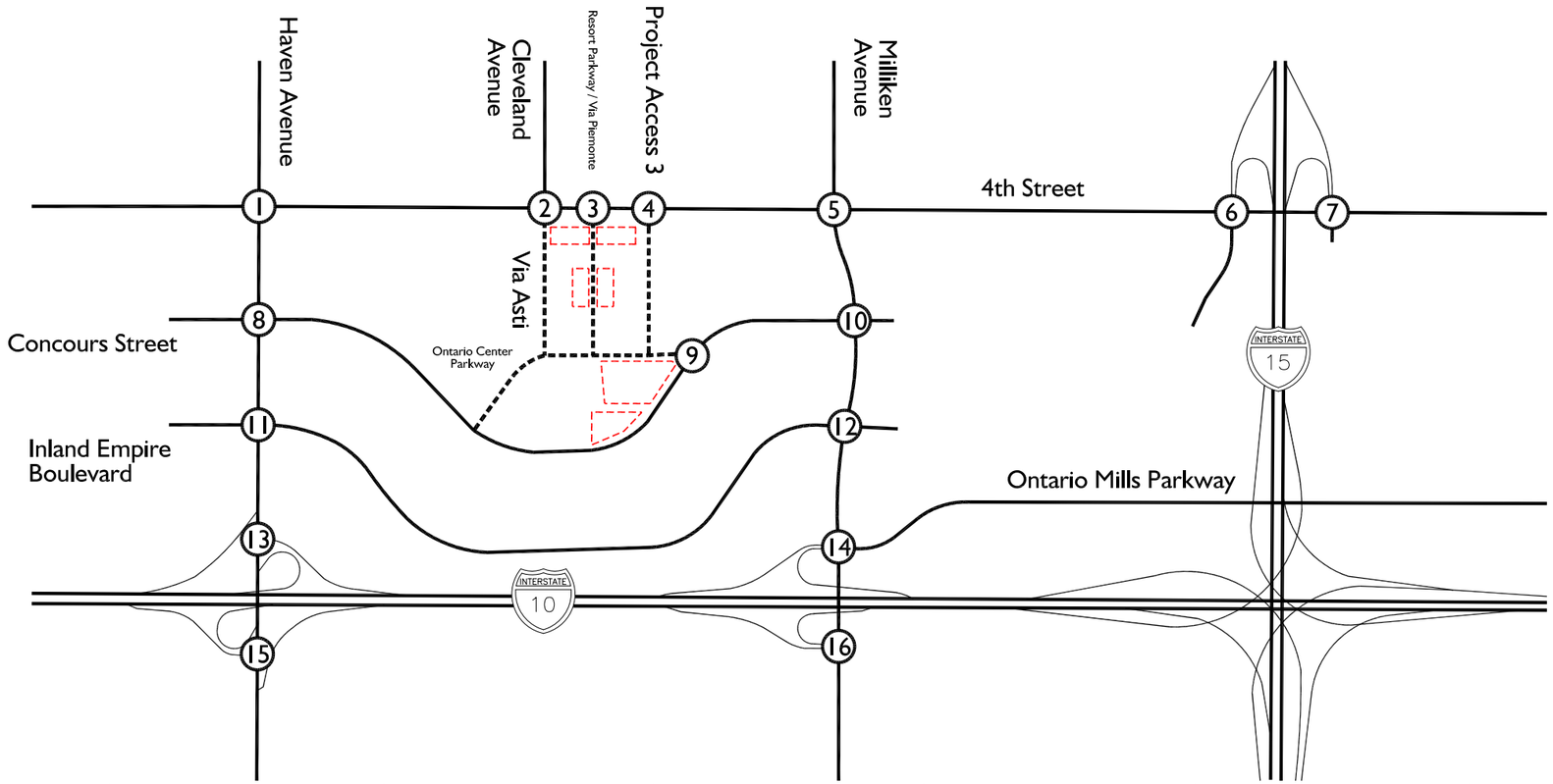


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

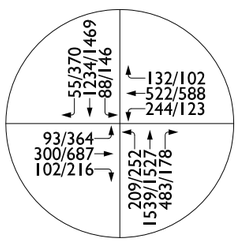
Exhibit 4-10

Opening Year Without Related Projects Without Project Conditions Traffic Volumes - Weekday

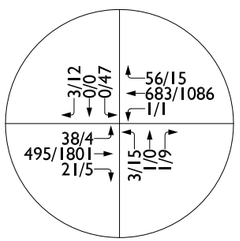


Legend:

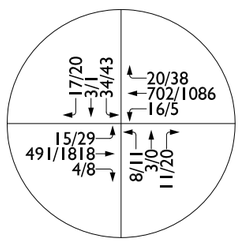
10/20 = AM/PM Peak Hour Volumes



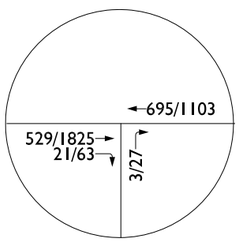
1. Haven Street (NS) & Fourth Street (EW)



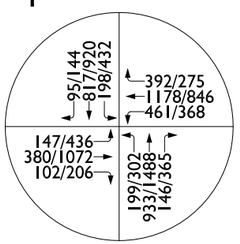
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



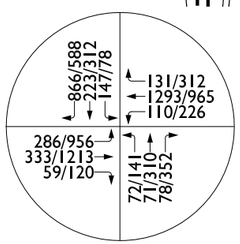
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



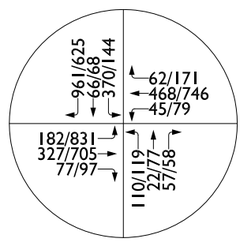
4. Project Street Access 3 (NS) & Fourth Street (EW)



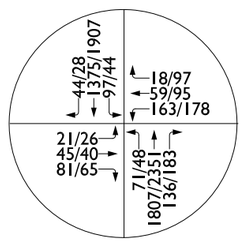
5. Milliken Avenue (NS) & Fourth Street (EW)



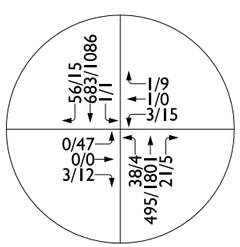
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



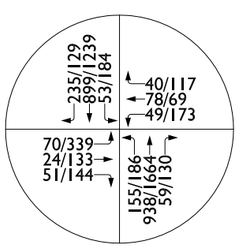
7. I-15 NB Ramps (NS) & Fourth Street (EW)



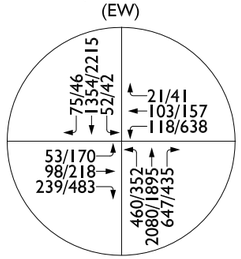
8. Haven Avenue (NS) & Concours Street (EW)



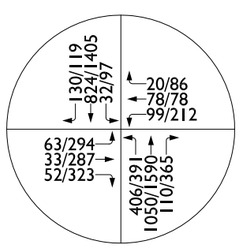
9. Concours Street (NS) & Ontario Center Parkway (EW)



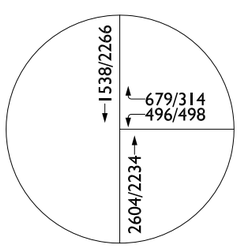
10. Milliken Street (NS) & Concours Street (EW)



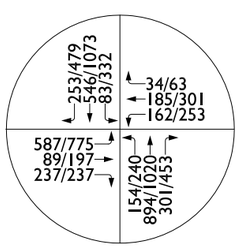
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



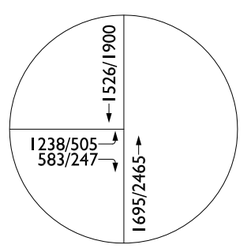
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



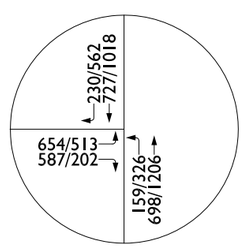
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

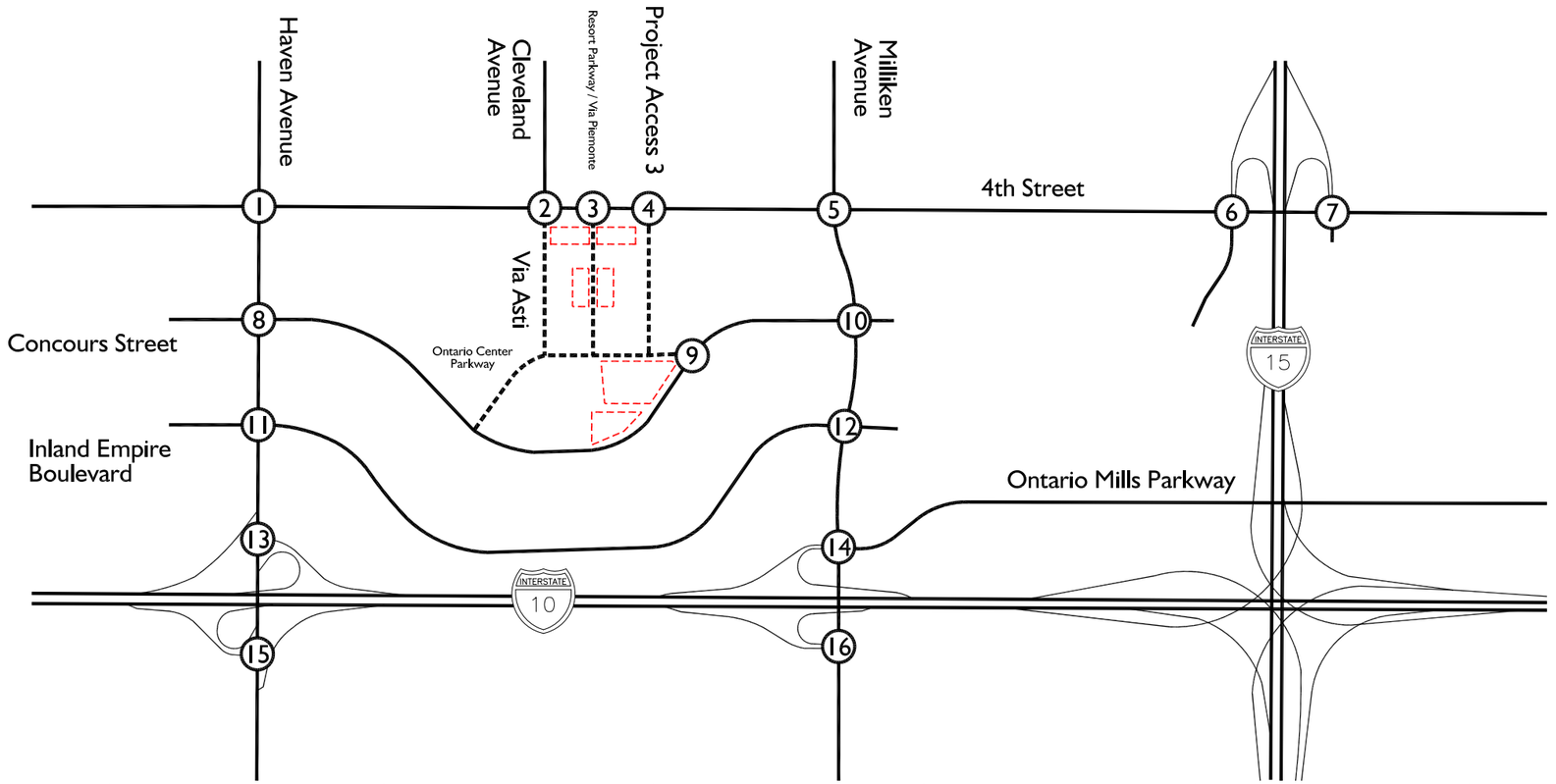


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

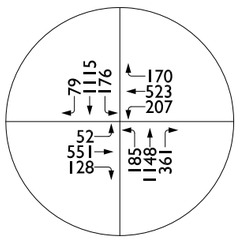
Exhibit 4-11

Project Opening Year Without Related Projects Without Project Conditions Traffic Volumes - Saturday

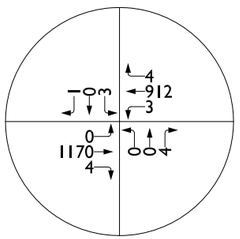


Legend:

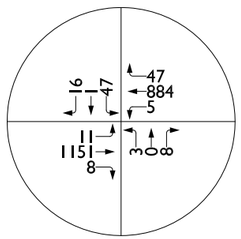
10 = Saturday Peak Hour Volumes



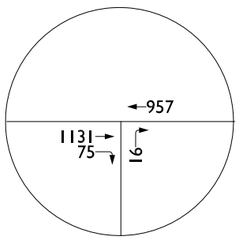
1. Haven Street (NS) & Fourth Street (EW)



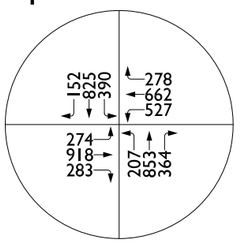
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



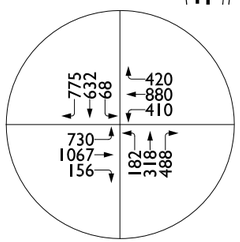
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



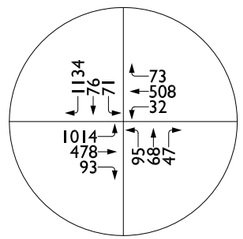
4. Project Street Access 3 (NS) & Fourth Street (EW)



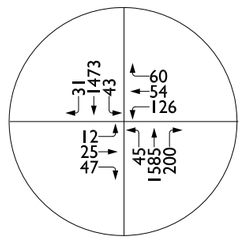
5. Milliken Avenue (NS) & Fourth Street (EW)



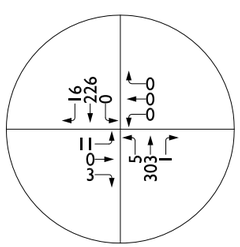
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



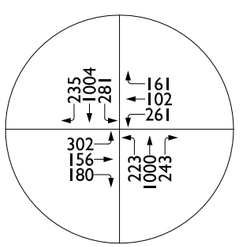
7. I-15 NB Ramps (NS) & Fourth Street (EW)



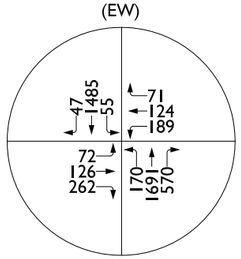
8. Haven Avenue (NS) & Concours Street (EW)



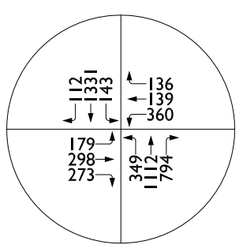
9. Concours Street (NS) & Ontario Center Parkway (EW)



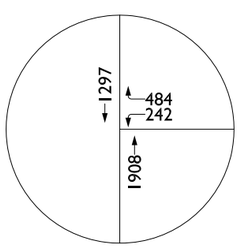
10. Milliken Street (NS) & Concours Street (EW)



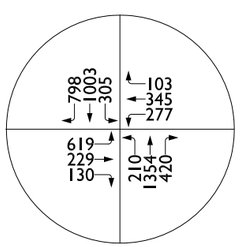
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



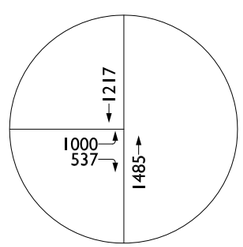
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



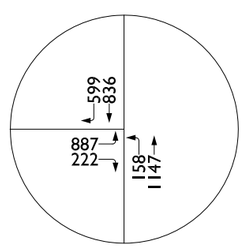
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



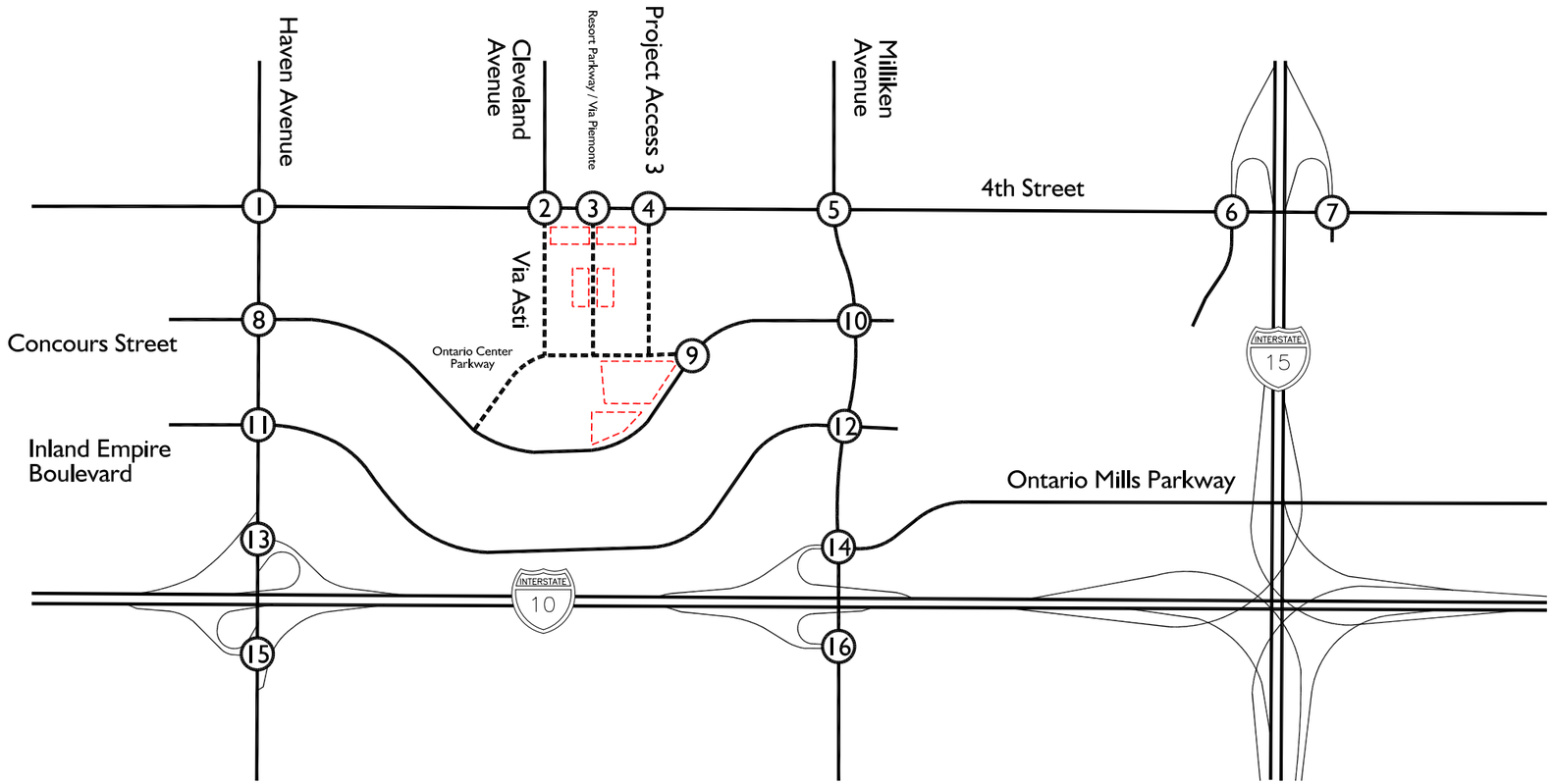
15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

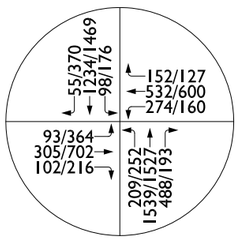
N

Opening Year Without Related Projects With Project Conditions Traffic Volumes - Weekday

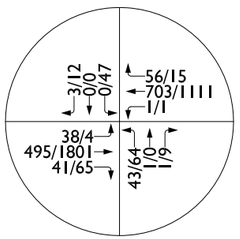


Legend:

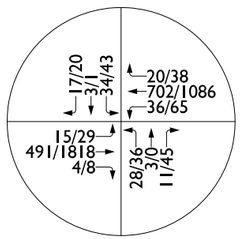
10/20 = AM/PM Peak Hour Volumes



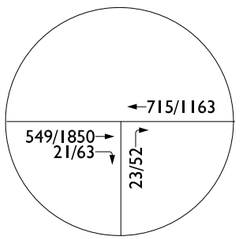
1. Haven Street (NS) & Fourth Street (EW)



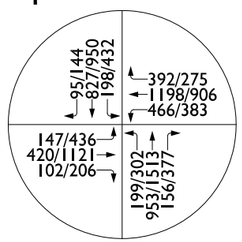
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



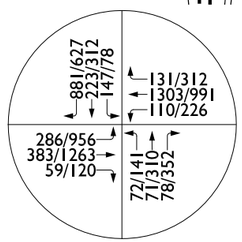
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



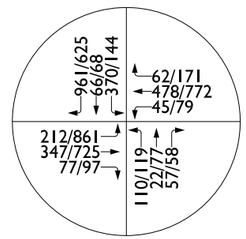
4. Project Street Access 3 (NS) & Fourth Street (EW)



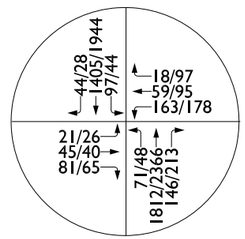
5. Milliken Avenue (NS) & Fourth Street (EW)



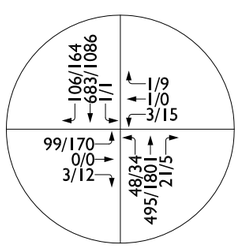
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



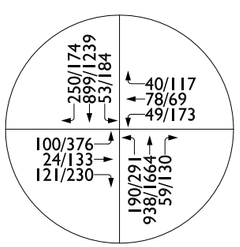
7. I-15 NB Ramps (NS) & Fourth Street (EW)



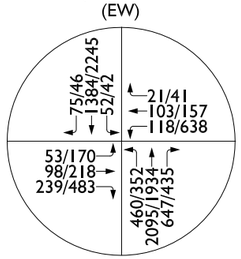
8. Haven Avenue (NS) & Concours Street (EW)



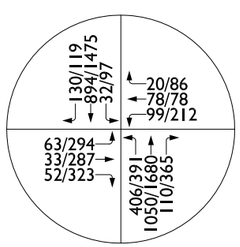
9. Concours Street (NS) & Ontario Center Parkway (EW)



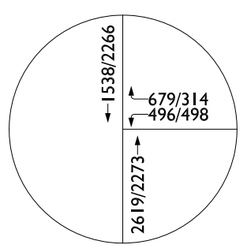
10. Milliken Street (NS) & Concours Street (EW)



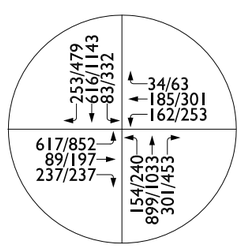
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



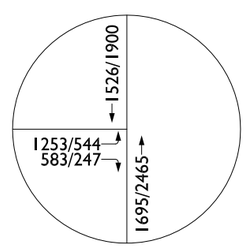
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



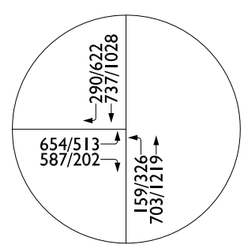
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



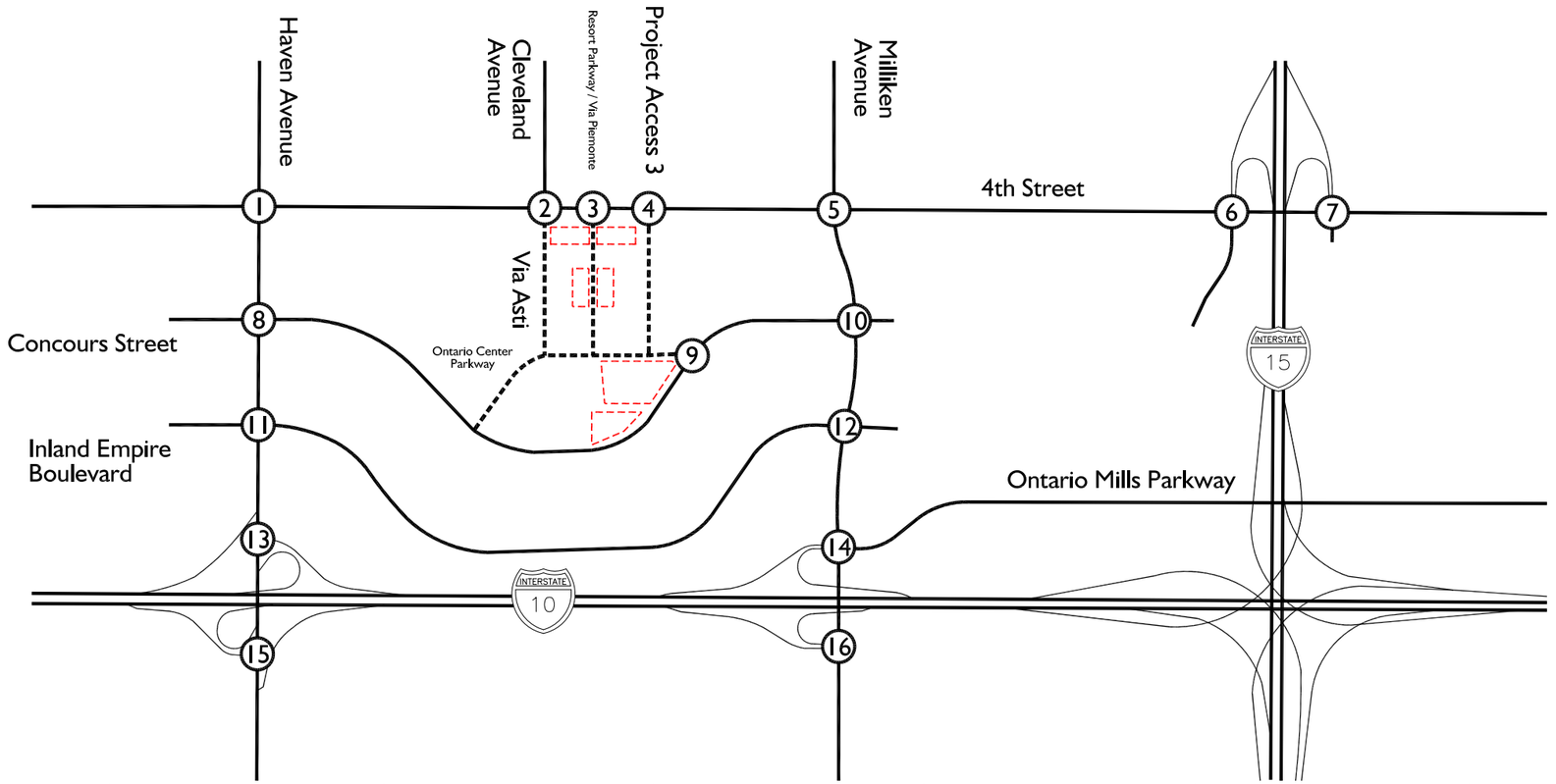
15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

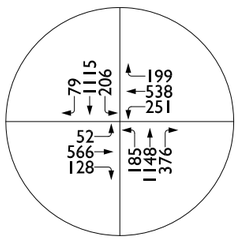
N

Project Opening Year Without Related Projects With Project Conditions Traffic Volumes - Saturday

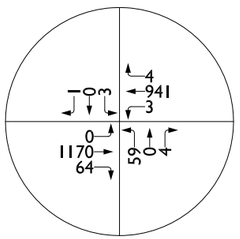


Legend:

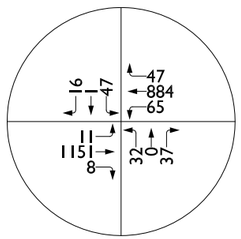
10 = Saturday Peak Hour Volumes



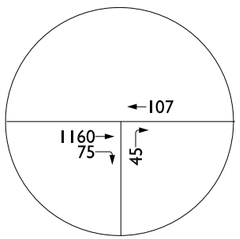
1. Haven Street (NS) & Fourth Street (EW)



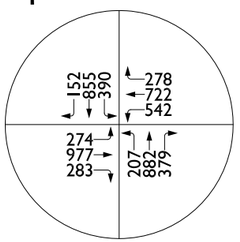
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



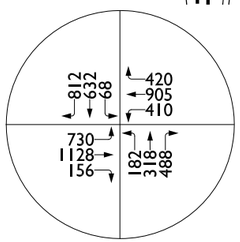
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



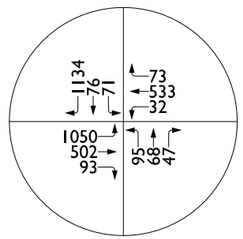
4. Project Street Access 3 (NS) & Fourth Street (EW)



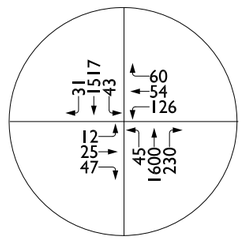
5. Milliken Avenue (NS) & Fourth Street (EW)



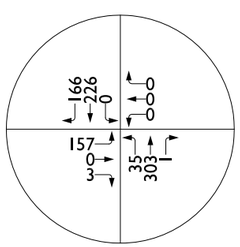
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



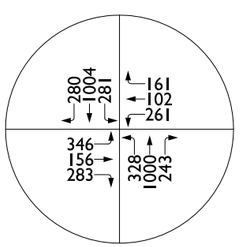
7. I-15 NB Ramps (NS) & Fourth Street (EW)



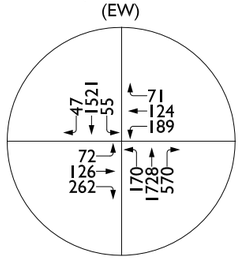
8. Haven Avenue (NS) & Concours Street (EW)



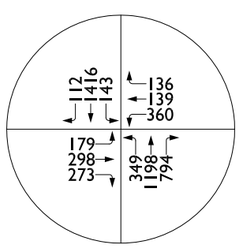
9. Concours Street (NS) & Ontario Center Parkway (EW)



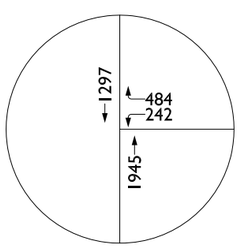
10. Milliken Street (NS) & Concours Street (EW)



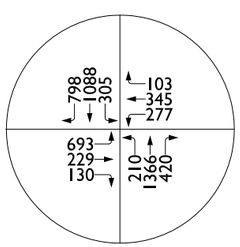
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



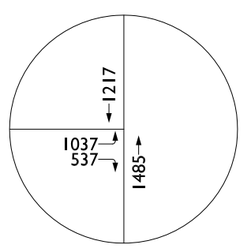
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



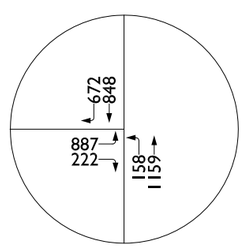
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



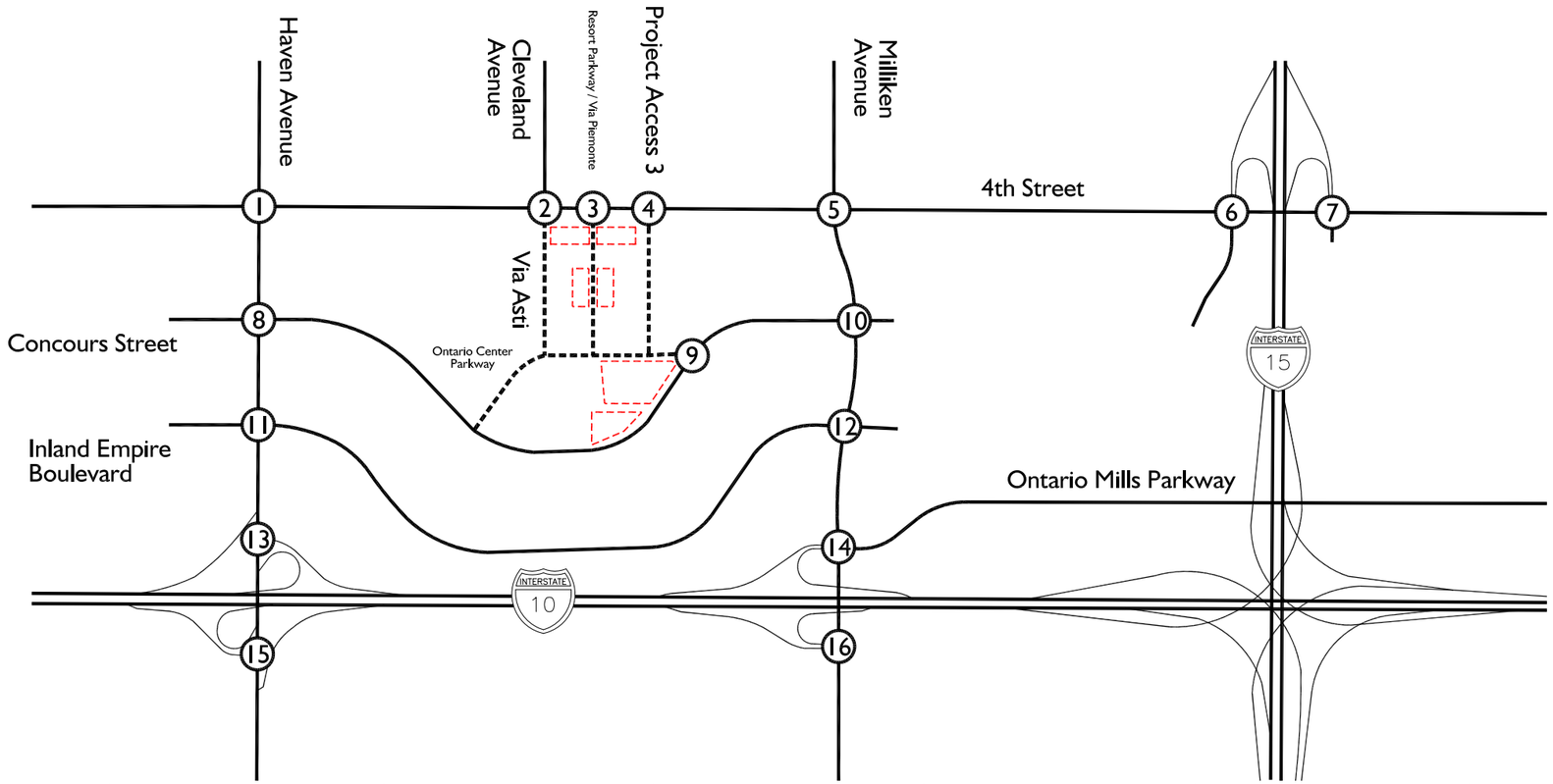
15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

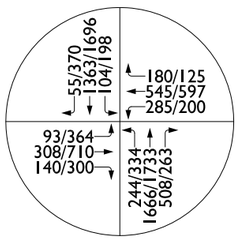
N

Opening Year With Related Projects Without Project Conditions Traffic Volumes - Weekday

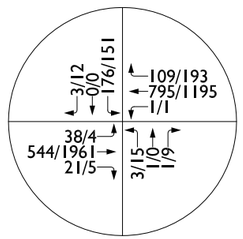


Legend:

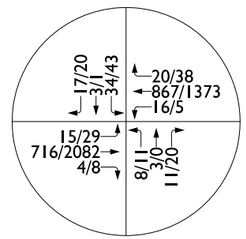
10/20 = AM/PM Peak Hour Volumes



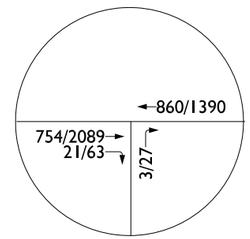
1. Haven Street (NS) & Fourth Street (EW)



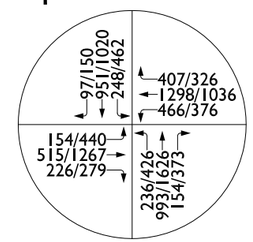
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



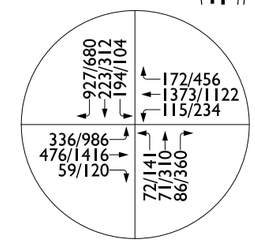
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



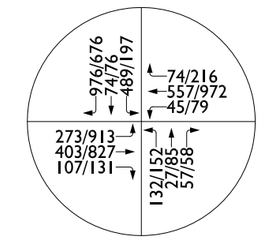
4. Project Street Access 3 (NS) & Fourth Street (EW)



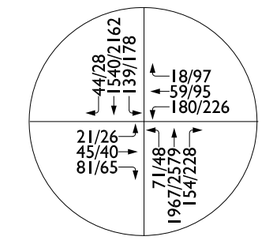
5. Milliken Avenue (NS) & Fourth Street (EW)



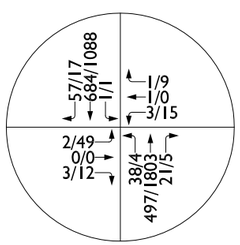
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



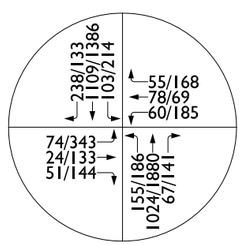
7. I-15 NB Ramps (NS) & Fourth Street (EW)



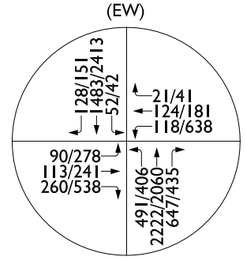
8. Haven Avenue (NS) & Concours Street (EW)



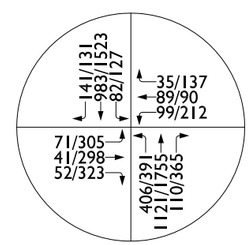
9. Concours Street (NS) & Ontario Center Parkway (EW)



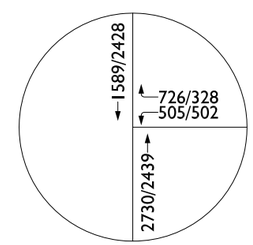
10. Milliken Street (NS) & Concours Street (EW)



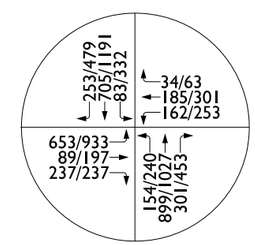
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



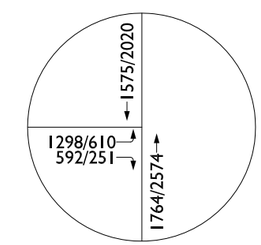
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



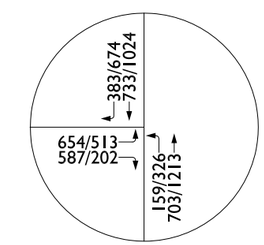
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

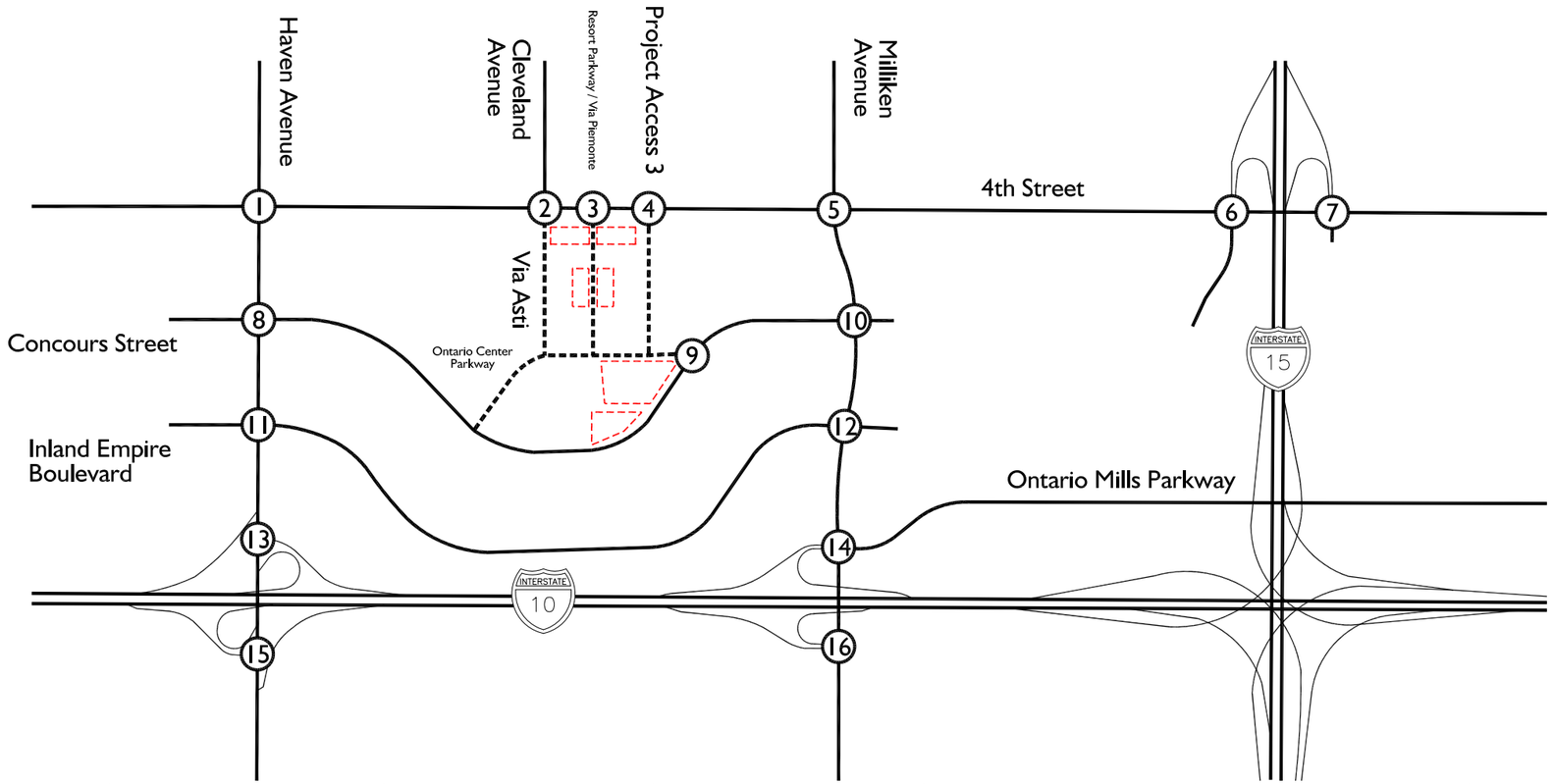


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

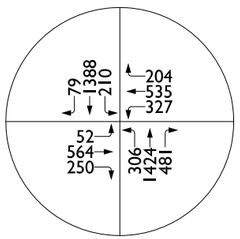
Exhibit 4-15

Project Opening Year With Related Projects Without Project Conditions Traffic Volumes – Saturday

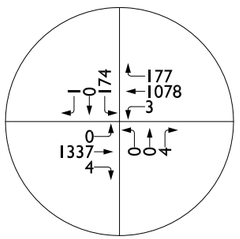


Legend:

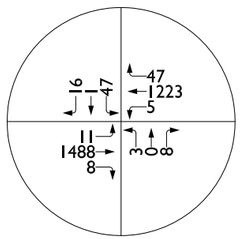
10 = Saturday Peak Hour Volumes



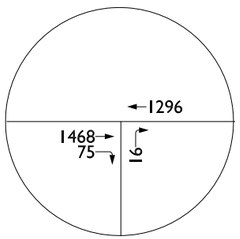
1. Haven Street (NS) & Fourth Street (EW)



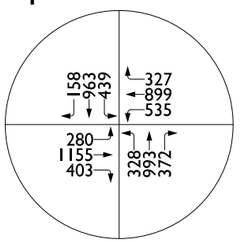
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



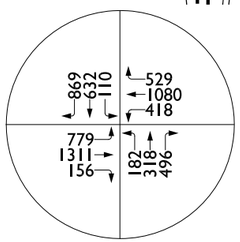
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



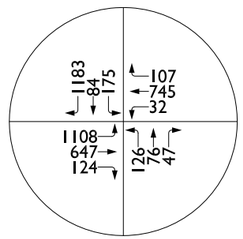
4. Project Street Access 3 (NS) & Fourth Street (EW)



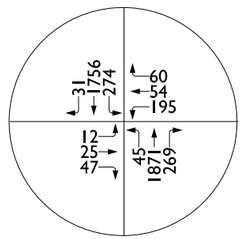
5. Milliken Avenue (NS) & Fourth Street (EW)



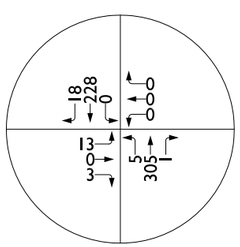
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



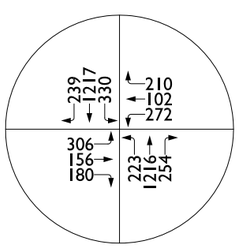
7. I-15 NB Ramps (NS) & Fourth Street (EW)



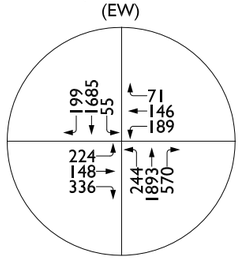
8. Haven Avenue (NS) & Concours Street (EW)



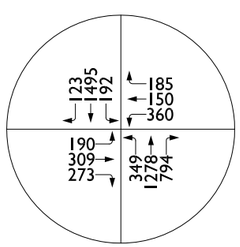
9. Concours Street (NS) & Ontario Center Parkway (EW)



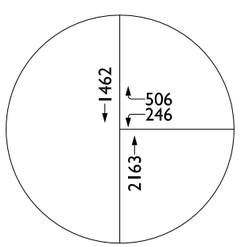
10. Milliken Street (NS) & Concours Street (EW)



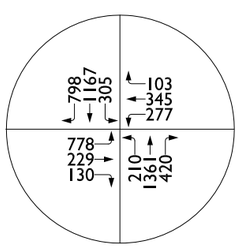
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



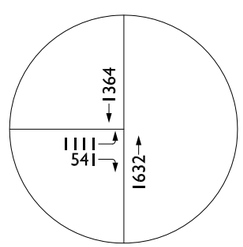
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



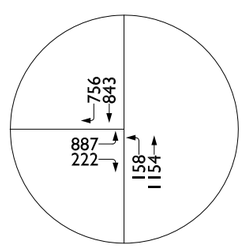
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



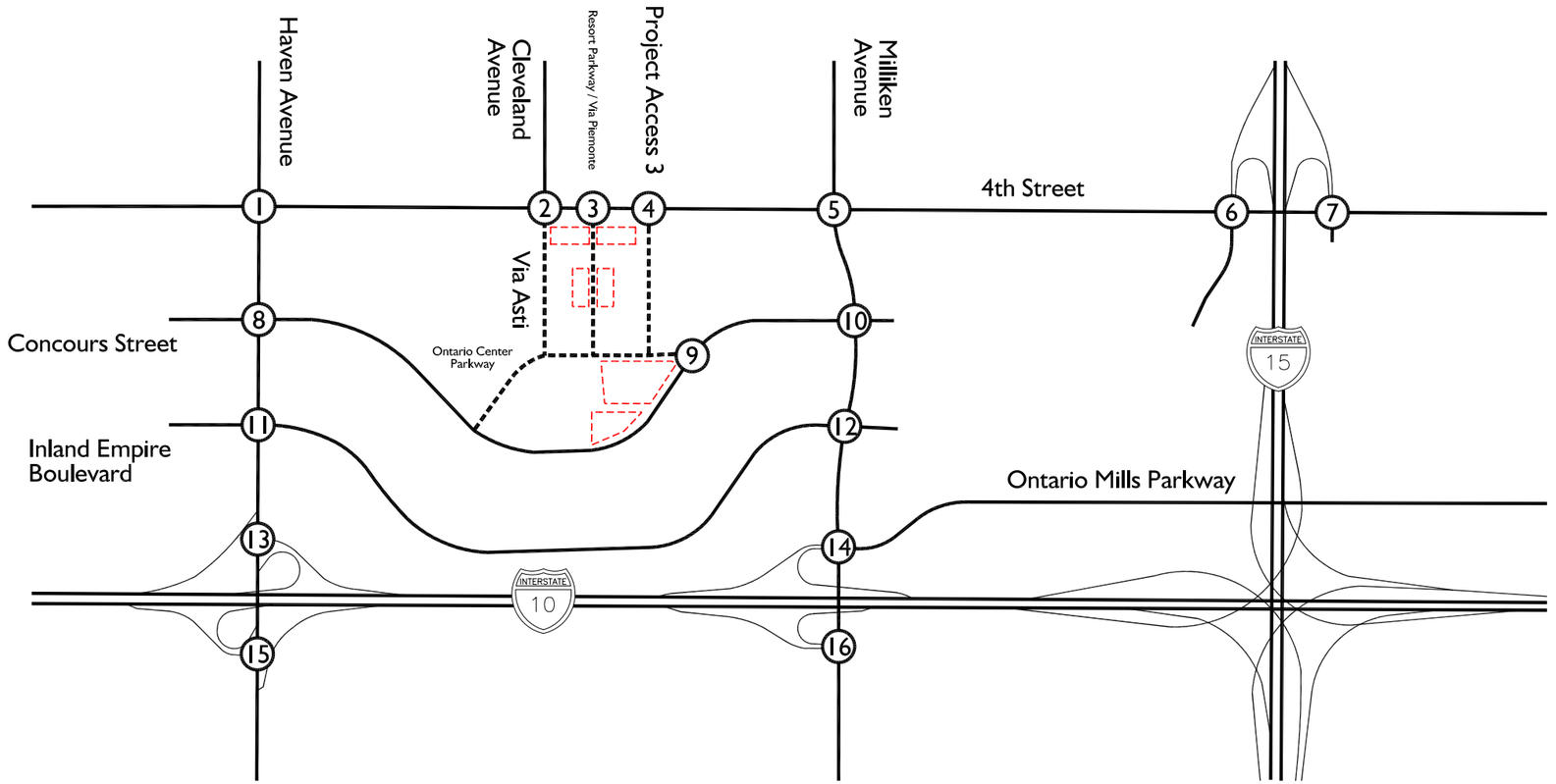
15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

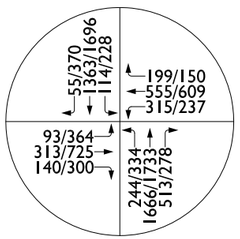
N

Opening Year With Related Projects With Project Conditions Traffic Volumes - Weekday

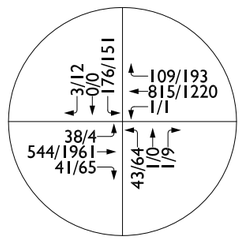


Legend:

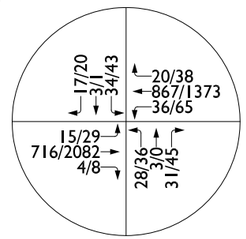
10/20 = AM/PM Peak Hour Volumes



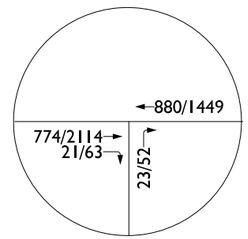
1. Haven Street (NS) & Fourth Street (EW)



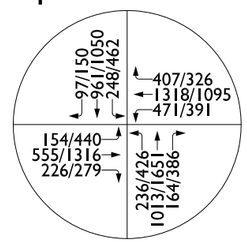
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



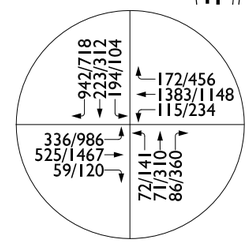
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



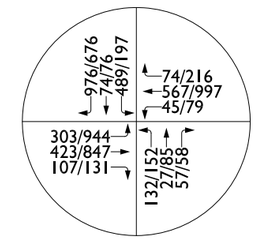
4. Project Street Access 3 (NS) & Fourth Street (EW)



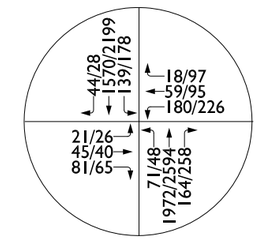
5. Milliken Avenue (NS) & Fourth Street (EW)



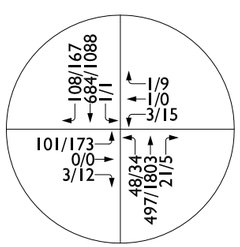
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



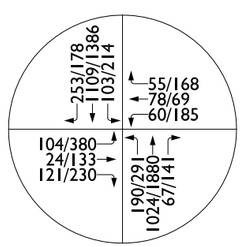
7. I-15 NB Ramps (NS) & Fourth Street (EW)



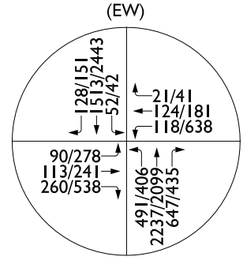
8. Haven Avenue (NS) & Concours Street (EW)



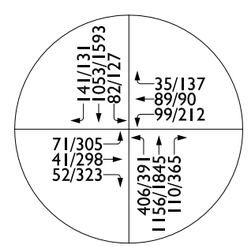
9. Concours Street (NS) & Ontario Center Parkway (EW)



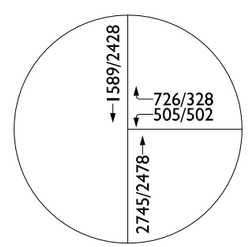
10. Milliken Street (NS) & Concours Street (EW)



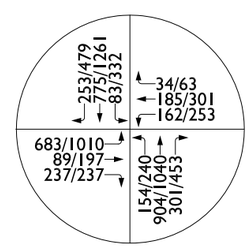
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



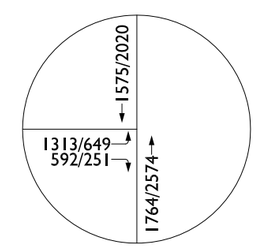
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



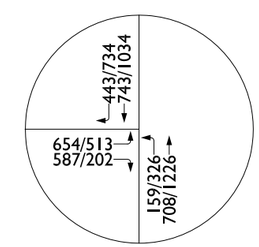
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



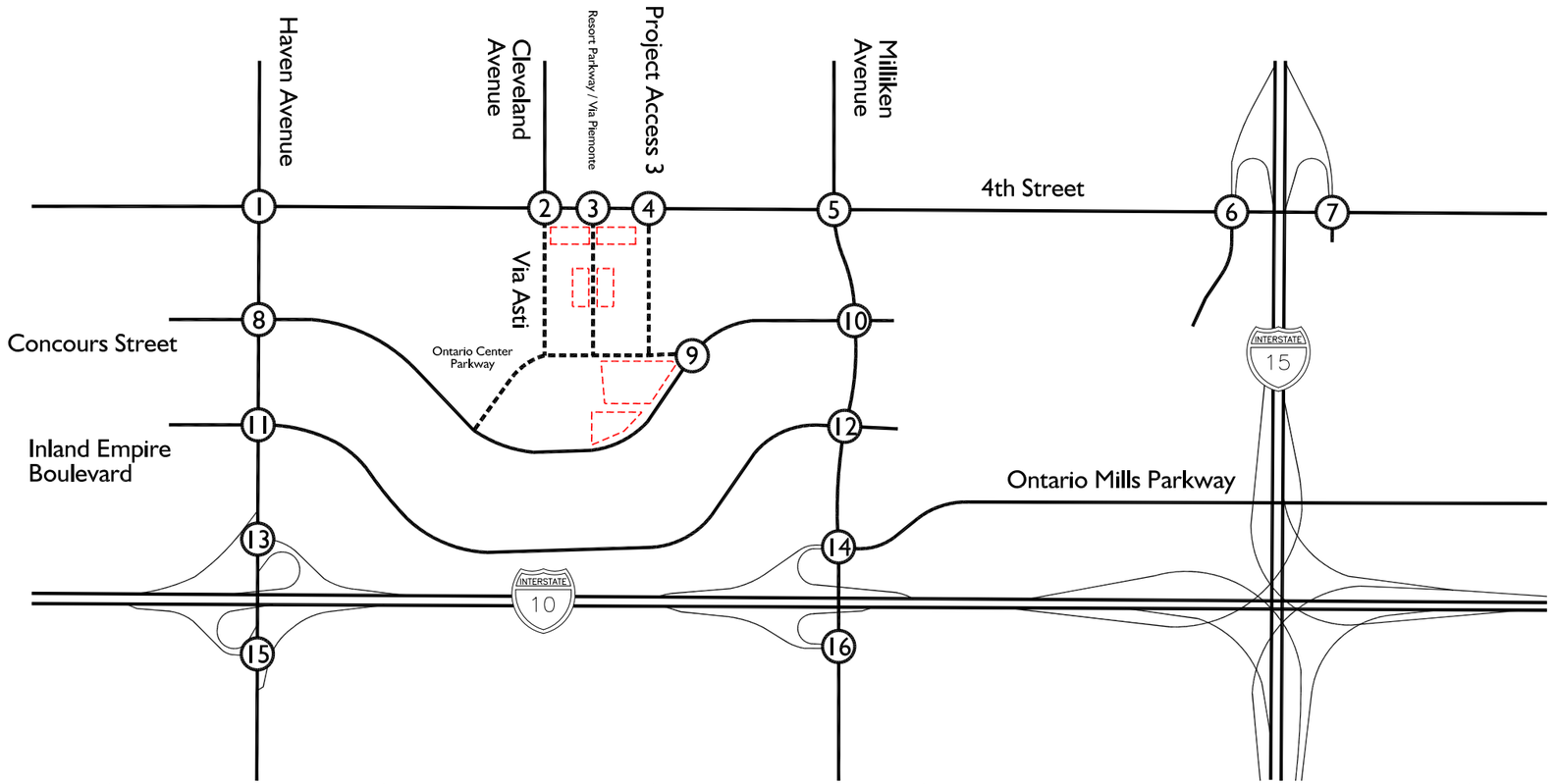
15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

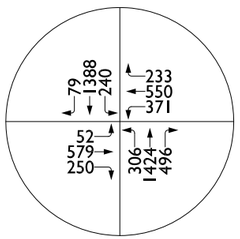
N

Project Opening Year With Related Projects With Project Conditions Traffic Volumes - Saturday

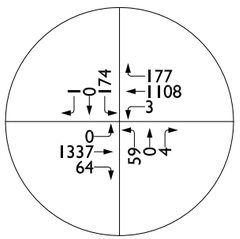


Legend:

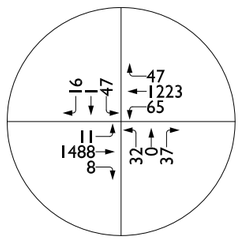
10 = Saturday Peak Hour Volumes



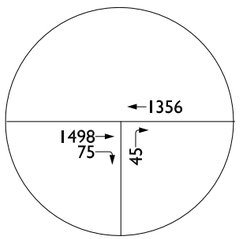
1. Haven Street (NS) & Fourth Street (EW)



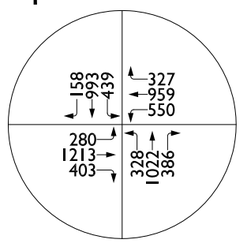
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



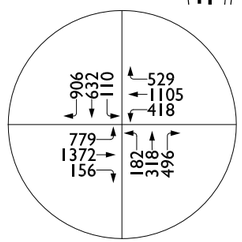
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



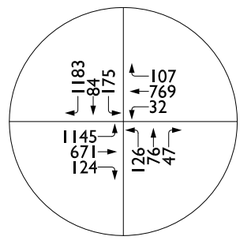
4. Project Street Access 3 (NS) & Fourth Street (EW)



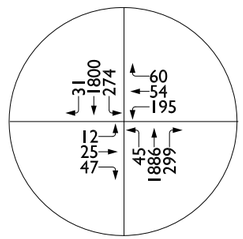
5. Milliken Avenue (NS) & Fourth Street (EW)



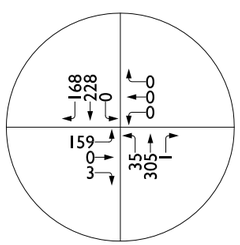
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



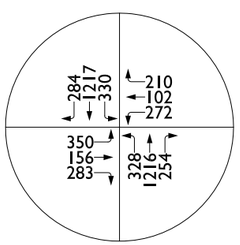
7. I-15 NB Ramps (NS) & Fourth Street (EW)



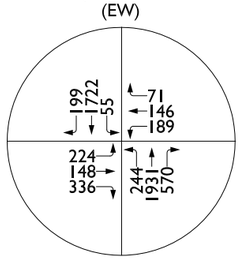
8. Haven Avenue (NS) & Concours Street (EW)



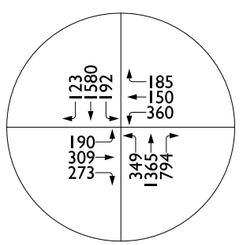
9. Concours Street (NS) & Ontario Center Parkway (EW)



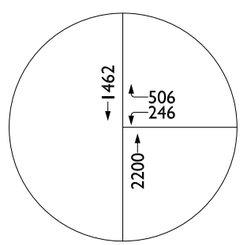
10. Milliken Street (NS) & Concours Street (EW)



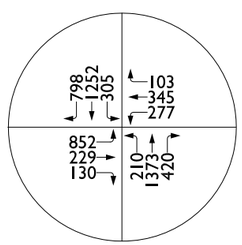
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



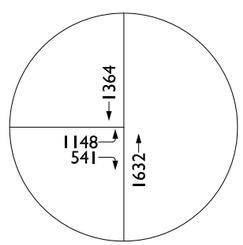
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



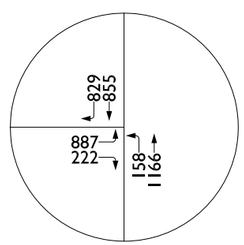
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

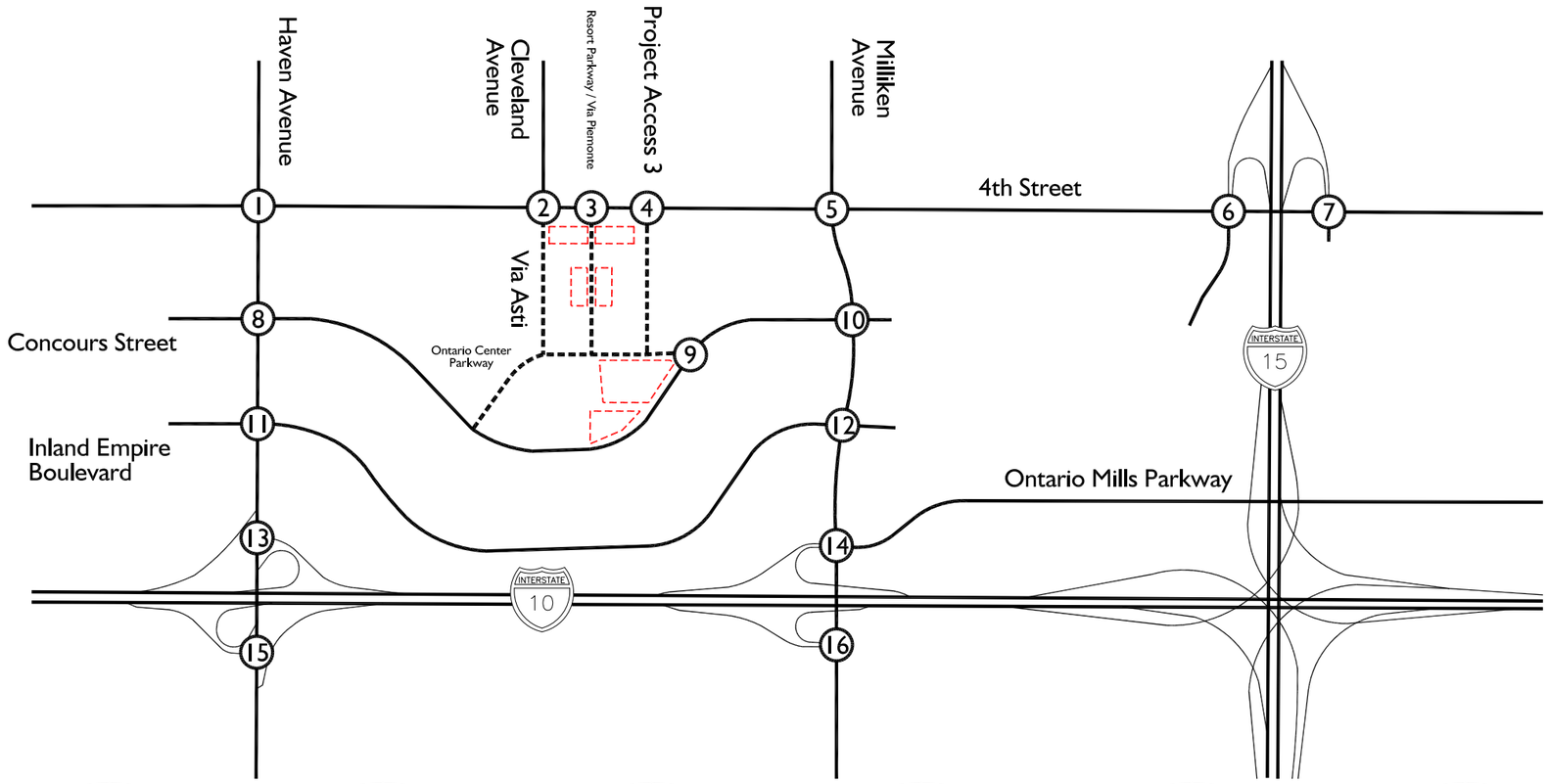


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

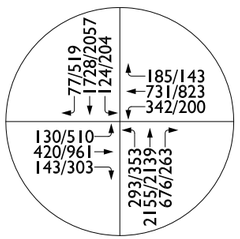
Exhibit 4-18

Horizon Year (2040) Without Project Conditions - Weekday

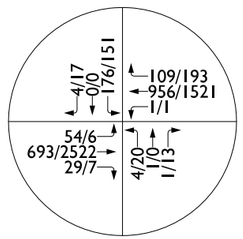


Legend:

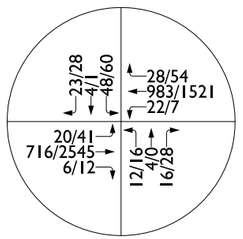
10/20 = AM/PM Peak Hour Volumes



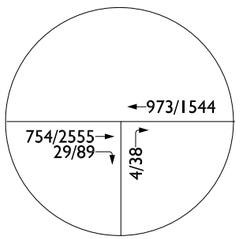
1. Haven Street (NS) & Fourth Street (EW)



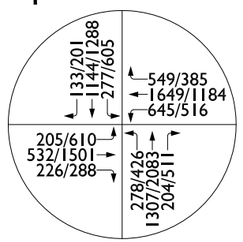
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



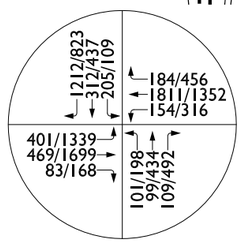
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



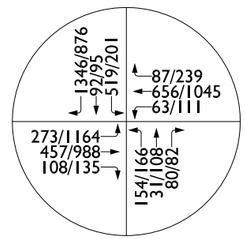
4. Project Street Access 3 (NS) & Fourth Street (EW)



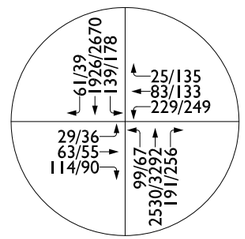
5. Milliken Avenue (NS) & Fourth Street (EW)



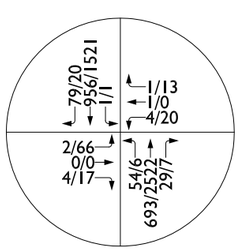
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



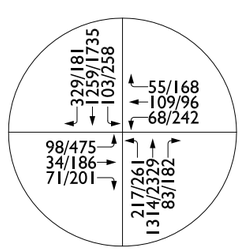
7. I-15 NB Ramps (NS) & Fourth Street (EW)



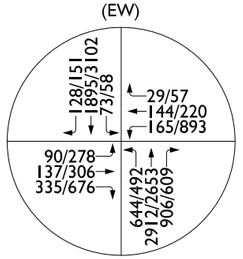
8. Haven Avenue (NS) & Concours Street (EW)



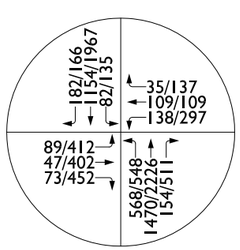
9. Concours Street (NS) & Ontario Center Parkway (EW)



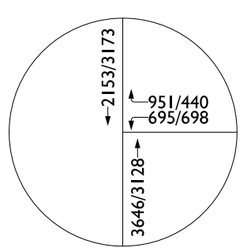
10. Milliken Street (NS) & Concours Street (EW)



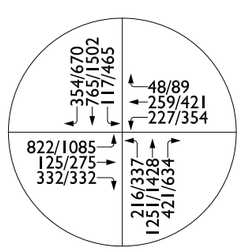
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



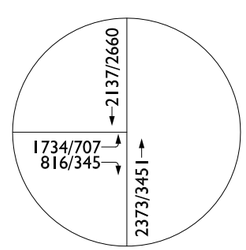
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



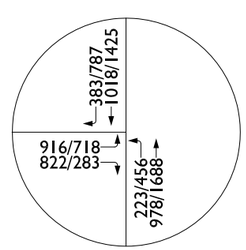
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)

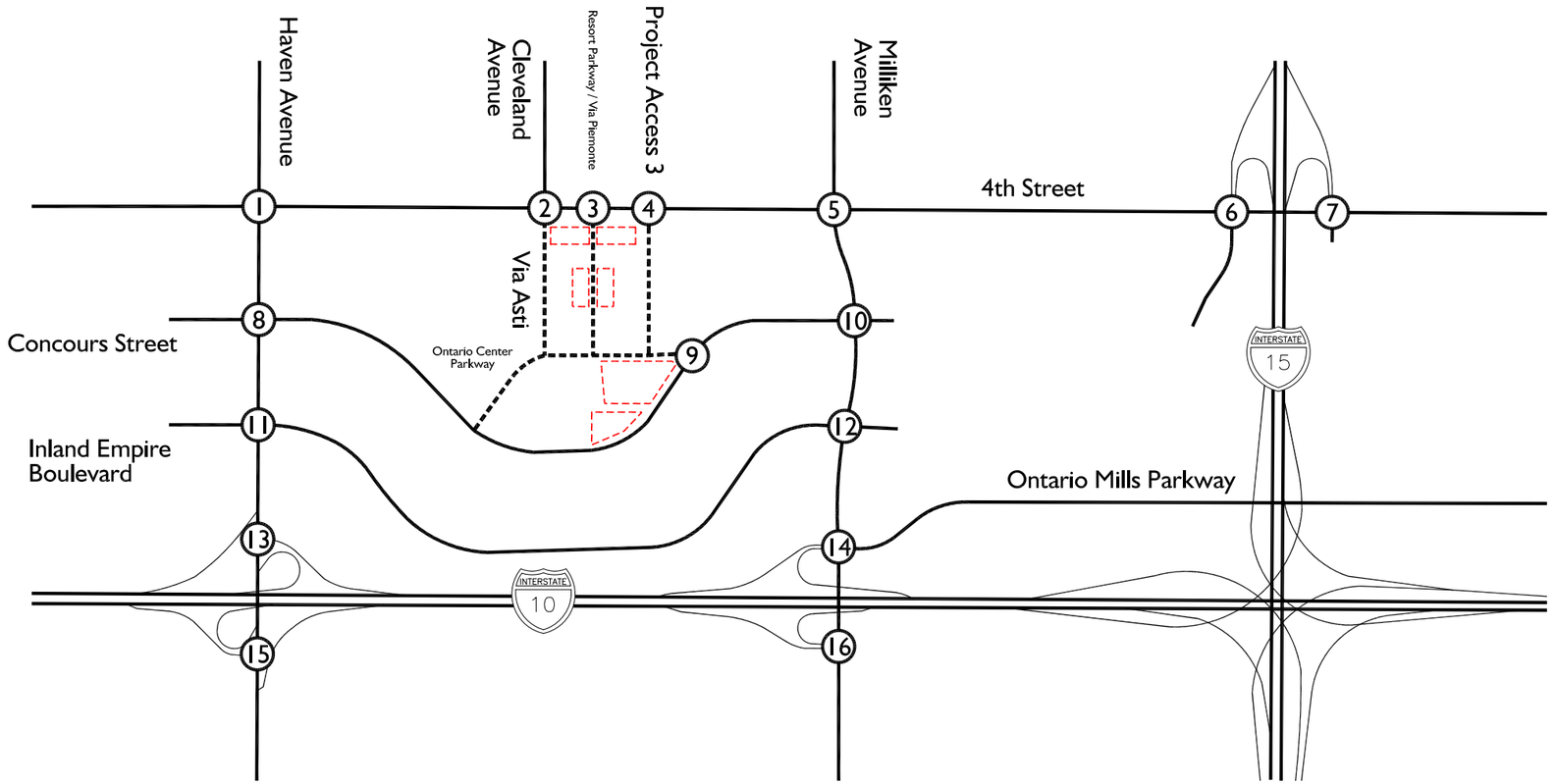


16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

N

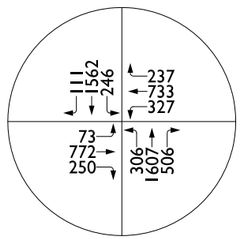
Exhibit 4-19

Horizon Year (2040) Without Project Conditions - Saturday

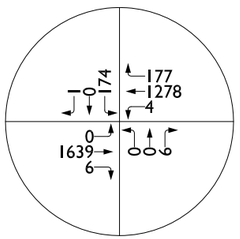


Legend:

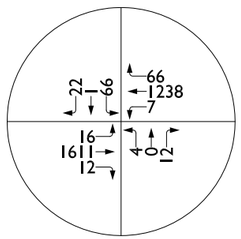
10 = Saturday Peak Hour Volumes



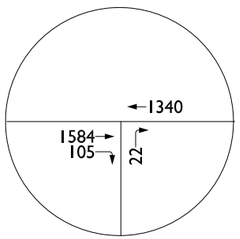
1. Haven Street (NS) & Fourth Street (EW)



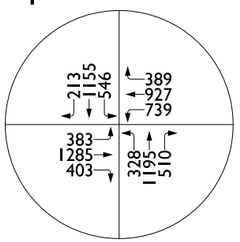
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



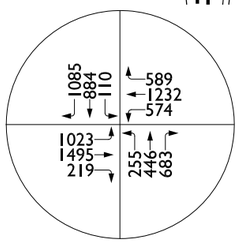
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



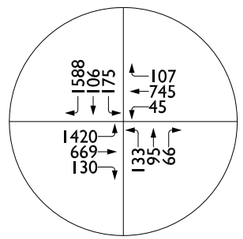
4. Project Street Access 3 (NS) & Fourth Street (EW)



5. Milliken Avenue (NS) & Fourth Street (EW)



6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



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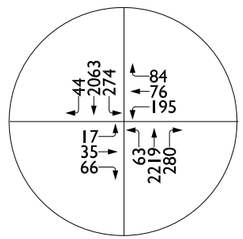
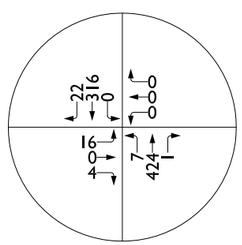
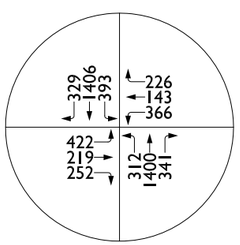


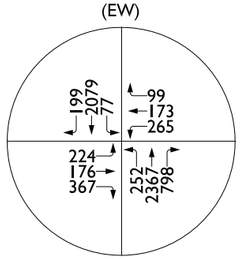
8. Haven Avenue (NS) & Concours Street (EW)



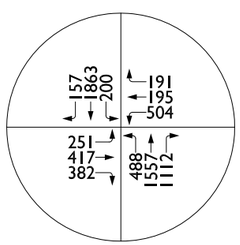
9. Concours Street (NS) & Ontario Center Parkway (EW)



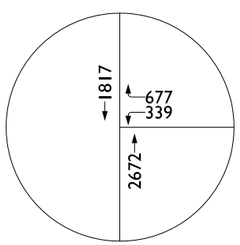
10. Milliken Street (NS) & Concours Street (EW)



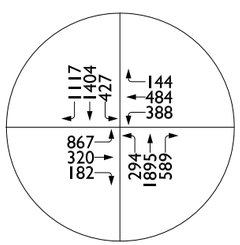
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



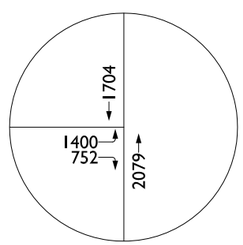
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



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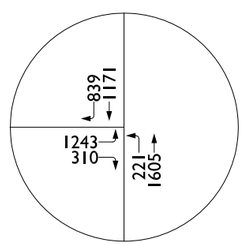

16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

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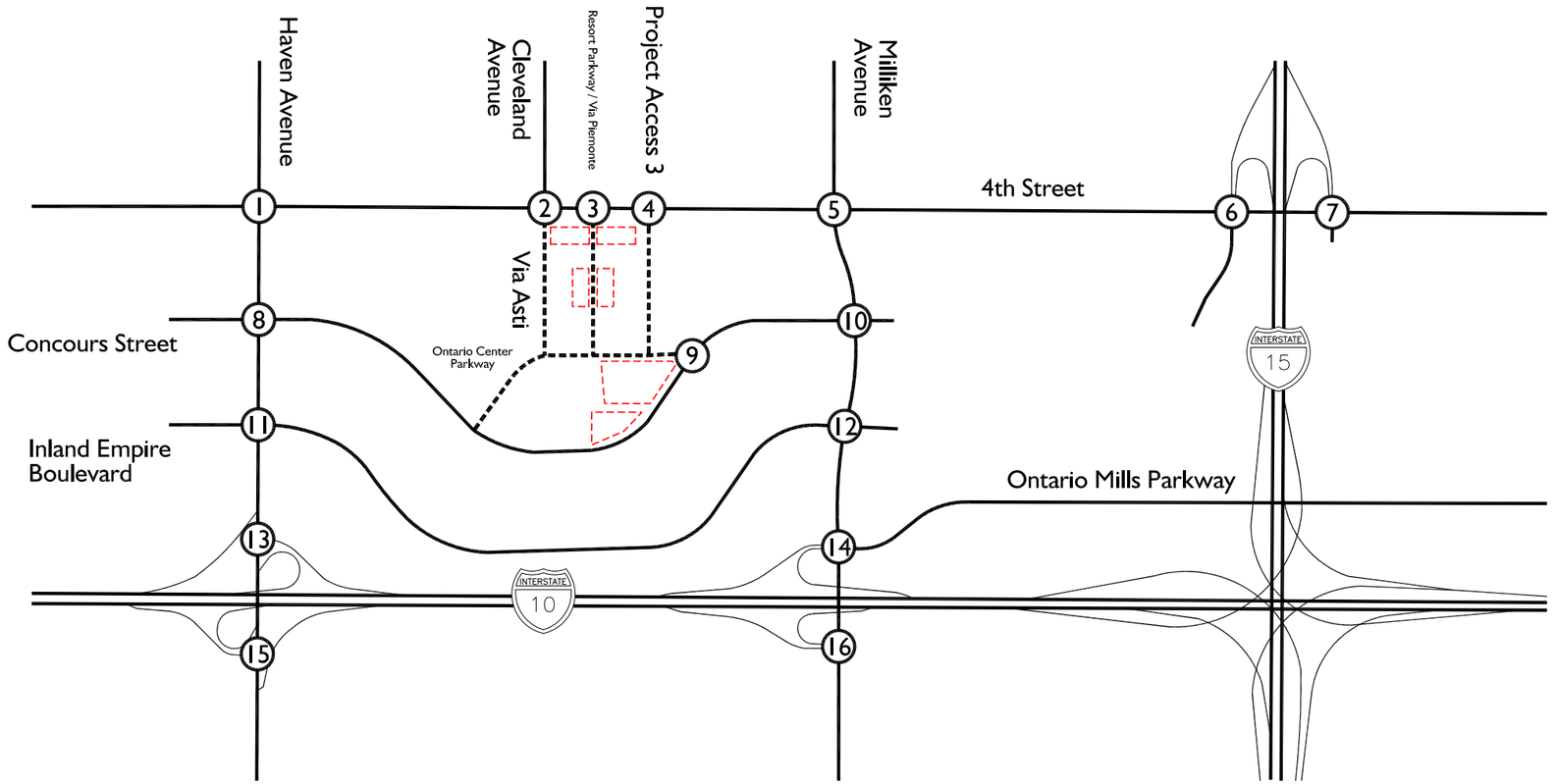
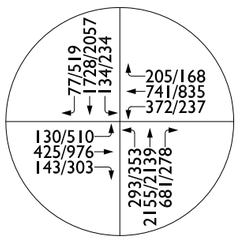
Exhibit 4-20

Horizon Year (2040) With Project Conditions - Weekday

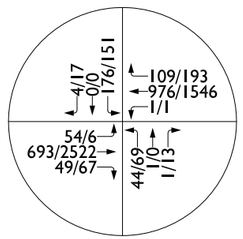


Legend:

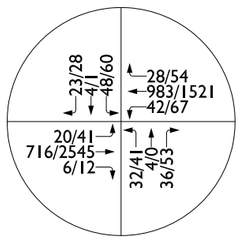
10/20 = AM/PM Peak Hour Volumes



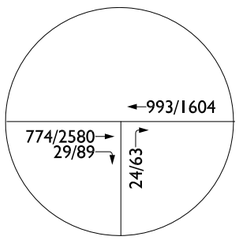
1. Haven Street (NS) & Fourth Street (EW)



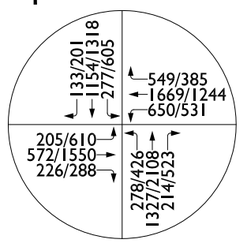
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



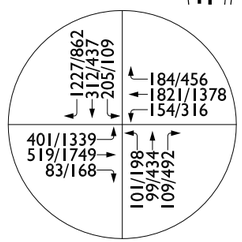
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



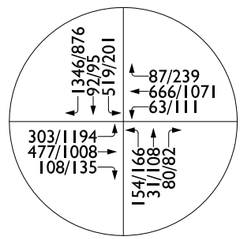
4. Project Street Access 3 (NS) & Fourth Street (EW)



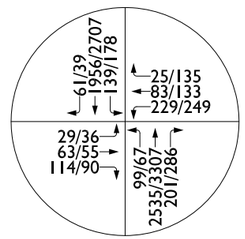
5. Milliken Avenue (NS) & Fourth Street (EW)



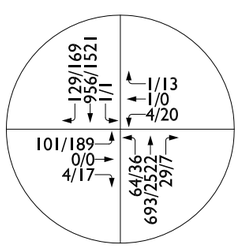
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



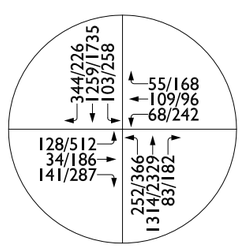
7. I-15 NB Ramps (NS) & Fourth Street (EW)



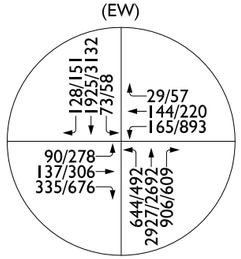
8. Haven Avenue (NS) & Concours Street (EW)



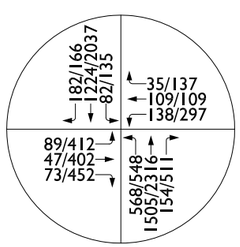
9. Concours Street (NS) & Ontario Center Parkway (EW)



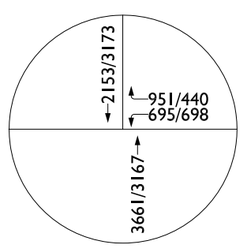
10. Milliken Street (NS) & Concours Street (EW)



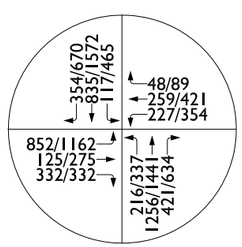
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



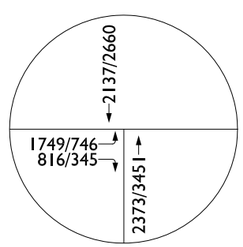
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



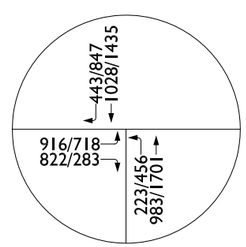
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

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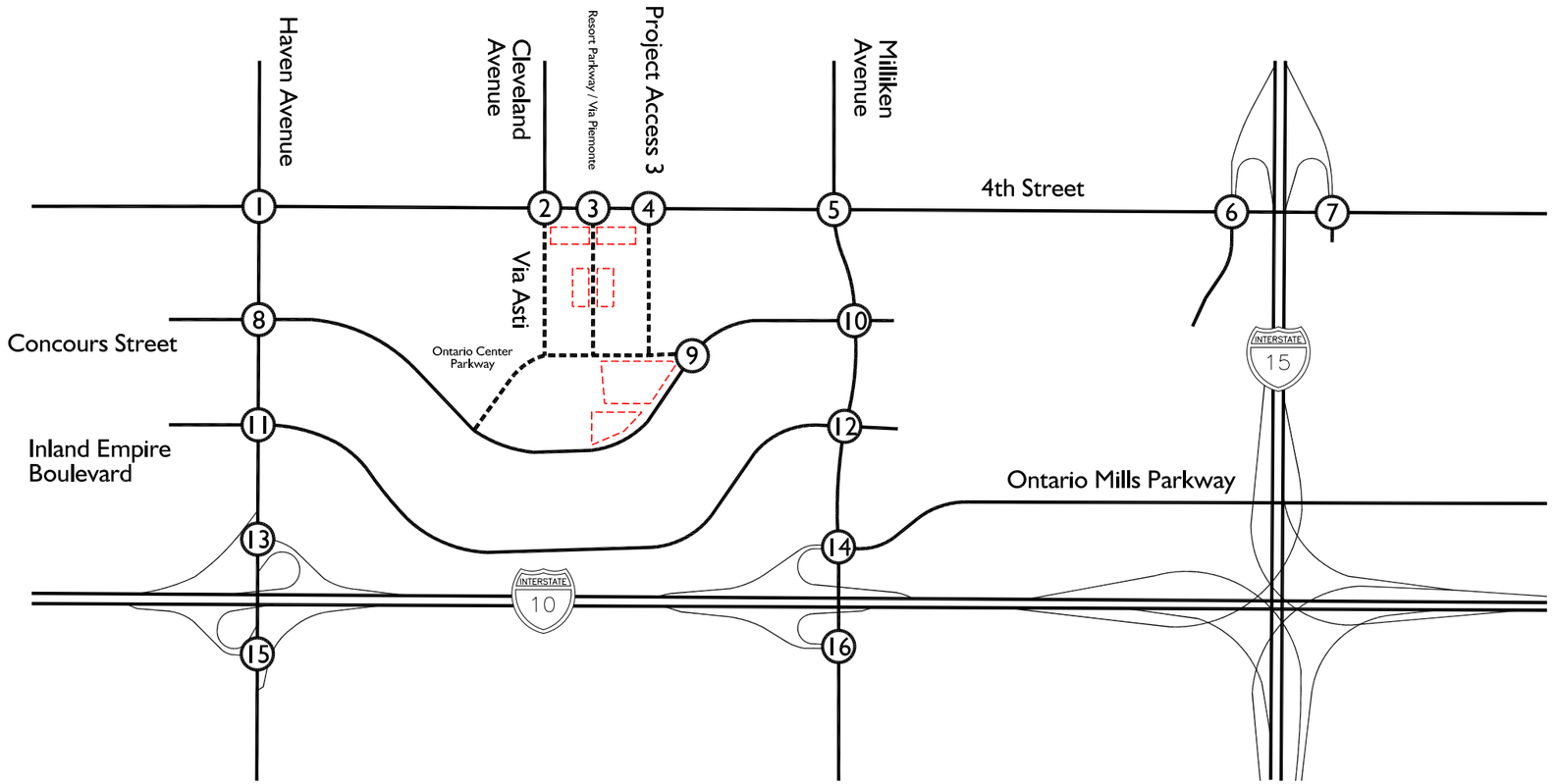
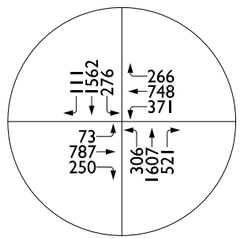
Exhibit 4-21

Horizon Year (2040) With Project Conditions - Saturday

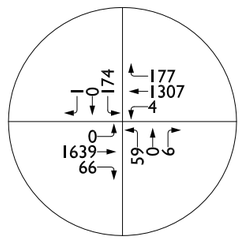


Legend:

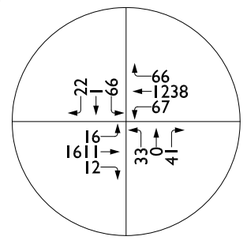
10 = Saturday Peak Hour Volumes



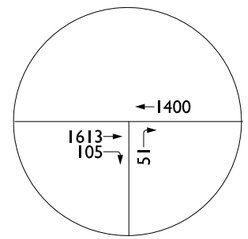
1. Haven Street (NS) & Fourth Street (EW)



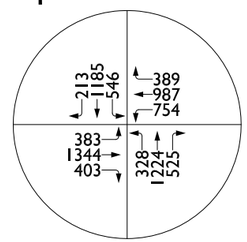
2. Cleveland Avenue -Via Asti (NS) & Fourth Street (EW)



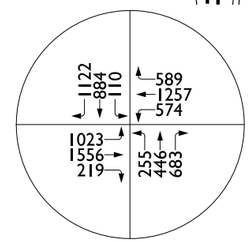
3. Resort Parkway - Via Piemonte (NS) & Fourth Street (EW)



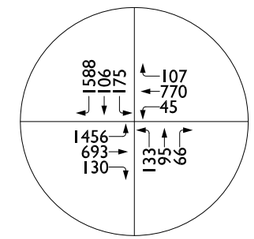
4. Project Street Access 3 (NS) & Fourth Street (EW)



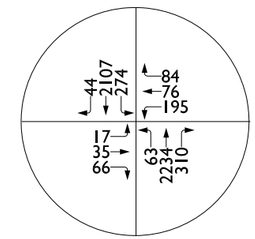
5. Milliken Avenue (NS) & Fourth Street (EW)



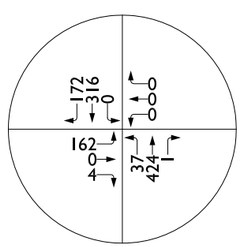
6. I-15 SB Ramps - Ontario Mills Drive (NS) & Fourth Street (EW)



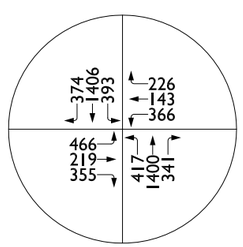
7. I-15 NB Ramps (NS) & Fourth Street (EW)



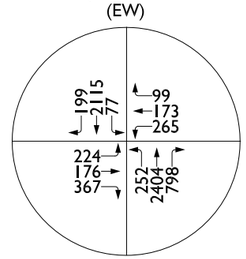
8. Haven Avenue (NS) & Concours Street (EW)



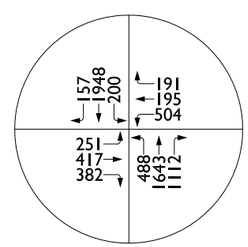
9. Concours Street (NS) & Ontario Center Parkway (EW)



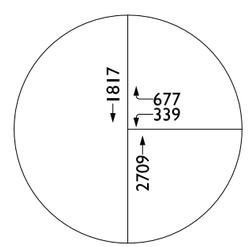
10. Milliken Street (NS) & Concours Street (EW)



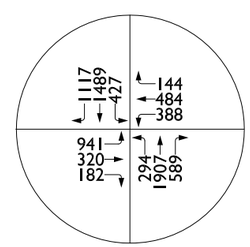
11. Haven Avenue (NS) & Inland Empire Boulevard (EW)



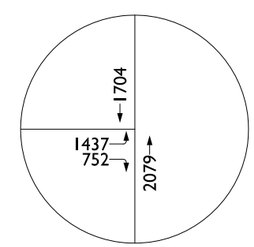
12. Milliken Avenue (NS) & Inland Empire Boulevard (EW)



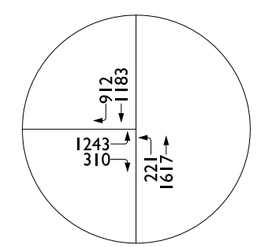
13. Haven Avenue (NS) & I-10 WB Ramps (EW)



14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)



15. Haven Avenue (NS) & I-10 EB Ramps (EW)



16. Milliken Avenue(NS) & I-10 EB Ramps Avenue (EW)

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Table 4-1
ITE Trip Generation Rates[1]

Land Use	Units[2]	ITE Code	Weekday							Weekend			
			AM			PM			Daily	SAT[3]			Daily
			In	Out	Total	In	Out	Total		In	Out	Total	
Multifamily Housing (Medium Rise)	DU	221	0.09	0.27	0.36	0.27	0.17	0.44	5.44	0.22	0.22	0.44	4.91
Retail	TSF	820	0.58	0.36	0.94	1.83	1.98	3.81	37.75	2.34	2.16	4.50	46.12

[1] Source: *2017 ITE Trip Generation Manual (10th Edition).*

[2] DU = Dwelling Units
TSF= Thousand Square Feet.

[3] ITE Saturday peak hour of generator trip rates utilized.

Table 4-2
Proposed Project Trip Generation[1]

Land Use (ITE Code)	Quantity	Units[2]	Weekday							Weekend			
			AM			PM			Daily	SAT			Daily
			In	Out	Total	In	Out	Total		In	Out	Total	
Multifamily Housing (Medium Rise) (221)	691	DU	65	184	249	185	119	304	3,759	149	155	304	3,393
Internal Trip Capture (5% AM, 5% PM, 5% Sat, 5% Daily)			-3	-9	-12	-9	-6	-15	-188	-7	-8	-15	-170
Subtotal Residential			***62***	***175***	***237***	***176***	***113***	***289***	***3,571***	***142***	***147***	***289***	***3,223***
Retail (820)	71.2	TSF	41	25	66	130	141	271	2,688	167	154	320	3,284
Internal Trip Capture (5% AM, 5% PM, 5% Sat, 5% Daily)			-2	-1	-3	-7	-7	-14	-134	-8	-8	-16	-164
Subtotal after Internal Trip Capture			39	24	63	123	134	257	2,554	159	146	304	3,120
Pass-by (0% AM, 34% PM, 34% SAT, 17% Daily)			0	0	0	-42	-46	-88	-434	-54	-50	-103	-530
Subtotal Retail			***39***	***24***	***63***	***81***	***88***	***169***	***2,120***	***105***	***96***	***201***	***2,590***
Project Trip Generation (Without Pass-by or Internal Capture)			***106***	***209***	***315***	***315***	***260***	***575***	***6,447***	***316***	***309***	***624***	***6,677***
Project Trip Generation With Internal Capture and Pass-By			***101***	***199***	***300***	***257***	***201***	***458***	***5,691***	***247***	***243***	***490***	***5,813***

[1] Source: *2017 ITE Trip Generation Manual (10th Edition).*

[2] DU = Dwelling Units
TSF= Thousand Square Feet.

Table 4-3
Cumulative Projects Trip Generation[1]

ID No.	Jurisdiction	Project Name / Case Number	Land Use	Quantity	Units[2]	Peak Hour									Daily
						AM			PM			SAT			
						In	Out	Total	In	Out	Total	In	Out	Total	
TAZ 1															
RC 1	**Rancho Cucamonga**	DRC2019-00371	General Office	12.000	TSF	12	2	14	2	12	14	3	3	6	117
RC 2	**Rancho Cucamonga**	DRC2018-00889	General Office	184.364	TSF	184	30	214	34	178	212	53	45	98	1,796
			Retail	15.811	TSF	9	6	15	29	31	60	50	50	100	597
TAZ 1 Total						**205**	**38**	**243**	**65**	**221**	**286**	**106**	**98**	**204**	**2,510**
TAZ 2															
RC 3	**Rancho Cucamonga**	DRC2017-00654	Multi-Family Housing (Low-Rise)	207	DU	22	73	95	73	43	116	72	72	145	1,515
			Retail	14.300	TSF	8	5	13	26	28	54	45	45	91	540
TAZ 2 Total						**30**	**78**	**108**	**99**	**71**	**170**	**117**	**117**	**236**	**2,055**
TAZ 3															
RC 4	**Rancho Cucamonga**	DRC2019-00766	Warehousing	143.014	TSF	19	6	25	7	20	27	5	3	7	249
RC 6	**Rancho Cucamonga**	DRC2020-00026	Warehousing	23.380	TSF	3	1	4	1	3	4	1	0	1	41
TAZ 3 Total						**22**	**7**	**29**	**8**	**23**	**31**	**6**	**3**	**8**	**290**
TAZ 4															
RC 5	**Rancho Cucamonga**	DRC2018-00529	Industrial	198.000	TSF	122	17	139	16	109	125	38	43	81	982
RC 7	**Rancho Cucamonga**	5th and Hermosa Warehouse	Warehousing	140.000	TSF	18	5	23	7	19	26	4	3	7	244
TAZ 4 Total						**140**	**22**	**162**	**23**	**128**	**151**	**42**	**46**	**88**	**1,226**
TAZ 5															
RC 8	**Rancho Cucamonga**	DRC2017-00925	Multi-Family Housing (Low-Rise)	296	DU	31	105	136	104	61	165	104	104	207	2,167
RC 9	**Rancho Cucamonga**	DRC2018-00784	Multi-Family Housing (Low-Rise)	135	DU	14	48	62	48	28	76	47	47	95	988
RC 10	**Rancho Cucamonga**	DRC2018-00851	Single Family Homes	80	DU	15	44	59	50	29	79	40	34	74	755
RC 11	**Rancho Cucamonga**	DRC2019-00674	Multi-Family Housing (Low-Rise)	867	DU	92	307	399	306	180	486	303	303	607	6,346
TAZ 5 Total						**152**	**504**	**656**	**508**	**298**	**806**	**494**	**488**	**983**	**10,256**
TAZ 6															
RC 12	**Rancho Cucamonga**	DRC2020-00212	High Cube Warehouse	2,200.000	TSF	136	40	176	62	158	220	132	132	264	3,080
TAZ 6 Total						**136**	**40**	**176**	**62**	**158**	**220**	**132**	**132**	**264**	**3,080**
TAZ 7															
O 1	**Ontario**	Top Golf - Recreation	Golf Course	13.800	ACRES	2	1	3	1	3	4	1	3	4	52
TAZ 7 Total						**2**	**1**	**3**	**1**	**3**	**4**	**1**	**3**	**4**	**52**
TAZ 8															
O 2	**Ontario**	File No. 21-013	Retail	91.163	TSF	53	33	86	167	181	348	289	289	579	3,441
TAZ 8 Total						**53**	**33**	**86**	**167**	**181**	**348**	**289**	**289**	**579**	**3,441**
TAZ 9															
O 3	**Ontario**	File No. PDEV19-054	Multi-Family Housing (Low-Rise)	72	DU	8	26	34	25	15	40	25	25	50	527
O 4	**Ontario**	File No. PDEV19-061	Multi-Family Housing (Low-Rise)	110	DU	12	39	51	39	23	62	39	39	77	805
TAZ 9 Total						**20**	**65**	**85**	**64**	**38**	**102**	**64**	**64**	**127**	**1,332**
TAZ 10															
O 5	**Ontario**	File No. PDEV21-021	Hotel	138	RM	38	27	65	42	41	83	39	39	77	1,154
TAZ 10 Total						**38**	**27**	**65**	**42**	**41**	**83**	**39**	**39**	**77**	**1,154**
TAZ 11															
O 6	**Ontario**	File No. PDEV19-024	Retail	329.850	TSF	192	118	310	603	653	1,256	1,047	1,047	2,095	12,452
TAZ 11 Total						**192**	**118**	**310**	**603**	**653**	**1,256**	**1,047**	**1,047**	**2,095**	**12,452**
TAZ 12															
O 7	**Ontario**	File No. PDEV19-067	Hotel	265	RM	73	51	124	81	78	159	74	74	148	2,215
O 8	**Ontario**	File No. PDEV17-016	Hotel	124	RM	34	24	58	38	36	74	35	35	69	1,037
TAZ 12 Total						**107**	**75**	**182**	**119**	**114**	**233**	**109**	**109**	**217**	**3,252**
TAZ 13															
O 9	**Ontario**	File No. PDEV20-008	High Cube Warehouse	200.000	TSF	12	4	16	6	14	20	12	12	24	280
O 10	**Ontario**	File No. PDEV21-018	Warehousing	168.000	TSF	22	7	29	9	23	32	5	3	8	292
TAZ 13 Total						**34**	**11**	**45**	**15**	**37**	**52**	**17**	**15**	**32**	**572**
Total Cumulative Projects Trip Generation						***1,131***	***1,019***	***2,150***	***1,776***	***1,966***	***3,742***	***2,463***	***2,450***	***4,914***	***41,672***

[1] Cumulative Projects information provided by the City of Ontario and the City of Rancho Cucamonga.

[2] TSF = Thousand Square Feet;
DU = Dwelling Units;
RM = Rooms.

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5.0 Study Intersection Peak Hour Level of Service Analysis

5.1 Existing Conditions Study Intersection Peak Hour LOS

Existing Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-1 and are based upon the existing (2021) traffic volumes shown in Exhibit 3-2 and Exhibit 3-3, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-1, the study intersections are all currently operating at an acceptable LOS (LOS E or better) during the peak hours for Existing Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (82.4 secs)

Detailed LOS analysis sheets for Existing Conditions are contained in Appendix B.

5.2 Existing Plus Project Conditions Study Intersection Peak Hour LOS

Existing Plus Project Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-2 and are based upon the Existing Plus Project Conditions traffic volumes shown in Exhibit 4-5 and Exhibit 4-6, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-2, the study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Existing Plus Project Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (82.7 secs)

As also shown in Table 5-2, based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Existing Plus Project Conditions:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

After review of the existing roadway conditions at this intersection, no feasible intersection improvements can be identified for this study intersection to achieve acceptable level of service (LOS E or better) for Existing Plus Project Conditions.

Detailed LOS analysis sheets for Existing Plus Project Conditions are contained in Appendix C.

5.3 Opening Year Without Related Projects Without Project Conditions Study Intersection Peak Hour LOS

Opening Year Without Related Projects Without Project Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-3 and are based upon the Opening Year Without Related Projects Without Project Conditions traffic volumes shown in Exhibit 4-10 and Exhibit 4-11, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-3, the study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year Without Related Projects Without Project Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (90.4 secs)

Detailed LOS analysis sheets for Opening Year Without Related Projects Without Project Conditions are contained in Appendix D.

5.4 Opening Year Without Related Projects With Project Conditions Study Intersection Peak Hour LOS

Opening Year Without Related Projects With Project Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-4 and are based upon the Opening Year Without Related Projects With Project Conditions traffic volumes shown in Exhibit 4-12 and Exhibit 4-13, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-4, the study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year Without Related Projects With Project Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (90.8 secs)

As also shown in Table 5-4, based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Opening Year Without Related Projects With Project Conditions:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

After review of the existing roadway conditions at this intersection, no feasible intersection improvements can be identified for this study intersection to achieve acceptable level of service (LOS E or better) for Opening Year Without Related Projects With Project Conditions.

Detailed LOS analysis sheets for Opening Year Without Related Projects With Project Conditions are contained in Appendix E.

5.5 Opening Year With Related Projects Without Project Conditions Study Intersection Peak Hour LOS

Opening Year With Related Projects Without Project Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-5 and are based upon the Opening Year With Related Projects Without Project Conditions traffic volumes shown in Exhibit 4-14 and Exhibit 4-15, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-5, the study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year With Related Projects Without Project Conditions with exception to the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (94.4 secs)

- SAT Peak Hour – LOS F (113.9 secs)

Detailed LOS analysis sheets for Opening Year With Related Projects Without Project Conditions are contained in Appendix F.

5.6 Opening Year With Related Projects With Project Conditions Study Intersection Peak Hour LOS

Opening Year With Related Projects With Project Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-6 and are based upon the Opening Year With Related Projects With Project Conditions traffic volumes shown in Exhibit 4-16 and Exhibit 4-17, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-6, the study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year With Related Projects With Project Conditions with exception to the following study intersections:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
  - PM Peak Hour – LOS F (97.0 secs)
  - SAT Peak Hour – LOS F (116.1 secs)

As also shown in Table 5-6, based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Opening Year With Related Projects With Project Conditions:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

After review of the existing roadway conditions at this intersection, no feasible intersection improvements can be identified for this study intersection to achieve acceptable level of service (LOS E or better) for Opening Year With Related Projects With Project Conditions.

Detailed LOS analysis sheets for Opening Year With Related Projects With Project Conditions are contained in Appendix G.

5.7 Horizon Year (2040) Without Project Conditions Study Intersection Peak Hour LOS

Horizon Year (2040) Without Project Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-7 and are based upon the weekday and Saturday Opening Year With Related Projects Without Project Conditions traffic volumes shown in Exhibit 4-18 and Exhibit 4-19, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-7, the study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Horizon Year (2040) Without Project Conditions with exception to the following study intersection:

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (98.0 secs)
- **Int #4:** Project Access 3 (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (51.9 secs)
- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (103.9 secs)
- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - AM Peak Hour LOS – F (118.2 secs)
    - PM Peak Hour – LOS F (149.3 secs)
    - SAT Peak Hour – LOS F (180.2 secs)
- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)
    - PM Peak Hour LOS – F (134.7 secs)

- **Int #14:** Milliken Avenue (NS) / Ontario Mills Parkway – I-10 WB Ramps (EW)

    - SAT Peak Hour – LOS F (82.2 secs)

Detailed LOS analysis sheets for Horizon Year (2040) Without Project Conditions are contained in Appendix H.

5.8 Horizon Year (2040) With Project Conditions Study Intersection Peak Hour LOS

Horizon Year (2040) With Project Conditions level of service (LOS) calculations for the study intersections are shown in Table 5-8 and are based upon the weekday and Saturday Horizon Year (2040) With Project Conditions traffic volumes shown in Exhibit 4-20 and Exhibit 4-21, as well as the existing geometry shown in Exhibit 3-1.

As shown in Table 5-8, the study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Horizon Year (2040) With Project Conditions with exception to the following study intersections:

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)

    - PM Peak Hour – LOS F (102.3 secs)

- **Int #4** Project Access 3 (NS) / 4th Street (EW)

    - PM Peak Hour – LOS F (73.8 secs)

- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)

    - PM Peak Hour – LOS F (109.7 secs)

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

    - AM Peak Hour LOS – F (119.0 secs)

    - PM Peak Hour – LOS F (152.9 secs)

    - SAT Peak Hour – LOS F (184.8 secs)

- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)
    - PM Peak Hour LOS – F (136.5 secs)
- **Int #14:** Milliken Avenue (NS) / Ontario Mills Parkway – I-10 WB Ramps (EW)
    - SAT Peak Hour – LOS F (87.3 secs)

As also shown in Table 5-8, based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Horizon Year (2040) With Project Conditions:

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)
- **Int #4:** Project Access 3 (NS) / 4th Street (EW)
- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)
- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)
- **Int #14:** Milliken Avenue (NS) / Ontario Mills Parkway – I-10 WB Ramps (EW)

After review of the existing roadway conditions at these study intersections, no feasible intersection improvements can be identified for the following study intersections to achieve acceptable level of service (LOS E or better) for Horizon Year (2040) With Project Conditions.

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)
- **Int #4:** Project Access 3 (NS) / 4th Street (EW)
- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)
- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)

The following recommended improvements are identified to restore the intersection of *Milliken Avenue / Ontario Mills Parkway – I-10 WB Ramps* to acceptable conditions (LOS E for Horizon Year (2040) With Project Conditions:

Intersection Improvement #1	**Int 14 – Milliken Avenue / Ontario Mills Parkway – I-10 WB Ramps:** Make a fair-share contribution to widen the eastbound off-ramp approach from two left turn lanes, one through lane and one right turn lane to **three** left turn lanes, one through lane, and one right turn lane.

Detailed LOS analysis sheets for Horizon Year (2040) With Project Conditions are contained in Appendix I.

Detailed LOS analysis sheets for Horizon Year (2040) With Project Conditions With Improvements are contained in Appendix J.

Table 5-1
Study Intersection LOS Analysis Summary
Existing Conditions

	Intersection	Traffic Control[3]	Delay (Secs)[1,2]			Level of Service		
			AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	29.3	46.0	27.4	C	D	C
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	10.2	9.4	7.9	B	A	A
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.9	6.7	7.5	A	A	A
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	11.0	23.2	15.0	B	C	B
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	27.4	48.1	39.7	C	D	D
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	49.3	67.1	**82.4**	D	E	**F**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	21.1	32.5	29.7	C	C	C
8.	Haven Avenue (NS) / Concours Street (EW)	TS	14.5	13.0	12.0	B	B	B
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	8.0	7.7	4.4	A	A	A
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	13.3	20.2	19.7	B	C	B
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	21.4	53.3	19.6	C	D	B
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	15.3	22.9	25.2	B	C	C
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	21.6	9.5	8.0	C	A	A
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	21.2	36.0	38.4	C	D	D
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	24.8	9.6	12.9	C	A	B
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	15.1	11.6	13.1	B	B	B

[1] Deficient operation shown in **Bold**.

[2] HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst

[3] TS = Traffic Signal

CSS = Cross-Street Stop

Table 5-2
Study Intersection LOS Analysis Summary
Existing Plus Project Conditions

	Intersection	Traffic Control[3]	Existing Conditions						Existing Plus Project Conditions											
			Delay (Secs)[1,2]			Level of Service			Delay (Secs)[1,2]			Increase in Delay			Level of Service			Requires Improvement?		
			AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	29.3	46.0	27.4	C	D	C	30.3	48.6	29.6	1.0	2.6	2.2	C	D	C	NO	NO	NO
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	10.2	9.4	7.9	B	A	A	11.4	10.1	9.4	1.2	0.7	1.5	B	B	A	NO	NO	NO
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.9	6.7	7.5	A	A	A	8.3	8.0	8.3	0.4	1.3	0.8	A	A	A	NO	NO	NO
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	11.0	23.2	15.0	B	C	B	11.3	26.4	16.3	0.3	3.2	1.3	B	D	C	NO	NO	NO
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	27.4	48.1	39.7	C	D	D	27.7	49.9	41.6	0.3	1.8	1.9	C	D	D	NO	NO	NO
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	49.3	67.1	**82.4**	D	E	**F**	50.1	67.7	**82.7**	0.8	0.6	**0.3**	D	E	**F**	NO	NO	**YES**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	21.1	32.5	29.7	C	C	C	21.5	34.0	31.2	0.4	1.5	1.5	C	C	C	NO	NO	NO
8.	Haven Avenue (NS) / Concours Street (EW)	TS	14.5	13.0	12.0	B	B	B	14.5	13.0	12.1	0.0	0.0	0.1	B	B	B	NO	NO	NO
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	8.0	7.7	4.4	A	A	A	10.1	10.3	7.1	2.1	2.6	2.7	B	B	A	NO	NO	NO
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	13.3	20.2	19.7	B	C	B	14.1	21.9	21.3	0.8	1.7	1.6	B	C	C	NO	NO	NO
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	21.4	53.3	19.6	C	D	B	21.5	53.6	19.7	0.1	0.3	0.1	C	D	B	NO	NO	NO
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	15.3	22.9	25.2	B	C	C	15.5	23.2	25.6	0.2	0.3	0.4	B	C	C	NO	NO	NO
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	21.6	9.5	8.0	C	A	A	21.7	9.5	8.0	0.1	0.0	0.0	C	A	A	NO	NO	NO
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	21.2	36.0	38.4	C	D	D	21.7	38.8	40.9	0.5	2.8	2.5	C	D	D	NO	NO	NO
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	24.8	9.6	12.9	C	A	B	25.2	10.0	13.2	0.4	0.4	0.3	C	A	B	NO	NO	NO
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	15.1	11.6	13.1	B	B	B	15.1	11.9	13.5	0.0	0.3	0.4	B	B	B	NO	NO	NO

1 Deficient operation shown in **Bold**.

2 HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 TS = Traffic Signal
CSS = Cross-Street Stop

Table 5-3
Study Intersection LOS Analysis Summary
Project Opening Year Without Related Projects Without Project Conditions

	Intersection	Traffic Control[3]	Delay (Secs)[1,2]			Level of Service		
			AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	30.4	49.0	28.3	C	D	C
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	10.1	9.4	7.8	B	A	A
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.9	6.8	7.5	A	A	A
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	11.1	24.5	15.5	B	C	C
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	28.9	51.6	42.4	C	D	D
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	54.4	73.7	**90.4**	D	E	**F**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	22.0	35.1	31.6	C	D	C
8.	Haven Avenue (NS) / Concours Street (EW)	TS	14.9	13.5	12.2	B	B	B
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	8.0	7.8	4.4	A	A	A
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	13.5	20.8	20.2	B	C	C
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	22.4	58.6	20.4	C	E	C
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	15.6	23.9	26.6	B	C	C
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	23.3	10.0	8.3	C	A	A
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	22.0	38.3	41.2	C	D	D
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	27.4	10.2	13.7	C	B	B
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	15.9	12.1	13.8	B	B	B

[1] Deficient operation shown in **Bold**.

[2] HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst

[3] TS = Traffic Signal

CSS = Cross-Street Stop

Table 5-4
Study Intersection LOS Analysis Summary
Project Opening Year Without Related Projects With Project Conditions

	Intersection	Traffic Control[3]	Project Opening Year Without Related Projects Without Project Conditions						Project Opening Year Without Related Projects With Project Conditions											
			Delay (Secs)[1,2]			Level of Service			Delay (Secs)[1,2]			Increase in Delay			Level of Service			Requires Improvement?[1]		
			AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	30.4	49.0	28.3	C	D	C	31.4	51.8	30.6	1.0	2.8	2.3	C	D	C	NO	NO	NO
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	10.1	9.4	7.8	B	A	A	11.3	10.1	9.4	1.2	0.7	1.6	B	B	A	NO	NO	NO
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.9	6.8	7.5	A	A	A	8.3	8.0	8.3	0.4	1.2	0.8	A	A	A	NO	NO	NO
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	11.1	24.5	15.5	B	C	C	11.4	28.3	16.8	0.3	3.8	1.3	B	D	C	NO	NO	NO
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	28.9	51.6	42.4	C	D	D	29.2	53.6	44.2	0.3	2.0	1.8	C	D	D	NO	NO	NO
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	54.4	73.7	**90.4**	D	E	**F**	55.3	74.6	**90.8**	0.9	0.9	**0.4**	E	E	**F**	NO	NO	**YES**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	22.0	35.1	31.6	C	D	C	22.4	36.8	33.3	0.4	1.7	1.7	C	D	C	NO	NO	NO
8.	Haven Avenue (NS) / Concours Street (EW)	TS	14.9	13.5	12.2	B	B	B	14.9	13.5	12.2	0.0	0.0	0.0	B	B	B	NO	NO	NO
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	8.0	7.8	4.4	A	A	A	10.1	10.4	7.0	2.1	2.6	2.6	B	B	A	NO	NO	NO
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	13.5	20.8	20.2	B	C	C	14.2	22.7	21.8	0.7	1.9	1.6	B	C	C	NO	NO	NO
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	22.4	58.6	20.4	C	E	C	22.5	59.0	20.6	0.1	0.4	0.2	C	E	C	NO	NO	NO
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	15.6	23.9	26.6	B	C	C	15.7	24.2	27.1	0.1	0.3	0.5	B	C	C	NO	NO	NO
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	23.3	10.0	8.3	C	A	A	23.4	10.0	8.3	0.1	0.0	0.0	C	A	A	NO	NO	NO
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	22.0	38.3	41.2	C	D	D	22.6	41.5	43.8	0.6	3.2	2.6	C	D	D	NO	NO	NO
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	27.4	10.2	13.7	C	B	B	27.8	10.6	14.0	0.4	0.4	0.3	C	B	B	NO	NO	NO
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	15.9	12.1	13.8	B	B	B	15.9	12.4	14.1	0.0	0.3	0.3	B	B	B	NO	NO	NO

[1] Deficient operation shown in **Bold**.

[2] HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal
CSS = Cross-Street Stop

Table 5-5
Study Intersection LOS Analysis Summary
Project Opening Year With Related Projects Without Project Conditions

	Intersection	Traffic Control[3]	Delay (Secs)[1,2]			Level of Service		
			AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	33.3	66.6	38.9	C	E	D
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	14.8	12.7	11.7	B	B	B
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.8	6.9	7.5	A	A	A
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	12.3	30.0	18.9	B	D	C
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	33.1	62.9	54.9	C	E	D
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	67.8	**94.4**	**113.9**	E	**F**	**F**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	24.8	54.3	54.0	C	D	D
8.	Haven Avenue (NS) / Concours Street (EW)	TS	16.4	17.8	16.3	B	B	B
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	8.0	7.8	4.4	A	A	A
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	14.2	22.2	21.6	B	C	C
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	24.6	74.6	25.8	C	E	C
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	16.7	25.3	28.4	B	C	C
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	25.7	10.7	8.8	C	B	A
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	23.4	45.0	48.4	C	D	D
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	30.1	12.0	15.4	C	B	B
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	15.8	12.8	14.4	B	B	B

[1] Deficient operation shown in **Bold**.

[2] HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst

[3] TS = Traffic Signal

CSS = Cross-Street Stop

Table 5-6
Study Intersection LOS Analysis Summary
Project Opening Year With Related Projects With Project Conditions

	Intersection	Traffic Control[3]	Project Opening Year With Related Projects Without Project Conditions						Project Opening Year With Related Projects With Project Conditions											
			Delay (Secs)[1,2]			Level of Service			Delay (Secs)[1,2]			Increase in Delay			Level of Service			Requires Improvement?		
			AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	33.3	66.6	38.9	C	E	D	35.0	71.9	42.8	1.7	5.3	3.9	C	E	D	NO	NO	NO
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	14.8	12.7	11.7	B	B	B	15.0	13.3	12.2	0.2	0.6	0.5	B	B	B	NO	NO	NO
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.8	6.9	7.5	A	A	A	8.2	8.2	8.3	0.4	1.3	0.8	A	A	A	NO	NO	NO
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	12.3	30.0	18.9	B	D	C	12.8	36.0	21.1	0.5	6.0	2.2	B	E	C	NO	NO	NO
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	33.1	62.9	54.9	C	E	D	33.4	66.5	57.1	0.3	3.6	2.2	C	E	E	NO	NO	NO
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	67.8	**94.4**	**113.9**	E	**F**	**F**	68.9	**97.0**	**116.1**	1.1	**2.6**	**2.2**	E	**F**	**F**	NO	**YES**	**YES**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	24.8	54.3	54.0	C	D	D	25.1	58.4	58.8	0.3	4.1	4.8	C	E	E	NO	NO	NO
8.	Haven Avenue (NS) / Concours Street (EW)	TS	16.4	17.8	16.3	B	B	B	16.4	17.8	16.3	0.0	0.0	0.0	B	B	B	NO	NO	NO
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	8.0	7.8	4.4	A	A	A	10.1	10.5	7.1	2.1	2.7	2.7	B	B	A	NO	NO	NO
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	14.2	22.2	21.6	B	C	C	15.0	24.3	23.3	0.8	2.1	1.7	B	C	C	NO	NO	NO
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	24.6	74.6	25.8	C	E	C	24.8	75.7	25.9	0.2	1.1	0.1	C	E	C	NO	NO	NO
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	16.7	25.3	28.4	B	C	C	16.8	25.7	29.0	0.1	0.4	0.6	B	C	C	NO	NO	NO
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	25.7	10.7	8.8	C	B	A	25.8	10.7	8.8	0.1	0.0	0.0	C	B	A	NO	NO	NO
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	23.4	45.0	48.4	C	D	D	24.1	48.8	54.3	0.7	3.8	5.9	C	D	D	NO	NO	NO
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	30.1	12.0	15.4	C	B	B	30.5	12.7	15.6	0.4	0.7	0.2	C	B	B	NO	NO	NO
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	15.8	12.8	14.4	B	B	B	16.1	13.5	14.7	0.3	0.7	0.3	B	B	B	NO	NO	NO

1 Deficient operation shown in **Bold**.

2 HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 TS = Traffic Signal
CSS = Cross-Street Stop

Table 5-7
Study Intersection LOS Analysis Summary
Horizon Year (2040) Without Project Conditions

	Intersection	Traffic Control[3]	Delay (Secs)[1,2]			Level of Service		
			AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	43.1	**98.0**	43.7	D	**F**	D
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	14.8	13.6	11.8	B	B	B
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.8	7.5	7.5	A	A	A
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	12.4	**51.9**	21.1	B	**F**	C
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	43.9	**103.9**	71.0	D	**F**	E
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	**118.2**	**149.3**	**180.2**	**F**	**F**	**F**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	58.9	73.5	75.9	E	E	E
8.	Haven Avenue (NS) / Concours Street (EW)	TS	20.4	21.6	17.2	C	C	B
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	7.9	9.3	4.4	A	A	A
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	15.4	28.4	26.9	B	C	C
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	39.9	**134.7**	28.9	D	**F**	C
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	18.8	38.2	42.3	B	D	D
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	56.4	17.3	11.5	E	B	B
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	31.4	71.4	**82.2**	C	E	**F**
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	64.6	16.7	23.6	E	B	C
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	26.9	17.3	20.6	C	B	C

[1] Deficient operation shown in **Bold**.

[2] HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst

[3] TS = Traffic Signal

CSS = Cross-Street Stop

Table 5-8
Study Intersection LOS Analysis Summary
Horizon Year (2040) With Project Conditions

	Intersection	Traffic Control[3]	Horizon Year (2040) Without Project Conditions						Horizon Year (2040) With Project Conditions											
			Delay (Secs)[1,2]			Level of Service			Delay (Secs)[1,2]			Increase in Delay			Level of Service			Requires Improvement?		
			AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1.	Haven Avenue (NS) / 4th Street (EW)	TS	43.1	**98.0**	43.7	D	**F**	D	45.0	**102.3**	46.8	1.9	4.3	3.1	D	**F**	D	NO	**YES**	NO
2.	Cleveland Avenue - Via Asti (NS) / 4th Street (EW)	TS	14.8	13.6	11.8	B	B	B	15.0	14.2	12.3	0.2	0.6	0.5	B	B	B	NO	NO	NO
3.	Resort Parkway - Via Piemonte (NS) / 4th Street (EW)	TS	7.8	7.5	7.5	A	A	A	8.2	9.6	8.4	0.4	2.1	0.9	A	A	A	NO	NO	NO
4.	Project Access 3 (NS) / 4th Street (EW)	CSS	12.4	**51.9**	21.1	B	**F**	C	12.8	**73.8**	24.3	0.4	21.9	3.2	B	**F**	C	NO	**YES**	NO
5.	Milliken Avenue (NS) / 4th Street (EW)	TS	43.9	**103.9**	71.0	D	**F**	E	44.5	**109.7**	74.5	0.6	5.8	3.5	D	**F**	E	NO	**YES**	NO
6.	I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	TS	**118.2**	**149.3**	**180.2**	**F**	**F**	**F**	**119.0**	**152.9**	**184.8**	0.8	3.6	4.6	**F**	**F**	**F**	**YES**	**YES**	**YES**
7.	I-15 NB Ramps (NS) / 4th Street (EW)	TS	58.9	73.5	75.9	E	E	E	59.9	78.7	77.9	1.0	5.2	2.0	E	E	E	NO	NO	NO
8.	Haven Avenue (NS) / Concours Street (EW)	TS	20.4	21.6	17.2	C	C	B	20.5	21.7	17.3	0.1	0.1	0.1	C	C	B	NO	NO	NO
9.	Concours Street (NS) / Ontario Center Parkway (EW)	TS	7.9	9.3	4.4	A	A	A	10.2	12.6	6.8	2.3	3.3	2.4	B	B	A	NO	NO	NO
10.	Milliken Avenue (NS) / Concours Street (EW)	TS	15.4	28.4	26.9	B	C	C	16.1	31.1	28.8	0.7	2.7	1.9	B	C	C	NO	NO	NO
11.	Haven Avenue (NS) / Inland Empire Boulevard (EW)	TS	39.9	**134.7**	28.9	D	**F**	C	41.1	**136.5**	29.2	1.2	1.8	0.3	D	**F**	C	NO	**YES**	NO
12.	Milliken Avenue (NS) / Inland Empire Boulevard (EW)	TS	18.8	38.2	42.3	B	D	D	19.0	38.9	43.1	0.2	0.7	0.8	B	D	D	NO	NO	NO
13.	Haven Avenue (NS) / I-10 WB Ramps (EW)	TS	56.4	17.3	11.5	E	B	B	57.0	17.5	11.6	0.6	0.2	0.1	E	B	B	NO	NO	NO
14.	Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	TS	31.4	71.4	**82.2**	C	E	**F**	32.4	77.1	**87.3**	1.0	5.7	5.1	C	E	**F**	NO	NO	**YES**
	With Improvements	TS	- -	**- -**	**- -**	- -	**- -**	**- -**	27.0	55.6	77.3	-4.4	-15.8	-4.9	C	E	E	NO	NO	NO
15.	Haven Avenue (NS) / I-10 EB Ramps (EW)	TS	64.6	16.7	23.6	E	B	C	65.6	17.2	24.3	1.0	0.5	0.7	E	B	C	NO	NO	NO
16.	Milliken Avenue (NS) / I-10 EB Ramps (EW)	TS	26.9	17.3	20.6	C	B	C	32.3	18.4	20.9	5.4	1.1	0.3	C	B	C	NO	NO	NO

[1] Deficient operation shown in **Bold**.

[2] HCM Analysis Software: Synchro, Version 10.0. Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with traffic signal or all-way stop control. For intersections with cross-street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal
CSS = Cross-Street Stop

6.0 CEQA Vehicle Miles Traveled (VMT) Analysis

In response to Senate Bill (SB) 743, the California Natural Resource Agency certified and adopted new CEQA Guidelines in December 2018 which now identify Vehicle Miles Traveled (VMT) as the most appropriate metric to evaluate a project's transportation impact under CEQA (§ 15064.3).

Effective July 1, 2020, the previous CEQA metric of LOS, typically measured in terms of automobile delay, roadway capacity and congestion, generally will no longer constitute a significant environmental impact.

The City of Ontario has adopted guidelines to provide recommendations in the form of and methodology and thresholds of significance for identifying VMT related impacts. The proposed project is subject to a VMT analysis and will adhere to the recommendations and practices described in the *City of Ontario Planning Commission Resolution No. PC20-021 (May 26, 2020).*

Based on the analysis methodology described in the City of Ontario's adopted Planning Commission Resolution regarding VMT, project screening procedures have been implemented to identify projects that may be presumed to have a less than significant impact absent substantial evidence to the contrary and will be exempted from further project-level VMT assessment.

According to the City's guidelines, land use projects located within a Transit Priority Area (TPA) and that have the following characteristics are presumed to have a less than significant impact absent substantial evidence to the contrary:

- Has a Floor Area Ratio of 0.75 or higher;
- Includes no more parking for residents, customers, or employees than the City Development Code mandates;
- Is consistent with the Sustainable Communities Strategy (SCS) as determined by the City with input from the Southern California Association of Governments (SCAG) or San Bernardino County Transportation Authority (SBCTA); and

- If there are existing affordable residential units, replaces those residential units with at least as many similarly affordable units and not with a smaller number of moderate or high-income residential units.

Based on the project site plan, the proposed project encompasses the following Assessor Parcel Numbers:

LOT	Assessor Parcel Number (APN)
LOT A & B	APN 021020501
LOT C	APN 021020438
LOT D	APN 021020439
LOT F	APN 021020412-15
LOT G	APN 021020420-25

Hence, the VMT analysis examined in this study focuses on the land use components from Lot A, Lot B, Lot C, and Lot D.

After utilizing the SBCTA VMT Screening Tool, all project parcels *with the exception of a portion of Parcel F* of the proposed project are located within a Transit Priority Area as shown in Exhibit 6-1 and are presumed to maintain the aforementioned characteristics.

The portion of Parcel F which is not within the TPA is not planned to consist of any trip-generating land uses as those portions of the site will only be used to relocate some of the existing parking capacity on the project site. Hence, those non-TPA areas are not subject to VMT analysis.

Additionally, the proposed project is expected to implement the following design features identified in the *Toyota Arena Mixed-Use Development Air Quality and Greenhouse Gas Impact Study, City of Ontario, California, June 4th, 2021.* The following project design features are trip reduction measures to reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking:

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.)

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-own signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

It should be also noted that the SBCTA VMT Screening Tool additionally generates various project VMT metrics per traffic analysis zone (TAZ) such as:

- Productions and Attractions (PA) VMT Per Population
    - Residential VMT;
- PA VMT Per Worker; and
- PA VMT Per Service Population
    - Residential VMT, Worker VMT, and Customer VMT

Based on the outputted VMT metrics for the project TAZ, it appears that the project's PA VMT Per Population and PA VMT Per Worker is lower than the jurisdictional average. However, when accounting for the Customer VMT in the PA Per Service Population VMT, the project TAZ's VMT is greater than the jurisdictional average. As a result, *the project is in not within a low VMT generating area*.

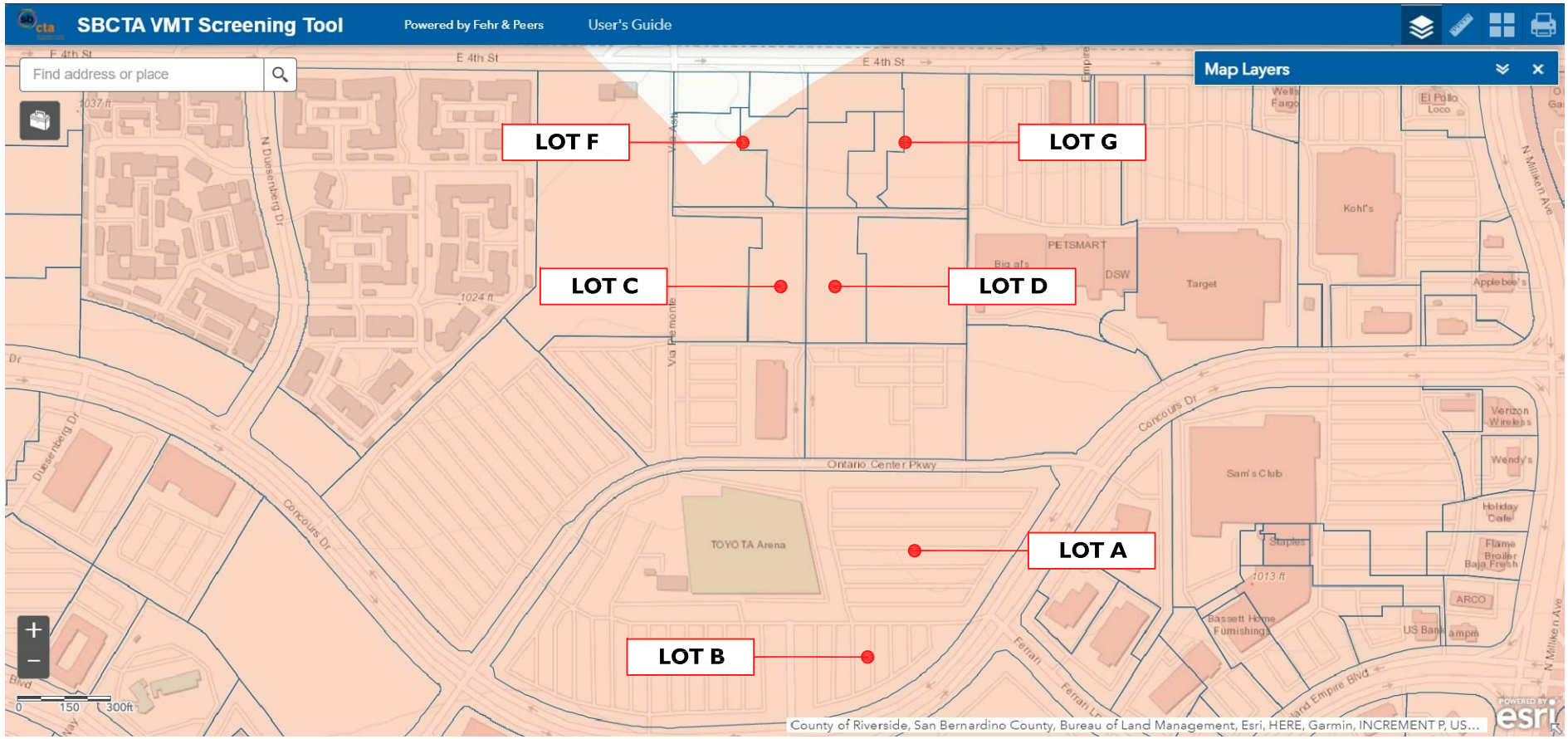
However, it is still noteworthy that the PA VMT Per Population and PA VMT Per Worker is lower than the jurisdiction average VMT.

SBCTA VMT Screening Tool output is shown in Exhibit 6-2.

In summary, the proposed project is found to have a less than significant VMT impact.

Exhibit 6-1

Transit Priority Area



Legend:

= Transit Priority Area

N

SBCTA VMT Screening Tool Output

PA VMT Per Population

Output Parcels | Selected Project Area | Low VMT Generating TAZs | San Bernardino Parcels (Zoom in to view) | City Boundaries | San Bernardino County Boundary | Transit Priority Area

Options | Filter by map extent | Zoom to | Clear selection | Refresh

OBJECTID	Assessor Parcel Number (APN)	Traffic Analysis Zone (TAZ)	Community Region	Inside a Transit Priority Area (TPA)	TAZ VMT	Jurisdiction VMT	% Difference	VMT Metric	Threshold	Community Regions have different thresholds (1=Yes, 0=No)	Note	Shape_Length	Shape_Area
1	021020438	53,690,101.00	Ontario	Yes	7.90	14.00	-44.0%	PA VMT Per Population	14.00	0	Screening results are based on location of parcel centroids. If results are desired considering the full parcel, please refer to the associated map layers to visually review parcel and TAZ boundary relationship.	665.02	11,374.10

PA VMT Per Worker

Output Parcels | Selected Project Area | Low VMT Generating TAZs | San Bernardino Parcels (Zoom in to view) | City Boundaries | San Bernardino County Boundary | Transit Priority Area

Options | Filter by map extent | Zoom to | Clear selection | Refresh

OBJECTID	Assessor Parcel Number (APN)	Traffic Analysis Zone (TAZ)	Community Region	Inside a Transit Priority Area (TPA)	TAZ VMT	Jurisdiction VMT	% Difference	VMT Metric	Threshold	Community Regions have different thresholds (1=Yes, 0=No)	Note	Shape_Length	Shape_Area
1	021020438	53,690,101.00	Ontario	Yes	16.50	17.40	-5.28%	PA VMT Per Worker	17.40	0	Screening results are based on location of parcel centroids. If results are desired considering the full parcel, please refer to the associated map layers to visually review parcel and TAZ boundary relationship.	665.02	11,374.10

PA VMT Per Service Population

Output Parcels | Selected Project Area | Low VMT Generating TAZs | TAZ Boundaries (Zoom in to view) | San Bernardino Parcels (Zoom in to view) | City Boundaries | San Bernardino County Boundary | Transit Priority Area

Options | Filter by map extent | Zoom to | Clear selection | Refresh

OBJECTID	Assessor Parcel Number (APN)	Traffic Analysis Zone (TAZ)	Community Region	Inside a Transit Priority Area (TPA)	TAZ VMT	Jurisdiction VMT	% Difference	VMT Metric	Threshold	Community Regions have different thresholds (1=Yes, 0=No)	Note	Shape_Length	Shape_Area
1	021020438	53,690,101.00	Ontario	Yes	36.20	26.10	38.3%	PA VMT Per Service Population	26.10	0	Screening results are based on location of parcel centroids. If results are desired considering the full parcel, please refer to the associated map layers to visually review parcel and TAZ boundary relationship.	665.02	11,374.10

7.0 Findings & Conclusions

7.1 Purpose of Report, Study Objectives & Proposed Project

The purpose of this traffic study is to assess the impacts of the proposed Toyota Arena Mixed-Use Development (hereinafter referred to as project) from a traffic and circulation stand point.

This study has been conducted in accordance with the guidelines detailed in *The Ontario General Plan Update Transportation Technical Report (March 19, 2009)* and recommendations and practices described in the *City of Ontario Planning Commission Resolution No. PC20-021 (May 26, 2020).*

The study has been prepared in accordance with the scope of work discussed and approved by City staff prior to initiating the analysis.

The proposed project is located adjacent to the Toyota Arena, north of Concours Street and south of 4th Street, in the City of Ontario.

The land uses surrounding the site include residential uses to the north, commercial uses to the south and west, and commercial and retail uses to the east at the Ontario Mills Shopping Center. The proposed project consists of the construction and operation of a mixed-use town center development with residential and commercial/retail land uses. The following is a breakdown of the project's development plan:

Proposed Development Plan

Lot	Dwelling Units (DU)	Retail (SF)	Parking Spaces
A	359	25,256	477*
B	98	20,802	130*
C	107	11,047	142*
D	127	14,095	170*
F & G	- -	- -	1,170
Total	**691**	**71,200**	**2,089**

* Parking structure

Main access for the project is planned via the following:

- One (1) signalized intersection at Cleveland Avenue – Via Asti / 4th Street;
- One (1) signalized intersection at Resort Parkway – Via Piemonte / 4th Street;
- One (1) right-in/right-out access driveway along 4th Street; and

The project is planned to open in 2023 and will be evaluated in one single phase.

7.2 Project Trip Generation:

Based on the ITE trip generation rates:

- The proposed project is forecast to generate approximately 6,447 weekday daily trips which include approximately 315 weekday AM peak hour trips, approximately 575 weekday PM peak hour trips.
- The proposed project is forecast to generate approximately 6,677 Saturday daily trips which include approximately 624 Saturday peak hour trips.

After accounting for internal trip capture and applicable ITE pass-by trips rates:

- The proposed project is forecast to generate approximately 5,691 weekday daily trips which include approximately 300 weekday AM peak hour trips, approximately 458 weekday PM peak hour trips.
- The proposed project is forecast to generate approximately 5,813 Saturday daily trips which include approximately 490 Saturday peak hour trips.

7.3.1 Level of Service Analysis Summary – ***Existing Conditions*:**

The study intersections are all currently operating at an acceptable LOS (LOS E or better) during the peak hours for Existing Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (82.4 secs)

7.3.2 Level of Service Analysis Summary – ***Existing Plus Project Conditions:***

The study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Existing Plus Project Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (82.7 secs)

Based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Existing Plus Project Conditions:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

After review of the existing roadway conditions at this intersection, no feasible intersection improvements can be identified for this study intersection to achieve acceptable level of service (LOS E or better) for Existing Plus Project Conditions.

7.3.3 Level of Service Analysis Summary – ***Opening Year Without Related Projects Without Project Conditions***:

The study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year Without Related Projects Without Project Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (90.4 secs)

7.3.4 Level of Service Analysis Summary – ***Opening Year Without Related Projects With Project Conditions***:

The study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year Without Related Projects With Project Conditions with exception of the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - SAT Peak Hour – LOS F (90.8 secs)

Based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Opening Year Without Related Projects With Project Conditions:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

After review of the existing roadway conditions at this intersection, no feasible intersection improvements can be identified for this study intersection to achieve acceptable level of service (LOS E or better) for Opening Year Without Related Projects With Project Conditions.

7.3.5 Level of Service Analysis Summary – ***Opening Year With Related Projects Without Project Conditions***:

The study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year With Related Projects Without Project Conditions with exception to the following study intersection:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (94.4 secs)
    - SAT Peak Hour – LOS F (113.9 secs)

7.3.6 Level of Service Analysis Summary – ***Opening Year With Related Projects With Project Conditions***:

The study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Opening Year With Related Projects With Project Conditions with exception to the following study intersections:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (97.0 secs)
    - SAT Peak Hour – LOS F (116.1 secs)

Based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Opening Year With Related Projects With Project Conditions:

- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)

After review of the existing roadway conditions at this intersection, no feasible intersection improvements can be identified for this study intersection to achieve acceptable level of service (LOS E or better) for Opening Year With Related Projects With Project Conditions.

7.3.7 Level of Service Analysis Summary – ***Horizon Year (2040) Without Project Conditions***:

The study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Horizon Year (2040) Without Project Conditions with exception to the following study intersection:

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (98.0 secs)
- **Int #4:** Project Access 3 (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (51.9 secs)
- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (103.9 secs)
- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - AM Peak Hour LOS – F (118.2 secs)
    - PM Peak Hour – LOS F (149.3 secs)
    - SAT Peak Hour – LOS F (180.2 secs)
- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)
    - PM Peak Hour LOS – F (134.7 secs)
- **Int #14:** Milliken Avenue (NS) / Ontario Mills Parkway – I-10 WB Ramps (EW)
    - SAT Peak Hour – LOS F (82.2 secs)

7.3.8 Level of Service Analysis Summary – ***Horizon Year (2040) With Project Conditions***:

The study intersections are all forecast to continue to operate at an acceptable LOS (LOS E or better) during the peak hours for Horizon Year (2040) With Project Conditions with exception to the following study intersections:

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (102.3 secs)
- **Int #4** Project Access 3 (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (73.8 secs)
- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)
    - PM Peak Hour – LOS F (109.7 secs)
- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
    - AM Peak Hour LOS – F (119.0 secs)
    - PM Peak Hour – LOS F (152.9 secs)
    - SAT Peak Hour – LOS F (184.8 secs)
- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)
    - PM Peak Hour LOS – F (136.5 secs)
- **Int #14:** Milliken Avenue (NS) / Ontario Mills Parkway – I-10 WB Ramps (EW)
    - SAT Peak Hour – LOS F (87.3 secs)

Based on agency-established thresholds, the proposed project is required to contribute to improvements at the following study intersection for Horizon Year (2040) With Project Conditions:

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)
- **Int #4:** Project Access 3 (NS) / 4th Street (EW)
- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)
- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)
- **Int #14:** Milliken Avenue (NS) / Ontario Mills Parkway – I-10 WB Ramps (EW)

After review of the existing roadway conditions at these study intersections, no feasible intersection improvements can be identified for the following study intersections to achieve acceptable level of service (LOS E or better) for Horizon Year (2040) With Project Conditions.

- **Int #1:** Haven Avenue (NS) / 4th Street (EW)
- **Int #4:** Project Access 3 (NS) / 4th Street (EW)
- **Int #5:** Milliken Avenue (NS) / 4th Street (EW)
- **Int #6:** I-15 SB Ramps – Ontario Mills Drive (NS) / 4th Street (EW)
- **Int #11:** Haven Avenue (NS) / Inland Empire Boulevard (EW)

The following recommended improvements are identified to restore the intersection of *Milliken Avenue / Ontario Mills Parkway – I-10 WB Ramps* to acceptable conditions (LOS E for Horizon Year (2040) With Project Conditions:

Intersection Improvement #1

Int 14 – Milliken Avenue / Ontario Mills Parkway – I-10 WB Ramps: Make a fair-share contribution to widen the

eastbound off-ramp approach from two left turn lanes, one through lane and one right turn lane to **three** left turn lanes, one through lane, and one right turn lane. Exhibit 7-1 shows the recommended improvement.

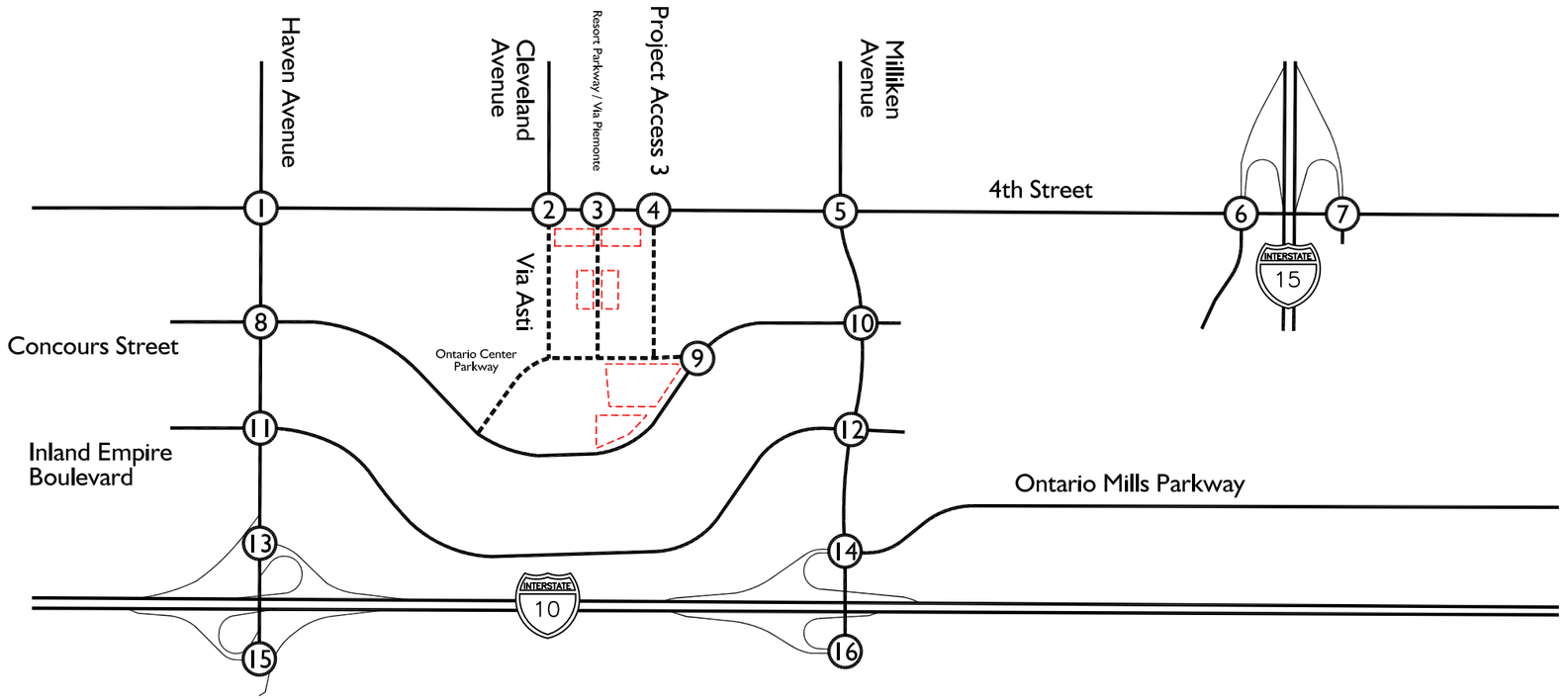
Table 7-1 shows the project's fair share traffic contribution to the deficiently-operating study intersections for Opening Year With Related Projects With Project Conditions.

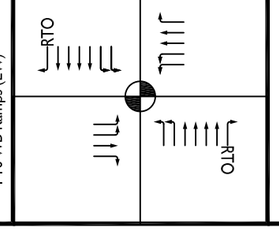
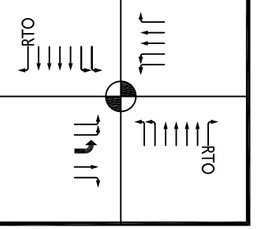
Table 7-2 shows the project's fair share traffic contribution to the deficiently-operating study intersections for Horizon Year (2040) With Project Conditions.

7.4 CEQA VMT Analysis Summary

The proposed project is found to have a less than significant VMT impact.

Recommendations



	Existing Conditions	Existing Plus Project Conditions	Opening Year With Related Projects With Project Conditions	Horizon Year (2040) With Project Condtions
(14) 14. Milliken Avenue (NS) & Ontario Mills Parkway - I-10 WB Ramps (EW)		No Improvements Needed	No Improvements Needed	

Legend:

⬅ = Lane Improvement / Lane Reconfiguration

N

Table 7-1
Project Fair-Share Contribution Summary[1]
Opening Year With Related Projects With Project Conditions Traffic

Intersection	Existing Conditions Traffic			Opening Year With Related Projects With Project Conditions Traffic			Growth in Traffic			Project Traffic			Project Fair-Share		
	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
6. I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	3,526	5,357	5,889	4,177	6,356	7,004	651	999	1,115	75	115	123	11.52%	11.51%	11.03%

[1] Project Fair-Share Contribution represents the project's traffic contribution at each impacted study area intersection as a percentage of the overall growth in traffic for Horizon Year (2040) With Project ConditionsThis table is for informational purposes only and is not tied to any mitigation.

Table 7-2
Project Fair-Share Contribution Summary[1]
Horizon Year (2040) With Project Conditions

Intersection	Existing Conditions Traffic			Horizon Year (2040) With Project Conditions Traffic			Growth in Traffic			Project Traffic			Project Fair-Share		
	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1. Haven Avenue (NS) / 4th Street (EW)	4,807	5,788	4,513	7,083	8,566	6,723	2,276	2,778	2,210	80	134	148	3.51%	4.82%	6.70%
4. Project Access 3 (NS) / 4th Street (EW)	1,199	2,901	2,094	1,807	4,336	3,169	608	1,435	1,075	60	110	118	9.87%	7.67%	10.98%
5. Milliken Avenue (NS) / 4th Street (EW)	4,850	6,586	5,510	7,170	9,785	8,235	2,320	3,199	2,725	105	191	208	4.53%	5.97%	7.63%
6. I-15 SB Ramps - Ontario Mills Drive (NS) / 4th Street (EW)	3,526	5,357	5,889	5,212	7,919	8,702	1,686	2,562	2,813	75	115	123	4.45%	4.49%	4.37%
11. Haven Avenue (NS) / Inland Empire Boulevard (EW)	5,093	6,430	4,672	7,464	9,436	6,879	2,371	3,006	2,207	45	69	73	1.90%	2.30%	3.31%
14. Milliken Avenue (NS) / Ontario Mills Parkway - I-10 WB Ramps (EW)	3,389	5,211	5,568	5,042	7,751	8,282	1,653	2,540	2,714	105	160	171	6.35%	6.30%	6.30%

[1] Project Fair-Share Contribution represents the project's traffic contribution at each impacted study area intersection as a percentage of the overall growth in traffic for Horizon Year (2040) With Project ConditionsThis table is for informational purposes only and is not tied to any mitigation.

Appendices

Appendix A

Traffic Count Data

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Ontario
N/S: Haven Avenue
E/W: Fourth Street
Weather: Clear

File Name : ONTHA4TAM
Site Code : 04216488
Start Date : 9/13/2016
Page No : 1

Groups Printed- Total Volume

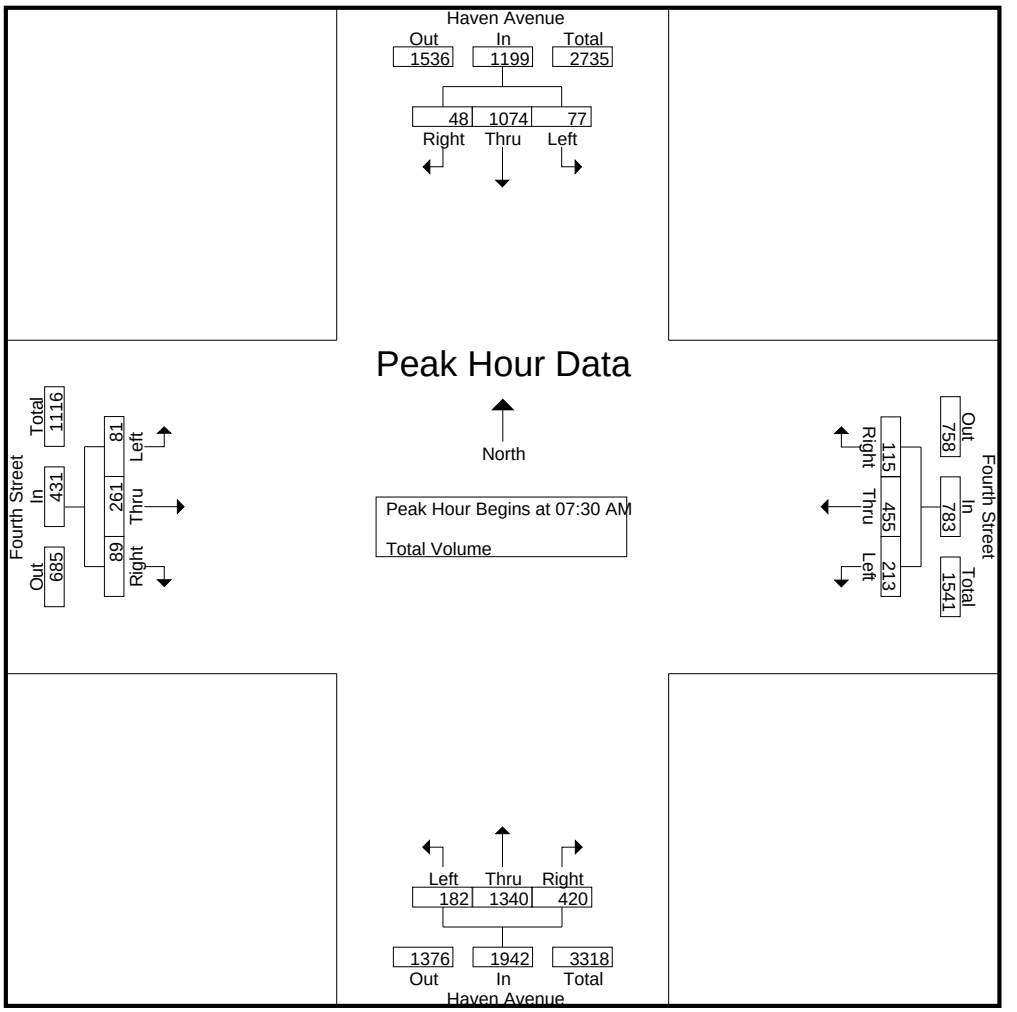
	Haven Avenue Southbound				Fourth Street Westbound				Haven Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	8	225	9	242	40	88	19	147	32	232	80	344	8	32	35	75	808
07:15 AM	20	237	12	269	45	81	33	159	33	321	84	438	13	36	17	66	932
07:30 AM	19	287	12	318	68	107	40	215	32	298	95	425	14	59	20	93	1051
07:45 AM	23	285	15	323	49	123	25	197	56	361	138	555	19	84	23	126	1201
Total	70	1034	48	1152	202	399	117	718	153	1212	397	1762	54	211	95	360	3992
08:00 AM	21	248	12	281	45	107	30	182	47	365	101	513	24	69	24	117	1093
08:15 AM	14	254	9	277	51	118	20	189	47	316	86	449	24	49	22	95	1010
08:30 AM	20	245	10	275	48	97	22	167	49	315	61	425	11	43	22	76	943
08:45 AM	23	230	13	266	25	74	28	127	41	344	76	461	13	62	26	101	955
Total	78	977	44	1099	169	396	100	665	184	1340	324	1848	72	223	94	389	4001
Grand Total	148	2011	92	2251	371	795	217	1383	337	2552	721	3610	126	434	189	749	7993
Apprch %	6.6	89.3	4.1		26.8	57.5	15.7		9.3	70.7	20		16.8	57.9	25.2		
Total %	1.9	25.2	1.2	28.2	4.6	9.9	2.7	17.3	4.2	31.9	9	45.2	1.6	5.4	2.4	9.4	

	Haven Avenue Southbound				Fourth Street Westbound				Haven Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	19	**287**	12	318	**68**	107	**40**	**215**	32	298	95	425	14	59	20	93	1051
07:45 AM	**23**	285	**15**	**323**	49	**123**	25	197	**56**	361	**138**	**555**	19	**84**	23	**126**	**1201**
08:00 AM	21	248	12	281	45	107	30	182	47	**365**	101	513	**24**	69	**24**	117	1093
08:15 AM	14	254	9	277	51	118	20	189	47	316	86	449	24	49	22	95	1010
Total Volume	77	1074	48	1199	213	455	115	783	182	1340	420	1942	81	261	89	431	4355
% App. Total	6.4	89.6	4		27.2	58.1	14.7		9.4	69	21.6		18.8	60.6	20.6		
PHF	.837	.936	.800	.928	.783	.925	.719	.910	.813	.918	.761	.875	.844	.777	.927	.855	.907

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Ontario
N/S: Haven Avenue
E/W: Fourth Street
Weather: Clear

File Name : ONTHA4TAM
Site Code : 04216488
Start Date : 9/13/2016
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	19	**287**	12	318	**68**	107	**40**	**215**	32	298	95	425	14	59	20	93
+15 mins.	**23**	285	**15**	**323**	49	**123**	25	197	**56**	361	**138**	**555**	19	**84**	23	**126**
+30 mins.	21	248	12	281	45	107	30	182	47	**365**	101	513	**24**	69	**24**	117
+45 mins.	14	254	9	277	51	118	20	189	47	316	86	449	24	49	22	95
Total Volume	77	1074	48	1199	213	455	115	783	182	1340	420	1942	81	261	89	431
% App. Total	6.4	89.6	4		27.2	58.1	14.7		9.4	69	21.6		18.8	60.6	20.6	
PHF	.837	.936	.800	.928	.783	.925	.719	.910	.813	.918	.761	.875	.844	.777	.927	.855

Counts Unlimited
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Ontario
N/S: Haven Avenue
E/W: Fourth Street
Weather: Clear

File Name : ONTHA4TPM
Site Code : 04216488
Start Date : 9/13/2016
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				Fourth Street Westbound				Haven Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	32	324	69	425	14	139	28	181	46	338	28	412	83	121	40	244	1262
04:15 PM	32	343	66	441	13	110	21	144	50	302	22	374	83	126	41	250	1209
04:30 PM	32	355	64	451	24	126	19	169	51	300	39	390	65	110	40	215	1225
04:45 PM	23	310	60	393	35	106	26	167	45	318	28	391	80	126	45	251	1202
Total	119	1332	259	1710	86	481	94	661	192	1258	117	1567	311	483	166	960	4898
05:00 PM	39	345	97	481	26	148	23	197	62	341	46	449	73	174	45	292	1419
05:15 PM	35	325	83	443	22	126	19	167	57	342	42	441	77	150	53	280	1331
05:30 PM	30	299	82	411	24	132	21	177	55	329	39	423	87	148	45	280	1291
05:45 PM	28	309	64	401	21	118	9	148	40	313	43	396	65	135	38	238	1183
Total	132	1278	326	1736	93	524	72	689	214	1325	170	1709	302	607	181	1090	5224
Grand Total	251	2610	585	3446	179	1005	166	1350	406	2583	287	3276	613	1090	347	2050	10122
Apprch %	7.3	75.7	17		13.3	74.4	12.3		12.4	78.8	8.8		29.9	53.2	16.9		
Total %	2.5	25.8	5.8	34	1.8	9.9	1.6	13.3	4	25.5	2.8	32.4	6.1	10.8	3.4	20.3	

	Haven Avenue Southbound				Fourth Street Westbound				Haven Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	23	310	60	393	**35**	106	**26**	167	45	318	28	391	80	126	45	251	1202
05:00 PM	**39**	**345**	**97**	**481**	26	**148**	23	**197**	**62**	341	**46**	**449**	73	**174**	45	**292**	**1419**
05:15 PM	35	325	83	443	22	126	19	167	57	**342**	42	441	77	150	**53**	280	1331
05:30 PM	30	299	82	411	24	132	21	177	55	329	39	423	**87**	148	45	280	1291
Total Volume	127	1279	322	1728	107	512	89	708	219	1330	155	1704	317	598	188	1103	5243
% App. Total	7.3	74	18.6		15.1	72.3	12.6		12.9	78.1	9.1		28.7	54.2	17		
PHF	.814	.927	.830	.898	.764	.865	.856	.898	.883	.972	.842	.949	.911	.859	.887	.944	.924

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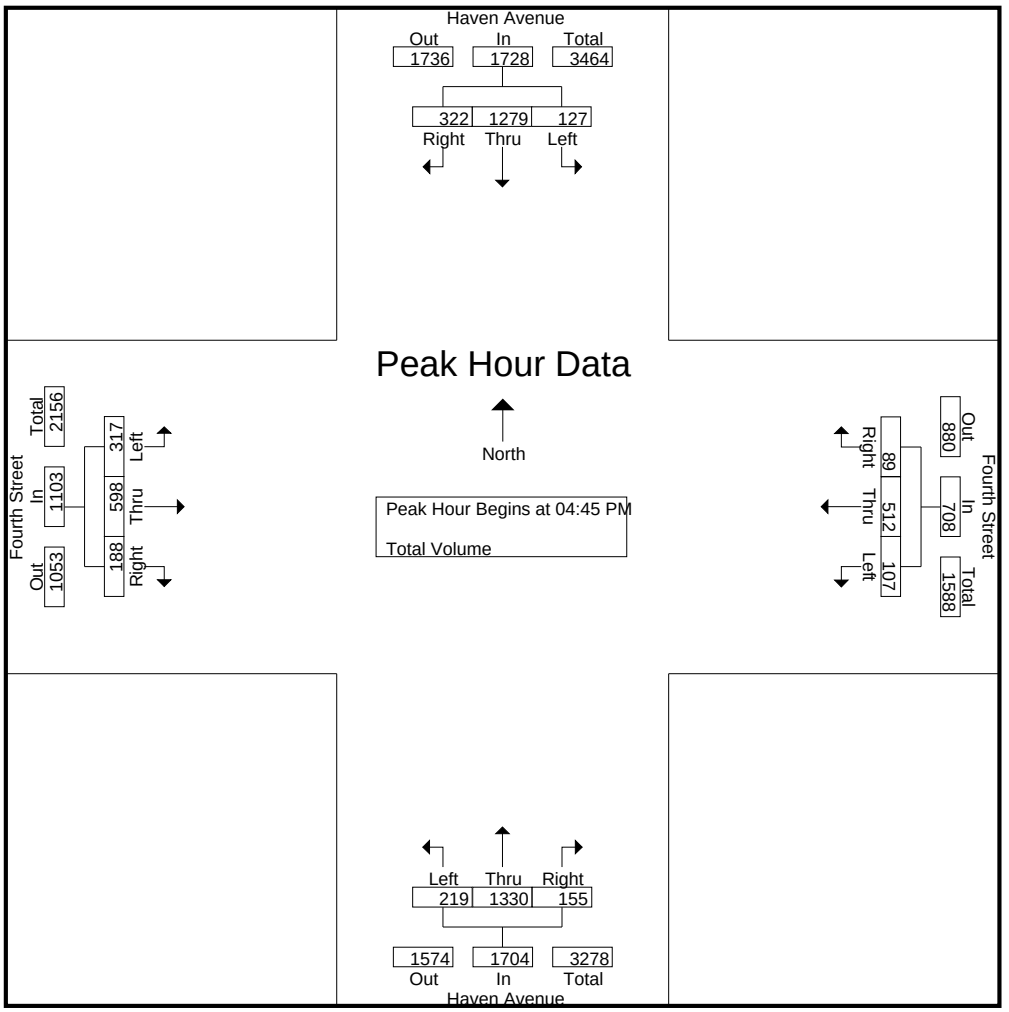
City of Ontario
N/S: Haven Avenue
E/W: Fourth Street
Weather: Clear

File Name : ONTHA4TPM
Site Code : 04216488
Start Date : 9/13/2016
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				05:00 PM				04:45 PM			
+0 mins.	32	**355**	64	451	**35**	106	**26**	167	**62**	341	**46**	**449**	80	126	45	251
+15 mins.	23	310	60	393	26	**148**	23	**197**	57	**342**	42	441	73	**174**	45	**292**
+30 mins.	**39**	345	**97**	**481**	22	126	19	167	55	329	39	423	77	150	**53**	280
+45 mins.	35	325	83	443	24	132	21	177	40	313	43	396	**87**	148	45	280
Total Volume	129	1335	304	1768	107	512	89	708	214	1325	170	1709	317	598	188	1103
% App. Total	7.3	75.5	17.2		15.1	72.3	12.6		12.5	77.5	9.9		28.7	54.2	17	
PHF	.827	.940	.784	.919	.764	.865	.856	.898	.863	.969	.924	.952	.911	.859	.887	.944

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City of Ontario
N/S: Cleveland Avenue / Via Asti
E/W: 4th Street
Weather: Clear

File Name : 02_ONT_Cleveland_4th_AM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 1

Groups Printed- Total Volume

	Cleveland Avenue Southbound				4th Street Westbound				Via Asti Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	0	2	3	0	98	8	106	0	0	0	0	5	66	2	73	182
07:15 AM	1	0	0	1	0	108	8	116	0	0	0	0	4	67	2	73	190
07:30 AM	0	0	0	0	1	122	9	132	2	1	0	3	11	78	5	94	229
07:45 AM	0	0	0	0	0	136	11	147	0	0	0	0	8	100	3	111	258
Total	2	0	2	4	1	464	36	501	2	1	0	3	28	311	12	351	859
08:00 AM	0	0	2	2	0	110	8	118	0	0	0	0	3	74	3	80	200
08:15 AM	0	0	0	0	0	116	12	128	0	0	1	1	5	99	4	108	237
08:30 AM	2	0	2	4	0	106	5	111	2	0	1	3	2	96	2	100	218
08:45 AM	4	0	0	4	0	114	4	118	1	0	1	2	7	97	3	107	231
Total	6	0	4	10	0	446	29	475	3	0	3	6	17	366	12	395	886
Grand Total	8	0	6	14	1	910	65	976	5	1	3	9	45	677	24	746	1745
Apprch %	57.1	0	42.9		0.1	93.2	6.7		55.6	11.1	33.3		6	90.8	3.2		
Total %	0.5	0	0.3	0.8	0.1	52.1	3.7	55.9	0.3	0.1	0.2	0.5	2.6	38.8	1.4	42.8	

	Cleveland Avenue Southbound				4th Street Westbound				Via Asti Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	**1**	122	9	132	**2**	**1**	0	**3**	**11**	78	**5**	94	229
07:45 AM	0	0	0	0	0	**136**	11	**147**	0	0	0	0	8	**100**	3	**111**	**258**
08:00 AM	0	0	**2**	**2**	0	110	8	118	0	0	0	0	3	74	3	80	200
08:15 AM	0	0	0	0	0	116	**12**	128	0	0	**1**	1	5	99	4	108	237
Total Volume	0	0	2	2	1	484	40	525	2	1	1	4	27	351	15	393	924
% App. Total	0	0	100		0.2	92.2	7.6		50	25	25		6.9	89.3	3.8		
PHF	.000	.000	.250	.250	.250	.890	.833	.893	.250	.250	.250	.333	.614	.878	.750	.885	.895

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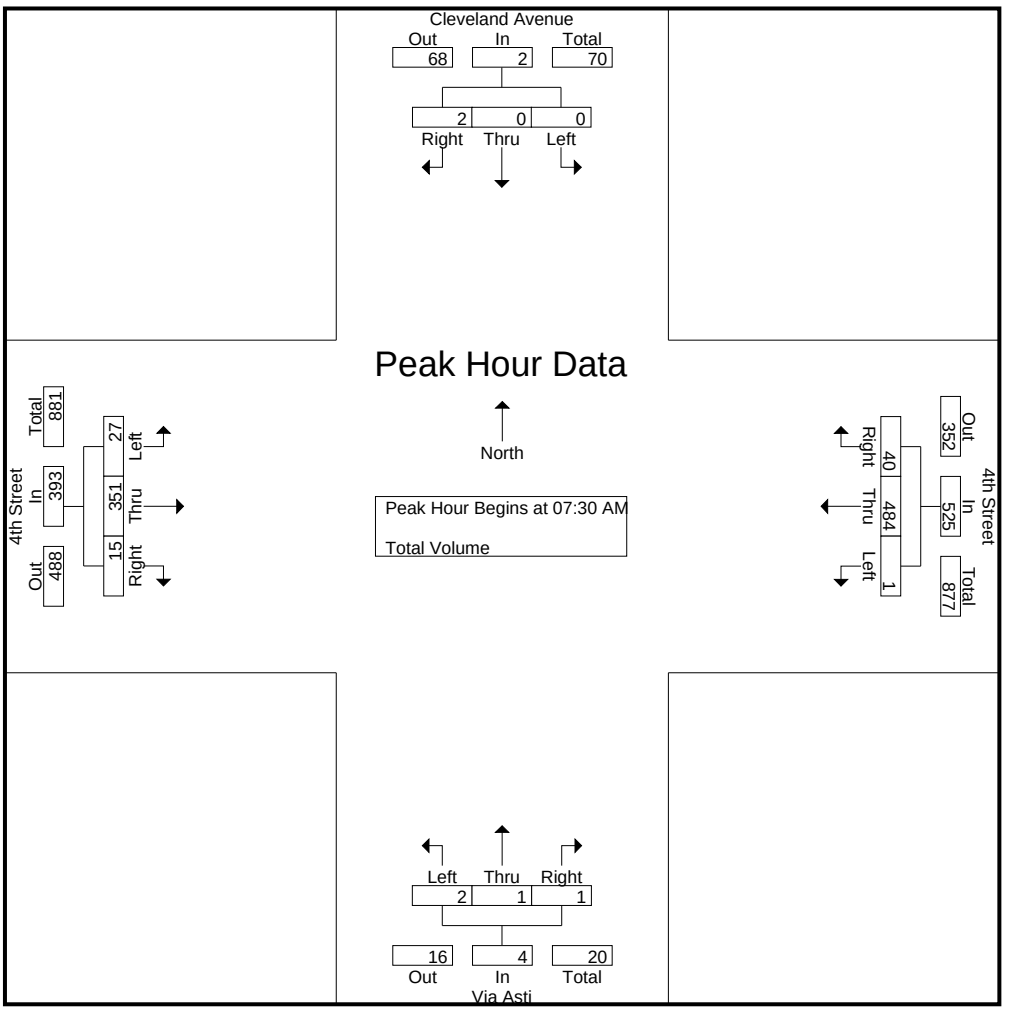
City of Ontario
N/S: Cleveland Avenue / Via Asti
E/W: 4th Street
Weather: Clear

File Name : 02_ONT_Cleveland_4th_AM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:30 AM				08:00 AM				07:45 AM			
+0 mins.	0	0	**2**	2	**1**	122	9	132	0	0	0	0	**8**	**100**	3	**111**
+15 mins.	0	0	0	0	0	**136**	11	**147**	0	0	**1**	1	3	74	3	80
+30 mins.	2	0	2	**4**	0	110	8	118	**2**	0	1	**3**	5	99	**4**	108
+45 mins.	**4**	0	0	4	0	116	**12**	128	1	0	1	2	2	96	2	100
Total Volume	6	0	4	10	1	484	40	525	3	0	3	6	18	369	12	399
% App. Total	60	0	40		0.2	92.2	7.6		50	0	50		4.5	92.5	3	
PHF	.375	.000	.500	.625	.250	.890	.833	.893	.375	.000	.750	.500	.563	.923	.750	.899

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City of Ontario
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Weather: Clear

File Name : 02_ONT_Cleveland_4th_PM
Site Code : 10521235
Start Date : 5/27/2021

Groups Printed- Total Volume

	Cleveland Avenue Southbound				4th Street Westbound				Via Asti Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	6	1	3	10	0	199	0	199	1	0	0	1	1	276	1	278	488
04:15 PM	6	0	1	7	0	190	1	191	1	0	0	1	3	290	3	296	495
04:30 PM	10	0	2	12	1	190	1	192	2	0	3	5	1	330	1	332	541
04:45 PM	5	0	1	6	0	206	2	208	1	0	3	4	0	286	0	286	504
Total	27	1	7	35	1	785	4	790	5	0	6	11	5	1182	5	1192	2028
05:00 PM	22	0	3	25	0	192	2	194	2	0	2	4	2	326	1	329	552
05:15 PM	5	0	2	7	0	189	1	190	3	0	0	3	0	292	1	293	493
05:30 PM	1	0	1	2	0	181	2	183	2	0	2	4	0	333	0	333	522
05:45 PM	5	0	3	8	1	208	5	214	3	0	3	6	1	326	2	329	557
Total	33	0	9	42	1	770	10	781	10	0	7	17	3	1277	4	1284	2124
Grand Total	60	1	16	77	2	1555	14	1571	15	0	13	28	8	2459	9	2476	4152
Apprch %	77.9	1.3	20.8		0.1	99	0.9		53.6	0	46.4		0.3	99.3	0.4		
Total %	1.4	0	0.4	1.9	0	37.5	0.3	37.8	0.4	0	0.3	0.7	0.2	59.2	0.2	59.6	

	Cleveland Avenue Southbound				4th Street Westbound				Via Asti Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**22**	0	**3**	**25**	0	192	2	194	2	0	2	4	**2**	326	1	329	552
05:15 PM	5	0	2	7	0	189	1	190	**3**	0	0	3	0	292	1	293	493
05:30 PM	1	0	1	2	0	181	2	183	2	0	2	4	0	**333**	0	**333**	522
05:45 PM	5	0	3	8	**1**	**208**	**5**	**214**	3	0	**3**	**6**	1	326	**2**	329	**557**
Total Volume	33	0	9	42	1	770	10	781	10	0	7	17	3	1277	4	1284	2124
% App. Total	78.6	0	21.4		0.1	98.6	1.3		58.8	0	41.2		0.2	99.5	0.3		
PHF	.375	.000	.750	.420	.250	.925	.500	.912	.833	.000	.583	.708	.375	.959	.500	.964	.953

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City of Ontario
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Weather: Clear

File Name : 02_ONT_Cleveland_4th_PM
Site Code : 10521235
Start Date : 5/27/2021
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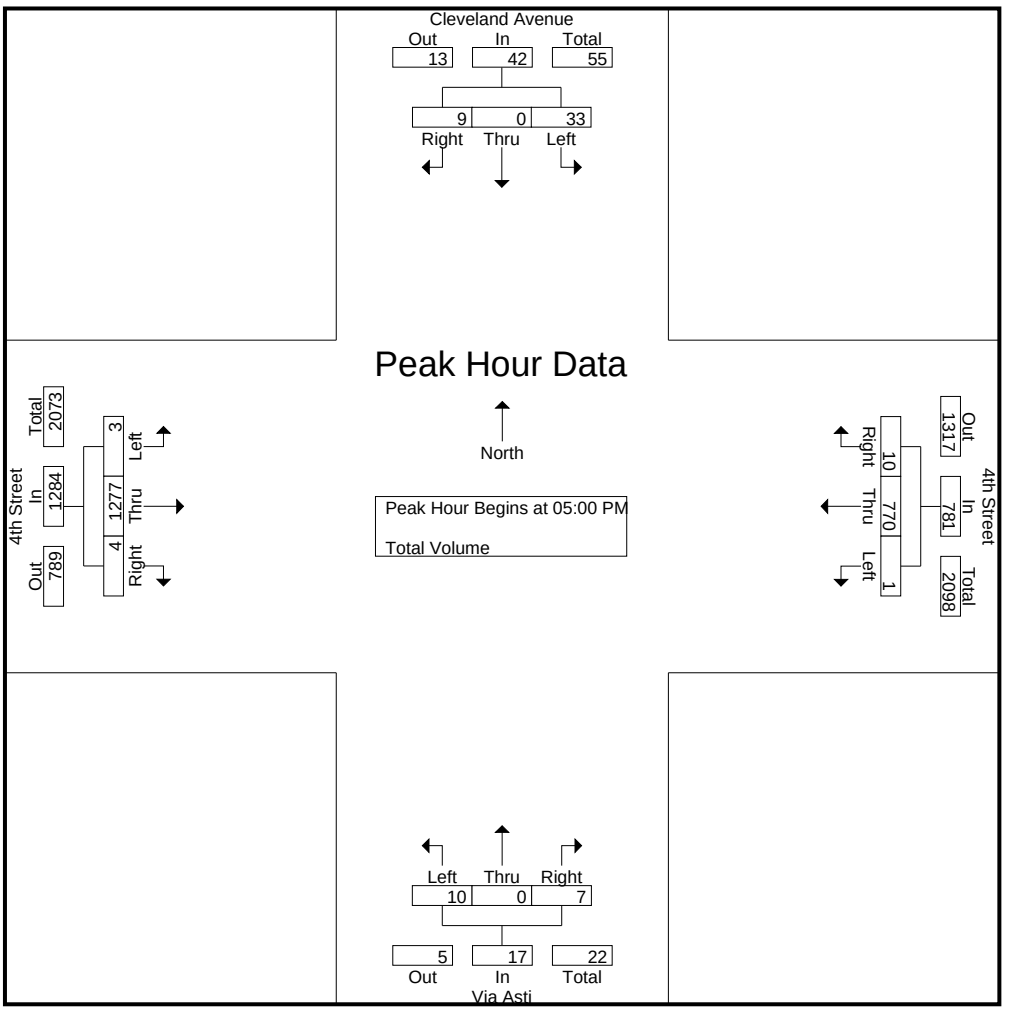

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:00 PM				05:00 PM				05:00 PM			
+0 mins.	6	0	1	7	0	199	0	199	2	0	2	4	**2**	326	1	329
+15 mins.	10	0	2	12	0	190	1	191	**3**	0	0	3	0	292	1	293
+30 mins.	5	0	1	6	**1**	190	1	192	2	0	2	4	0	**333**	0	**333**
+45 mins.	**22**	0	**3**	**25**	0	**206**	**2**	**208**	3	0	**3**	**6**	1	326	**2**	329
Total Volume	43	0	7	50	1	785	4	790	10	0	7	17	3	1277	4	1284
% App. Total	86	0	14		0.1	99.4	0.5		58.8	0	41.2		0.2	99.5	0.3	
PHF	.489	.000	.583	.500	.250	.953	.500	.950	.833	.000	.583	.708	.375	.959	.500	.964

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City of Ontario
N/S: Resort Pkwy / Via Piemonte
E/W: 4th Street
Weather: Clear

File Name : 03_ONT_Resort_4th_AM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 1

Groups Printed- Total Volume

	Resort Parkway Southbound				4th Street Westbound				Via Piemonte Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	1	5	10	1	104	10	115	0	0	2	2	5	59	3	67	194
07:15 AM	7	1	3	11	2	105	13	120	6	1	3	10	7	52	0	59	200
07:30 AM	7	0	2	9	3	133	6	142	0	0	1	1	1	81	0	82	234
07:45 AM	6	0	3	9	4	130	2	136	4	1	0	5	3	99	1	103	253
Total	24	2	13	39	10	472	31	513	10	2	6	18	16	291	4	311	881
08:00 AM	4	1	4	9	1	107	3	111	2	0	6	8	3	72	1	76	204
08:15 AM	7	1	3	11	3	128	3	134	0	1	1	2	3	96	1	100	247
08:30 AM	3	0	1	4	5	112	7	124	0	0	0	0	2	96	0	98	226
08:45 AM	7	0	1	8	5	121	5	131	0	0	0	0	1	100	3	104	243
Total	21	2	9	32	14	468	18	500	2	1	7	10	9	364	5	378	920
Grand Total	45	4	22	71	24	940	49	1013	12	3	13	28	25	655	9	689	1801
Apprch %	63.4	5.6	31		2.4	92.8	4.8		42.9	10.7	46.4		3.6	95.1	1.3		
Total %	2.5	0.2	1.2	3.9	1.3	52.2	2.7	56.2	0.7	0.2	0.7	1.6	1.4	36.4	0.5	38.3	

	Resort Parkway Southbound				4th Street Westbound				Via Piemonte Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**7**	0	2	9	3	**133**	**6**	**142**	0	0	1	1	1	81	0	82	234
07:45 AM	6	0	3	9	**4**	130	2	136	**4**	**1**	0	5	**3**	**99**	**1**	**103**	**253**
08:00 AM	4	**1**	**4**	9	1	107	3	111	2	0	**6**	**8**	3	72	1	76	204
08:15 AM	7	1	3	**11**	3	128	3	134	0	1	1	2	3	96	1	100	247
Total Volume	24	2	12	38	11	498	14	523	6	2	8	16	10	348	3	361	938
% App. Total	63.2	5.3	31.6		2.1	95.2	2.7		37.5	12.5	50		2.8	96.4	0.8		
PHF	.857	.500	.750	.864	.688	.936	.583	.921	.375	.500	.333	.500	.833	.879	.750	.876	.927

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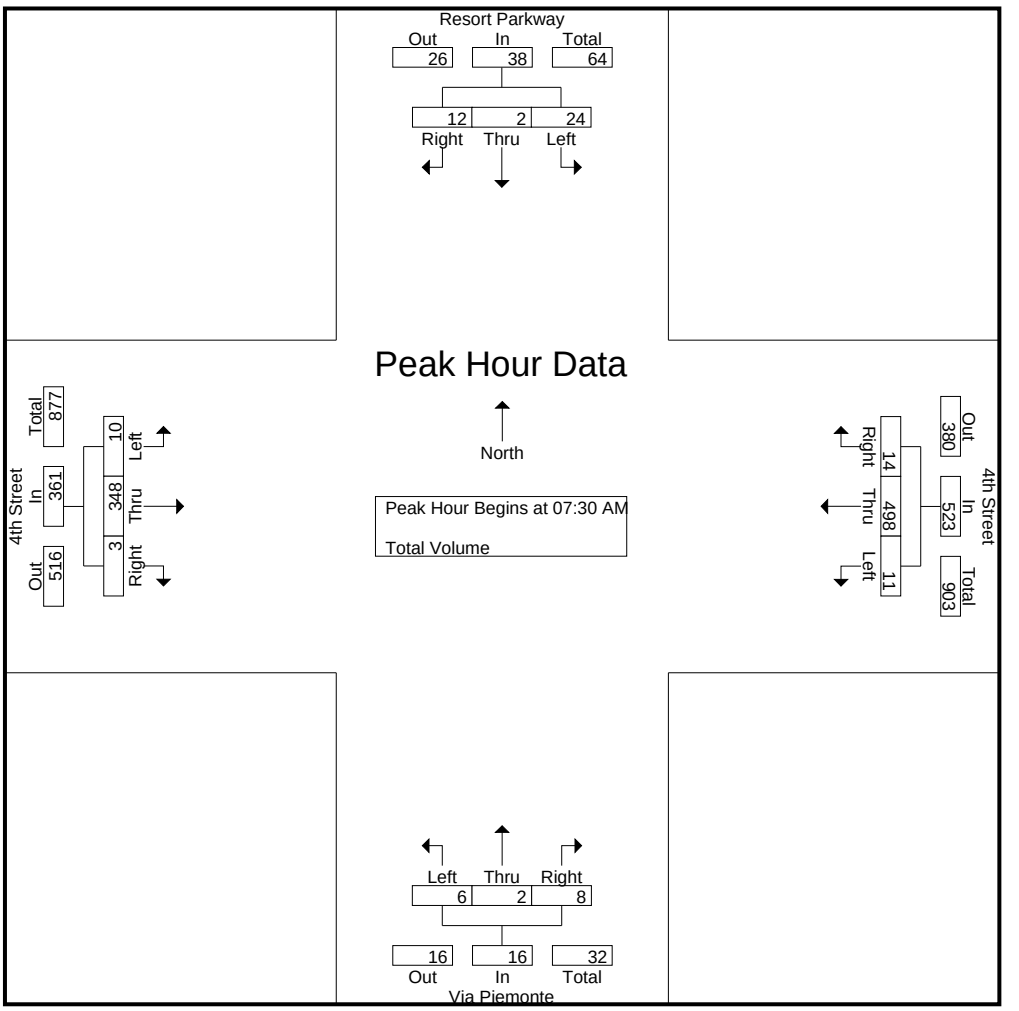
City of Ontario
N/S: Resort Pkwy / Via Piemonte
E/W: 4th Street
Weather: Clear

File Name : 03_ONT_Resort_4th_AM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				07:15 AM				08:00 AM			
+0 mins.	4	**1**	**5**	10	3	**133**	**6**	**142**	**6**	**1**	3	**10**	**3**	72	1	76
+15 mins.	**7**	1	3	**11**	**4**	130	2	136	0	0	1	1	3	96	1	100
+30 mins.	7	0	2	9	1	107	3	111	4	1	0	5	2	96	0	98
+45 mins.	6	0	3	9	3	128	3	134	2	0	**6**	8	1	**100**	**3**	**104**
Total Volume	24	2	13	39	11	498	14	523	12	2	10	24	9	364	5	378
% App. Total	61.5	5.1	33.3		2.1	95.2	2.7		50	8.3	41.7		2.4	96.3	1.3	
PHF	.857	.500	.650	.886	.688	.936	.583	.921	.500	.500	.417	.600	.750	.910	.417	.909

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City of Ontario
N/S: Resort Pkwy / Via Piemonte
E/W: 4th Street
Weather: Clear

File Name : 03_ONT_Resort_4th_PM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 1

Groups Printed- Total Volume

	Resort Parkway Southbound				4th Street Westbound				Via Piemonte Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	9	0	6	15	0	184	5	189	5	0	6	11	1	271	1	273	488
04:15 PM	5	0	0	5	1	199	8	208	0	0	3	3	4	289	1	294	510
04:30 PM	12	1	5	18	2	190	6	198	1	0	1	2	5	352	0	357	575
04:45 PM	6	0	6	12	0	203	7	210	4	0	8	12	10	287	3	300	534
Total	32	1	17	50	3	776	26	805	10	0	18	28	20	1199	5	1224	2107
05:00 PM	7	0	3	10	1	178	6	185	3	0	2	5	2	361	2	365	565
05:15 PM	8	0	4	12	1	184	9	194	1	1	1	3	2	289	0	291	500
05:30 PM	5	0	2	7	2	174	8	184	3	0	2	5	7	324	1	332	528
05:45 PM	12	0	4	16	1	204	9	214	2	0	3	5	3	335	4	342	577
Total	32	0	13	45	5	740	32	777	9	1	8	18	14	1309	7	1330	2170
Grand Total	64	1	30	95	8	1516	58	1582	19	1	26	46	34	2508	12	2554	4277
Apprch %	67.4	1.1	31.6		0.5	95.8	3.7		41.3	2.2	56.5		1.3	98.2	0.5		
Total %	1.5	0	0.7	2.2	0.2	35.4	1.4	37	0.4	0	0.6	1.1	0.8	58.6	0.3	59.7	

	Resort Parkway Southbound				4th Street Westbound				Via Piemonte Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	5	0	0	5	1	199	**8**	208	0	0	3	3	4	289	1	294	510
04:30 PM	**12**	**1**	5	**18**	**2**	190	6	198	1	0	1	2	5	352	0	357	**575**
04:45 PM	6	0	**6**	12	0	**203**	7	**210**	**4**	0	**8**	**12**	**10**	287	**3**	300	534
05:00 PM	7	0	3	10	1	178	6	185	3	0	2	5	2	**361**	2	**365**	565
Total Volume	30	1	14	45	4	770	27	801	8	0	14	22	21	1289	6	1316	2184
% App. Total	66.7	2.2	31.1		0.5	96.1	3.4		36.4	0	63.6		1.6	97.9	0.5		
PHF	.625	.250	.583	.625	.500	.948	.844	.954	.500	.000	.438	.458	.525	.893	.500	.901	.950

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City of Ontario
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E/W: 4th Street
Weather: Clear

File Name : 03_ONT_Resort_4th_PM
Site Code : 10521235
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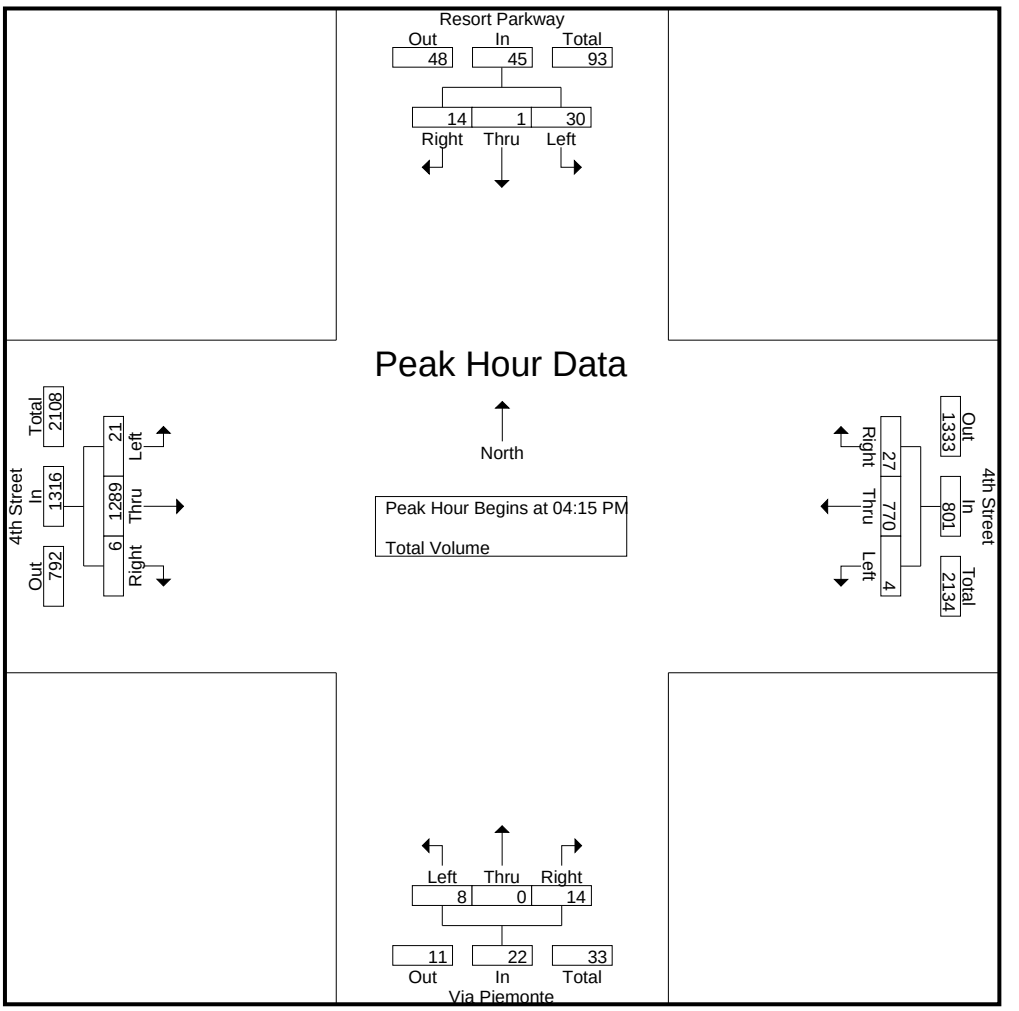

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				04:00 PM				05:00 PM			
+0 mins.	**12**	**1**	5	**18**	0	184	5	189	**5**	0	6	11	2	**361**	2	**365**
+15 mins.	6	0	**6**	12	1	199	**8**	208	0	0	3	3	2	289	0	291
+30 mins.	7	0	3	10	**2**	190	6	198	1	0	1	2	**7**	324	1	332
+45 mins.	8	0	4	12	0	**203**	7	**210**	4	0	**8**	**12**	3	335	**4**	342
Total Volume	33	1	18	52	3	776	26	805	10	0	18	28	14	1309	7	1330
% App. Total	63.5	1.9	34.6		0.4	96.4	3.2		35.7	0	64.3		1.1	98.4	0.5	
PHF	.688	.250	.750	.722	.375	.956	.813	.958	.500	.000	.563	.583	.500	.907	.438	.911

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City of Ontario
N/S: Project Access 3
E/W: 4th Street
Weather: Clear

File Name : 04_ONT_Project Access_4th_AM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 1

Groups Printed- Total Volume

	4th Street Westbound			Via Piemonte Northbound			4th Street Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	0	108	108	0	0	0	63	0	63	171
07:15 AM	0	115	115	0	0	0	65	0	65	180
07:30 AM	0	131	131	0	0	0	88	0	88	219
07:45 AM	0	135	135	0	0	0	101	5	106	241
Total	0	489	489	0	0	0	317	5	322	811
08:00 AM	0	109	109	0	0	0	83	2	85	194
08:15 AM	0	128	128	0	0	0	94	4	98	226
08:30 AM	0	121	121	0	2	2	97	4	101	224
08:45 AM	0	128	128	0	0	0	98	7	105	233
Total	0	486	486	0	2	2	372	17	389	877
Grand Total	0	975	975	0	2	2	689	22	711	1688
Apprch %	0	100		0	100		96.9	3.1		
Total %	0	57.8	57.8	0	0.1	0.1	40.8	1.3	42.1	

	4th Street Westbound			Via Piemonte Northbound			4th Street Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	**135**	**135**	0	0	0	**101**	**5**	**106**	**241**
08:00 AM	0	109	109	0	0	0	83	2	85	194
08:15 AM	0	128	128	0	0	0	94	4	98	226
08:30 AM	0	121	121	0	**2**	**2**	97	4	101	224
Total Volume	0	493	493	0	2	2	375	15	390	885
% App. Total	0	100		0	100		96.2	3.8		
PHF	.000	.913	.913	.000	.250	.250	.928	.750	.920	.918

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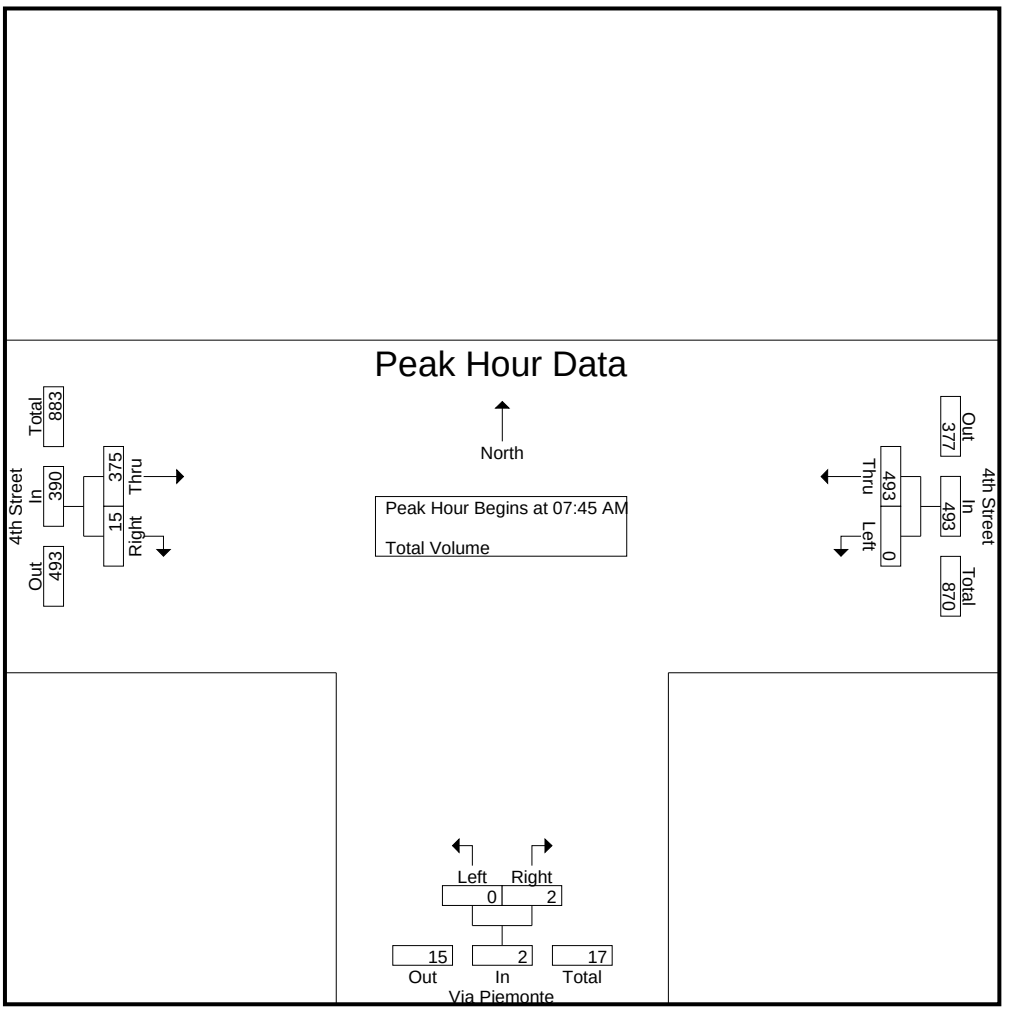
File Name : 04_ONT_Project Access_4th_AM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:45 AM			07:45 AM		
+0 mins.	0	131	131	0	0	0	**101**	**5**	**106**
+15 mins.	0	**135**	**135**	0	0	0	83	2	85
+30 mins.	0	109	109	0	0	0	94	4	98
+45 mins.	0	128	128	0	**2**	**2**	97	4	101
Total Volume	0	503	503	0	2	2	375	15	390
% App. Total	0	100		0	100		96.2	3.8	
PHF	.000	.931	.931	.000	.250	.250	.928	.750	.920

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File Name : 04_ONT_Project Access_4th_PM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 1

Groups Printed- Total Volume

	4th Street Westbound			Via Piemonte Northbound			4th Street Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	0	185	185	0	1	1	271	6	277	463
04:15 PM	0	201	201	0	7	7	283	19	302	510
04:30 PM	0	197	197	0	7	7	347	6	353	557
04:45 PM	0	203	203	0	3	3	303	8	311	517
Total	0	786	786	0	18	18	1204	39	1243	2047
05:00 PM	0	181	181	0	2	2	361	12	373	556
05:15 PM	0	190	190	0	9	9	294	16	310	509
05:30 PM	0	179	179	0	3	3	293	19	312	494
05:45 PM	0	207	207	0	3	3	331	9	340	550
Total	0	757	757	0	17	17	1279	56	1335	2109
Grand Total	0	1543	1543	0	35	35	2483	95	2578	4156
Apprch %	0	100		0	100		96.3	3.7		
Total %	0	37.1	37.1	0	0.8	0.8	59.7	2.3	62	

	4th Street Westbound			Via Piemonte Northbound			4th Street Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	0	201	201	0	**7**	**7**	283	**19**	302	510
04:30 PM	0	197	197	0	7	7	347	6	353	**557**
04:45 PM	0	**203**	**203**	0	3	3	303	8	311	517
05:00 PM	0	181	181	0	2	2	**361**	12	**373**	556
Total Volume	0	782	782	0	19	19	1294	45	1339	2140
% App. Total	0	100		0	100		96.6	3.4		
PHF	.000	.963	.963	.000	.679	.679	.896	.592	.897	.961

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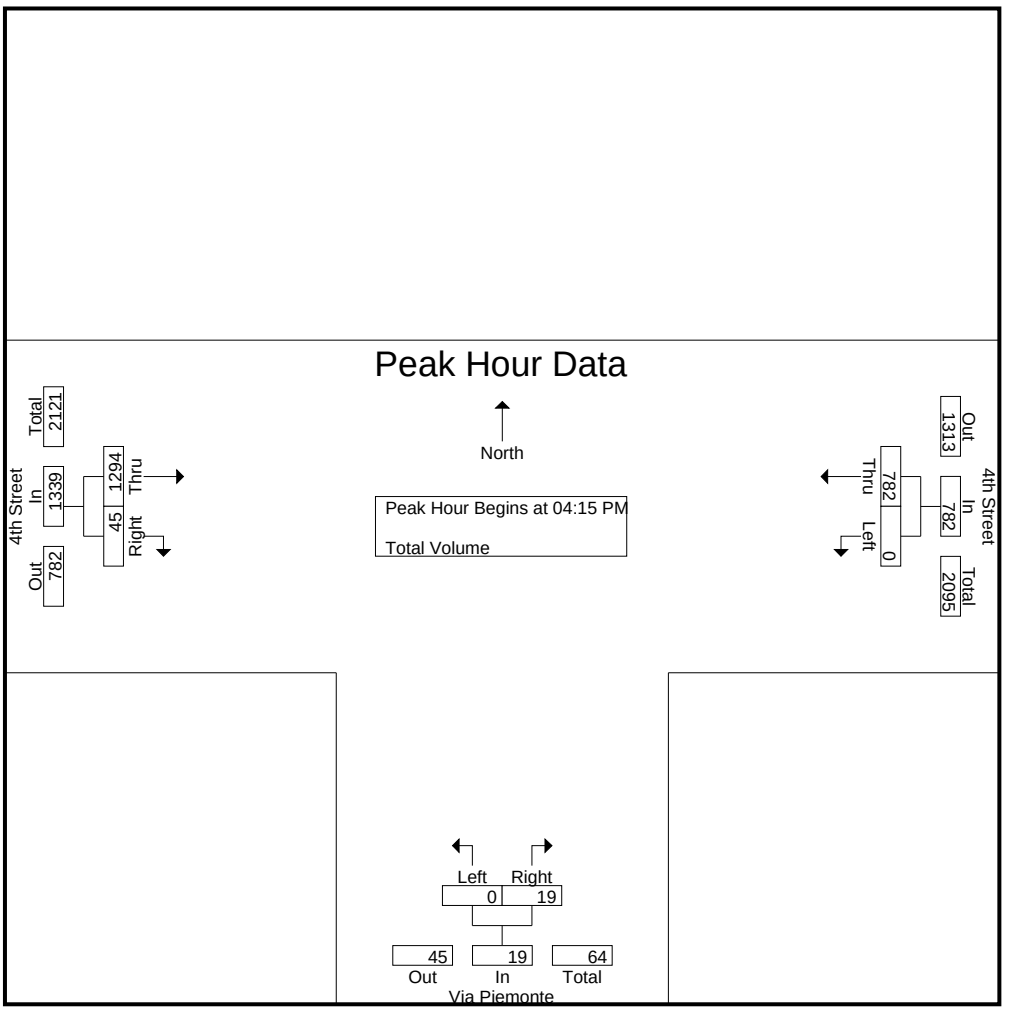
File Name : 04_ONT_Project Access_4th_PM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:30 PM			04:30 PM		
+0 mins.	0	185	185	0	7	7	347	6	353
+15 mins.	0	201	201	0	3	3	303	8	311
+30 mins.	0	197	197	0	2	2	**361**	12	**373**
+45 mins.	0	**203**	**203**	0	**9**	**9**	294	**16**	310
Total Volume	0	786	786	0	21	21	1305	42	1347
% App. Total	0	100		0	100		96.9	3.1	
PHF	.000	.968	.968	.000	.583	.583	.904	.656	.903

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City of Rancho Cucamonga
N/S: Milliken Avenue
E/W: Fourth Street
Weather: Clear

File Name : RNCMI4TAM
Site Code : 04216253
Start Date : 7/6/2016
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Fourth Street Westbound				Milliken Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	36	120	16	172	62	125	57	244	33	93	20	146	17	40	13	70	632
07:15 AM	36	128	15	179	76	152	71	299	28	103	12	143	20	40	19	79	700
07:30 AM	35	170	9	214	90	238	73	401	56	143	16	215	22	46	25	93	923
07:45 AM	57	179	14	250	84	278	87	449	53	197	31	281	27	65	25	117	1097
Total	164	597	54	815	312	793	288	1393	170	536	79	785	86	191	82	359	3352
08:00 AM	29	131	9	169	77	176	77	330	31	149	30	210	22	41	19	82	791
08:15 AM	32	131	17	180	88	207	66	361	39	122	25	186	29	49	26	104	831
08:30 AM	37	126	11	174	103	231	61	395	35	110	35	180	30	45	24	99	848
08:45 AM	47	123	22	192	77	226	82	385	45	128	30	203	28	50	24	102	882
Total	145	511	59	715	345	840	286	1471	150	509	120	779	109	185	93	387	3352
Grand Total	309	1108	113	1530	657	1633	574	2864	320	1045	199	1564	195	376	175	746	6704
Apprch %	20.2	72.4	7.4		22.9	57	20		20.5	66.8	12.7		26.1	50.4	23.5		
Total %	4.6	16.5	1.7	22.8	9.8	24.4	8.6	42.7	4.8	15.6	3	23.3	2.9	5.6	2.6	11.1	

	Milliken Avenue Southbound				Fourth Street Westbound				Milliken Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	35	170	9	214	**90**	238	73	401	**56**	143	16	215	22	46	25	93	923
07:45 AM	**57**	**179**	14	**250**	84	**278**	**87**	**449**	53	**197**	**31**	**281**	27	**65**	25	**117**	**1097**
08:00 AM	29	131	9	169	77	176	77	330	31	149	30	210	22	41	19	82	791
08:15 AM	32	131	**17**	180	88	207	66	361	39	122	25	186	**29**	49	**26**	104	831
Total Volume	153	611	49	813	339	899	303	1541	179	611	102	892	100	201	95	396	3642
% App. Total	18.8	75.2	6		22	58.3	19.7		20.1	68.5	11.4		25.3	50.8	24		
PHF	.671	.853	.721	.813	.942	.808	.871	.858	.799	.775	.823	.794	.862	.773	.913	.846	.830

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City of Rancho Cucamonga
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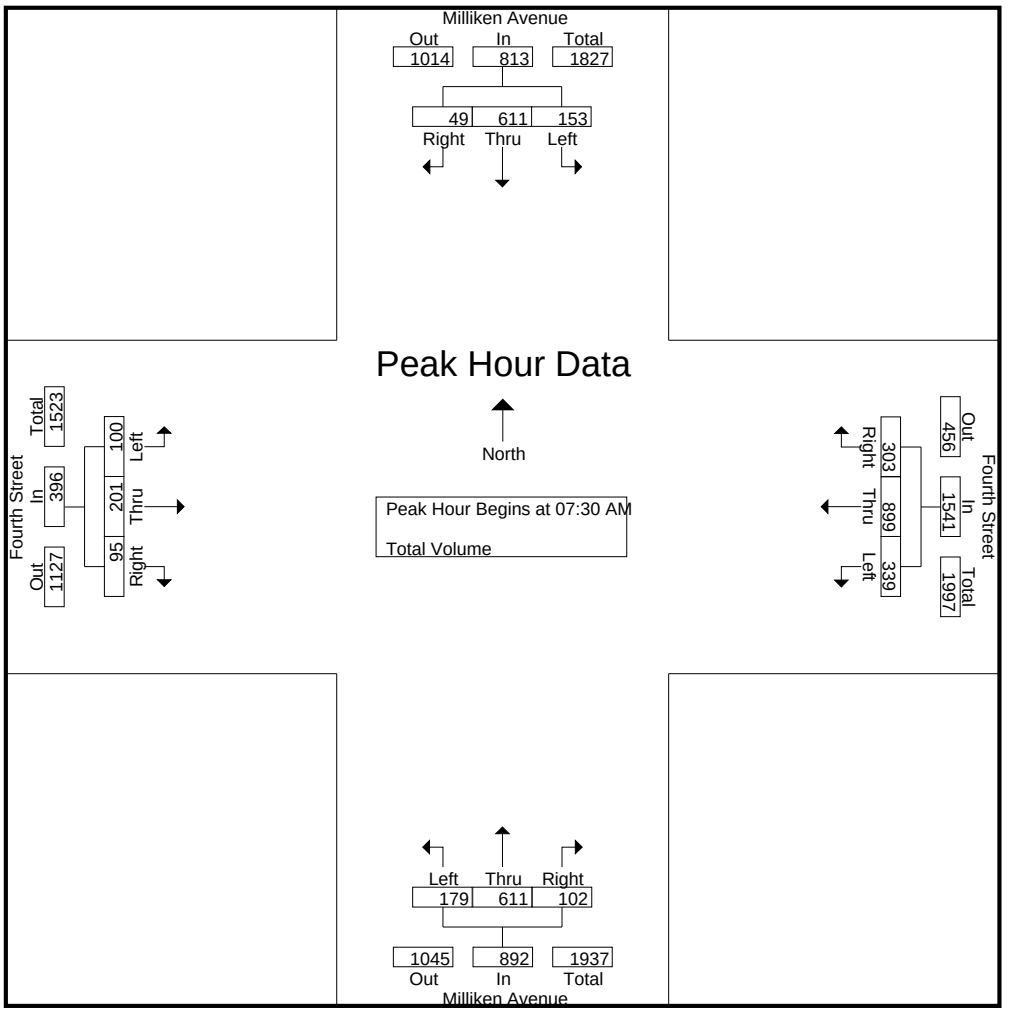
Site Code : 04216253
Start Date : 7/6/2016
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				07:30 AM				07:45 AM			
+0 mins.	36	120	**16**	172	**90**	238	73	401	**56**	143	16	215	27	**65**	25	**117**
+15 mins.	36	128	15	179	84	**278**	**87**	**449**	53	**197**	**31**	**281**	22	41	19	82
+30 mins.	35	170	9	214	77	176	77	330	31	149	30	210	29	49	**26**	104
+45 mins.	**57**	**179**	14	**250**	88	207	66	361	39	122	25	186	**30**	45	24	99
Total Volume	164	597	54	815	339	899	303	1541	179	611	102	892	108	200	94	402
% App. Total	20.1	73.3	6.6		22	58.3	19.7		20.1	68.5	11.4		26.9	49.8	23.4	
PHF	.719	.834	.844	.815	.942	.808	.871	.858	.799	.775	.823	.794	.900	.769	.904	.859

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City of Rancho Cucamonga
N/S: Milliken Avenue
E/W: Fourth Street
Weather: Clear

File Name : RNCMI4TPM
Site Code : 04216253
Start Date : 7/6/2016
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Fourth Street Westbound				Milliken Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	87	176	18	281	82	127	64	273	58	238	77	373	89	150	95	334	1261
04:15 PM	95	140	23	258	75	124	80	279	68	229	76	373	120	250	72	442	1352
04:30 PM	103	202	42	347	83	114	61	258	45	263	77	385	77	194	58	329	1319
04:45 PM	108	202	28	338	71	134	69	274	52	279	78	409	75	215	48	338	1359
Total	393	720	111	1224	311	499	274	1084	223	1009	308	1540	361	809	273	1443	5291
05:00 PM	133	197	38	368	93	110	58	261	80	309	82	471	83	271	64	418	1518
05:15 PM	120	176	27	323	81	129	69	279	75	374	93	542	102	295	86	483	1627
05:30 PM	90	166	30	286	84	127	68	279	78	311	99	488	113	246	49	408	1461
05:45 PM	103	156	27	286	80	115	52	247	58	275	74	407	96	174	51	321	1261
Total	446	695	122	1263	338	481	247	1066	291	1269	348	1908	394	986	250	1630	5867
Grand Total	839	1415	233	2487	649	980	521	2150	514	2278	656	3448	755	1795	523	3073	11158
Apprch %	33.7	56.9	9.4		30.2	45.6	24.2		14.9	66.1	19		24.6	58.4	17		
Total %	7.5	12.7	2.1	22.3	5.8	8.8	4.7	19.3	4.6	20.4	5.9	30.9	6.8	16.1	4.7	27.5	

	Milliken Avenue Southbound				Fourth Street Westbound				Milliken Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	108	**202**	28	338	71	**134**	**69**	274	52	279	78	409	75	215	48	338	1359
05:00 PM	**133**	197	**38**	**368**	**93**	110	58	261	**80**	309	82	471	83	271	64	418	1518
05:15 PM	120	176	27	323	81	129	69	**279**	75	**374**	93	**542**	102	**295**	**86**	**483**	**1627**
05:30 PM	90	166	30	286	84	127	68	279	78	311	**99**	488	**113**	246	49	408	1461
Total Volume	451	741	123	1315	329	500	264	1093	285	1273	352	1910	373	1027	247	1647	5965
% App. Total	34.3	56.3	9.4		30.1	45.7	24.2		14.9	66.6	18.4		22.6	62.4	15		
PHF	.848	.917	.809	.893	.884	.933	.957	.979	.891	.851	.889	.881	.825	.870	.718	.852	.917

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City of Rancho Cucamonga
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File Name : RNCMI4TPM
Site Code : 04216253
Start Date : 7/6/2016
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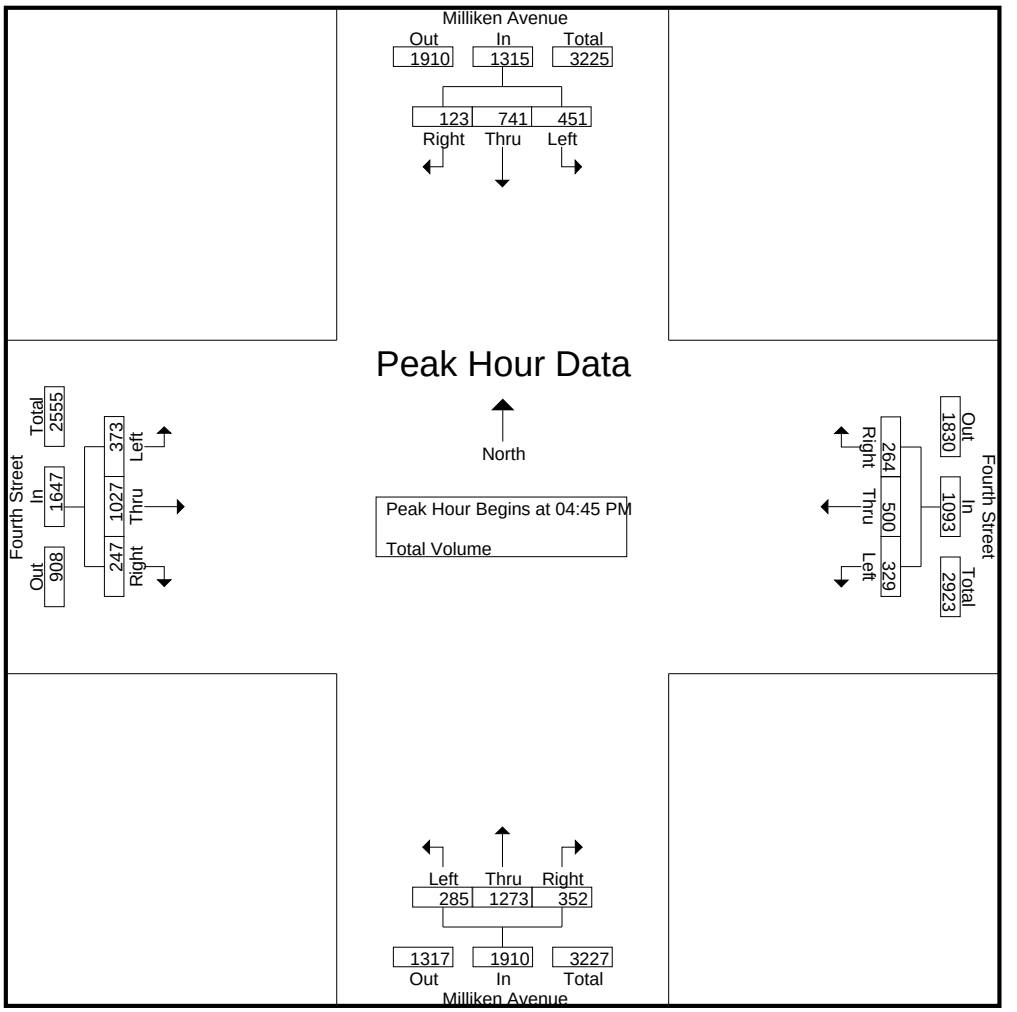

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				04:45 PM				04:45 PM			
+0 mins.	103	**202**	**42**	347	71	**134**	**69**	274	52	279	78	409	75	215	48	338
+15 mins.	108	202	28	338	**93**	110	58	261	**80**	309	82	471	83	271	64	418
+30 mins.	**133**	197	38	**368**	81	129	69	**279**	75	**374**	93	**542**	102	**295**	**86**	**483**
+45 mins.	120	176	27	323	84	127	68	279	78	311	**99**	488	**113**	246	49	408
Total Volume	464	777	135	1376	329	500	264	1093	285	1273	352	1910	373	1027	247	1647
% App. Total	33.7	56.5	9.8		30.1	45.7	24.2		14.9	66.6	18.4		22.6	62.4	15	
PHF	.872	.962	.804	.935	.884	.933	.957	.979	.891	.851	.889	.881	.825	.870	.718	.852

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City of Ontario
N/S: Milliken Avenue
E/W: 4th Street
Weather: Clear

File Name : ONT_Milliken_4th_AM
Site Code : 10521447
Start Date : 8/31/2021
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				4th Street Westbound				Milliken Avenue Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	31	90	5	126	94	172	46	312	22	101	28	151	20	51	20	91	680
07:15 AM	38	111	11	160	80	158	57	295	30	113	21	164	21	38	20	79	698
07:30 AM	35	127	17	179	84	245	79	408	28	156	32	216	16	69	16	101	904
07:45 AM	38	164	15	217	99	190	72	361	40	194	30	264	37	67	18	122	964
Total	142	492	48	682	357	765	254	1376	120	564	111	795	94	225	74	393	3246
08:00 AM	31	121	15	167	80	217	74	371	32	156	24	212	32	60	16	108	858
08:15 AM	36	167	20	223	64	183	53	300	41	156	17	214	19	73	22	114	851
08:30 AM	37	165	17	219	82	196	52	330	28	114	20	162	20	58	18	96	807
08:45 AM	49	133	19	201	84	192	71	347	27	148	23	198	33	78	21	132	878
Total	153	586	71	810	310	788	250	1348	128	574	84	786	104	269	77	450	3394
Grand Total	295	1078	119	1492	667	1553	504	2724	248	1138	195	1581	198	494	151	843	6640
Apprch %	19.8	72.3	8		24.5	57	18.5		15.7	72	12.3		23.5	58.6	17.9		
Total %	4.4	16.2	1.8	22.5	10	23.4	7.6	41	3.7	17.1	2.9	23.8	3	7.4	2.3	12.7	

	Milliken Avenue Southbound				4th Street Westbound				Milliken Avenue Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	35	127	17	179	84	**245**	**79**	**408**	28	156	**32**	216	16	69	16	101	904
07:45 AM	**38**	164	15	217	**99**	190	72	361	40	**194**	30	**264**	**37**	67	18	**122**	**964**
08:00 AM	31	121	15	167	80	217	74	371	32	156	24	212	32	60	16	108	858
08:15 AM	36	**167**	**20**	**223**	64	183	53	300	**41**	156	17	214	19	**73**	**22**	114	851
Total Volume	140	579	67	786	327	835	278	1440	141	662	103	906	104	269	72	445	3577
% App. Total	17.8	73.7	8.5		22.7	58	19.3		15.6	73.1	11.4		23.4	60.4	16.2		
PHF	.921	.867	.838	.881	.826	.852	.880	.882	.860	.853	.805	.858	.703	.921	.818	.912	.928

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City of Ontario
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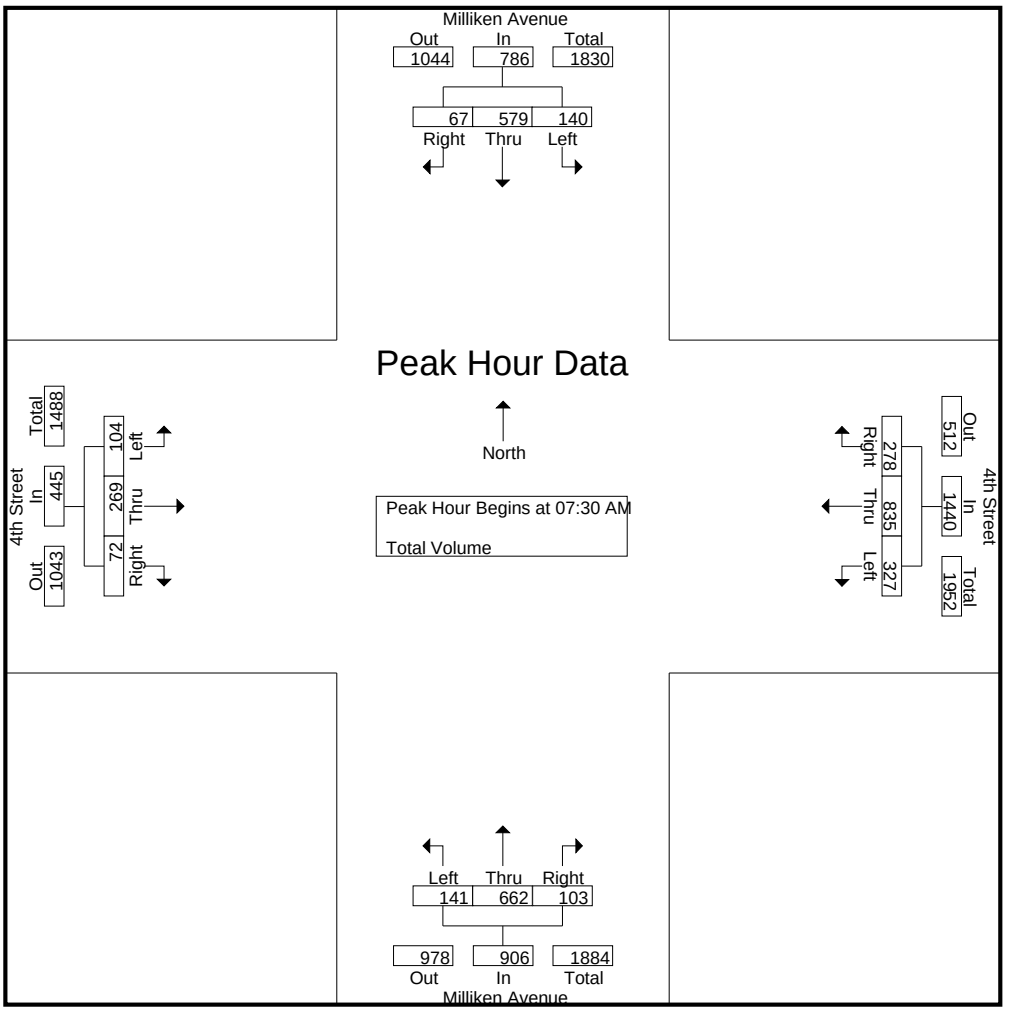
E/W: 4th Street
Weather: Clear

File Name : ONT_Milliken_4th_AM
Site Code : 10521447
Start Date : 8/31/2021
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:30 AM				07:30 AM				08:00 AM			
+0 mins.	**38**	164	15	217	84	**245**	**79**	**408**	28	156	**32**	216	32	60	16	108
+15 mins.	31	121	15	167	**99**	190	72	361	40	**194**	30	**264**	19	73	**22**	114
+30 mins.	36	**167**	**20**	**223**	80	217	74	371	32	156	24	212	20	58	18	96
+45 mins.	37	165	17	219	64	183	53	300	**41**	156	17	214	**33**	**78**	21	**132**
Total Volume	142	617	67	826	327	835	278	1440	141	662	103	906	104	269	77	450
% App. Total	17.2	74.7	8.1		22.7	58	19.3		15.6	73.1	11.4		23.1	59.8	17.1	
PHF	.934	.924	.838	.926	.826	.852	.880	.882	.860	.853	.805	.858	.788	.862	.875	.852

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City of Ontario
N/S: Milliken Avenue
E/W: 4th Street
Weather: Clear

File Name : ONT_Milliken_4th_PM
Site Code : 10521447
Start Date : 8/31/2021
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				4th Street Westbound				Milliken Avenue Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	71	125	24	220	92	114	44	250	45	247	77	369	71	187	36	294	1133
04:15 PM	88	116	22	226	72	137	44	253	52	230	66	348	58	207	37	302	1129
04:30 PM	83	167	23	273	77	122	46	245	45	256	68	369	60	192	45	297	1184
04:45 PM	86	138	19	243	84	174	56	314	63	240	47	350	79	163	30	272	1179
Total	328	546	88	962	325	547	190	1062	205	973	258	1436	268	749	148	1165	4625
05:00 PM	81	206	22	309	52	127	38	217	46	296	77	419	84	188	43	315	1260
05:15 PM	60	135	35	230	71	159	46	276	45	244	67	356	85	215	41	341	1203
05:30 PM	79	173	26	278	54	140	55	249	60	275	68	403	61	194	32	287	1217
05:45 PM	89	134	22	245	61	121	47	229	59	236	64	359	65	186	41	292	1125
Total	309	648	105	1062	238	547	186	971	210	1051	276	1537	295	783	157	1235	4805
Grand Total	637	1194	193	2024	563	1094	376	2033	415	2024	534	2973	563	1532	305	2400	9430
Apprch %	31.5	59	9.5		27.7	53.8	18.5		14	68.1	18		23.5	63.8	12.7		
Total %	6.8	12.7	2	21.5	6	11.6	4	21.6	4.4	21.5	5.7	31.5	6	16.2	3.2	25.5	

	Milliken Avenue Southbound				4th Street Westbound				Milliken Avenue Northbound				4th Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**86**	138	19	243	**84**	**174**	**56**	**314**	**63**	240	47	350	79	163	30	272	1179
05:00 PM	81	**206**	22	**309**	52	127	38	217	46	**296**	**77**	**419**	84	188	**43**	315	**1260**
05:15 PM	60	135	**35**	230	71	159	46	276	45	244	67	356	**85**	**215**	41	**341**	1203
05:30 PM	79	173	26	278	54	140	55	249	60	275	68	403	61	194	32	287	1217
Total Volume	306	652	102	1060	261	600	195	1056	214	1055	259	1528	309	760	146	1215	4859
% App. Total	28.9	61.5	9.6		24.7	56.8	18.5		14	69	17		25.4	62.6	12		
PHF	.890	.791	.729	.858	.777	.862	.871	.841	.849	.891	.841	.912	.909	.884	.849	.891	.964

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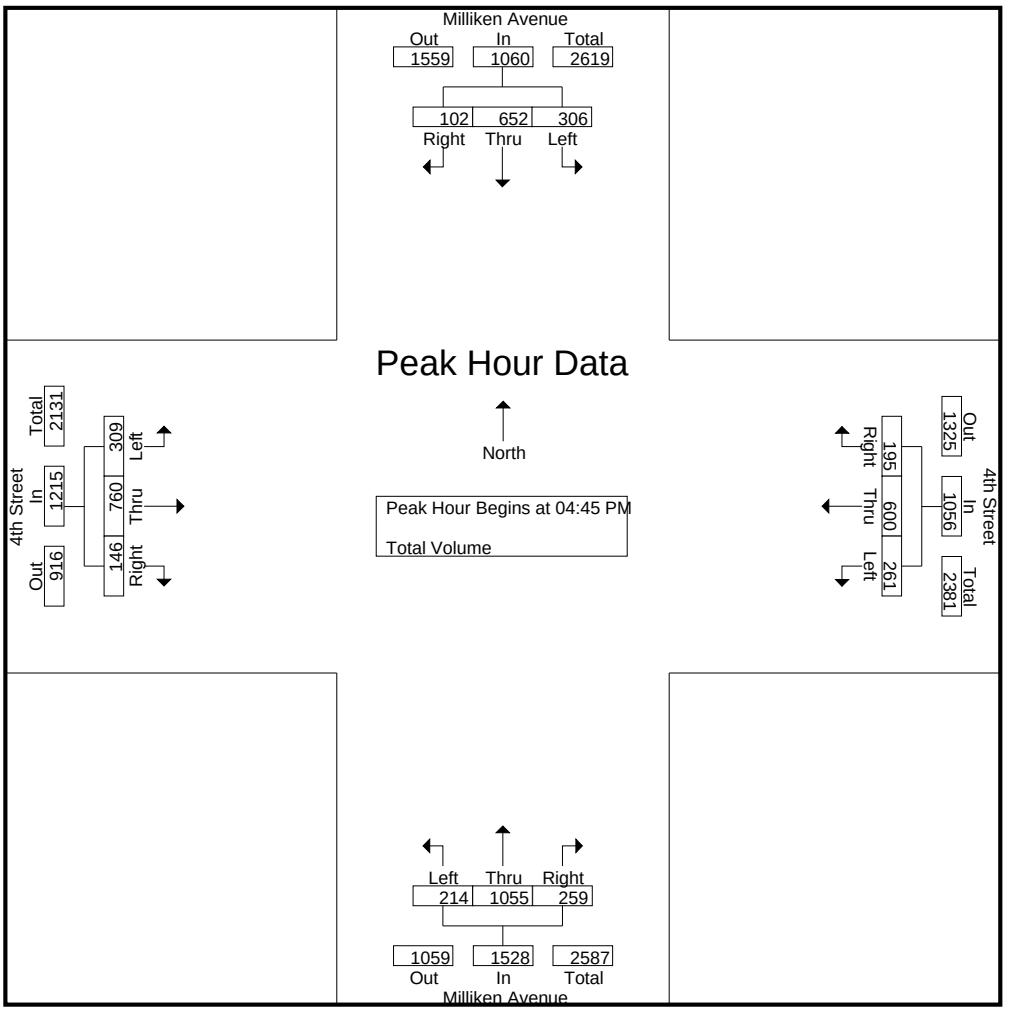
City of Ontario
N/S: Milliken Avenue
E/W: 4th Street
Weather: Clear

File Name : ONT_Milliken_4th_PM
Site Code : 10521447
Start Date : 8/31/2021
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				04:00 PM				05:00 PM				05:00 PM			
+0 mins.	81	**206**	22	**309**	**92**	114	44	250	46	**296**	**77**	**419**	84	188	**43**	315
+15 mins.	60	135	**35**	230	72	137	44	253	45	244	67	356	**85**	**215**	41	**341**
+30 mins.	79	173	26	278	77	122	46	245	**60**	275	68	403	61	194	32	287
+45 mins.	**89**	134	22	245	84	**174**	**56**	**314**	59	236	64	359	65	186	41	292
Total Volume	309	648	105	1062	325	547	190	1062	210	1051	276	1537	295	783	157	1235
% App. Total	29.1	61	9.9		30.6	51.5	17.9		13.7	68.4	18		23.9	63.4	12.7	
PHF	.868	.786	.750	.859	.883	.786	.848	.846	.875	.888	.896	.917	.868	.910	.913	.905

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15S4AM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	46	27	153	226	18	161	27	206	16	10	12	38	69	67	8	144	614
07:15 AM	38	44	150	232	28	197	21	246	21	8	15	44	74	75	9	158	680
07:30 AM	25	56	198	279	16	266	33	315	15	14	9	38	68	64	13	145	777
07:45 AM	39	63	220	322	27	290	31	348	17	16	20	53	59	81	19	159	882
Total	148	190	721	1059	89	914	112	1115	69	48	56	173	270	287	49	606	2953
08:00 AM	33	43	141	217	35	264	22	321	14	15	18	47	56	70	10	136	721
08:15 AM	26	24	165	215	14	262	24	300	14	14	18	46	56	64	8	128	689
08:30 AM	27	36	129	192	24	233	36	293	22	5	23	50	50	65	27	142	677
08:45 AM	28	40	146	214	40	214	35	289	13	10	12	35	47	69	5	121	659
Total	114	143	581	838	113	973	117	1203	63	44	71	178	209	268	50	527	2746
Grand Total	262	333	1302	1897	202	1887	229	2318	132	92	127	351	479	555	99	1133	5699
Apprch %	13.8	17.6	68.6		8.7	81.4	9.9		37.6	26.2	36.2		42.3	49	8.7		
Total %	4.6	5.8	22.8	33.3	3.5	33.1	4	40.7	2.3	1.6	2.2	6.2	8.4	9.7	1.7	19.9	
Passenger Vehicles	234	330	1285	1849	198	1763	168	2129	128	87	120	335	400	497	94	991	5304
% Passenger Vehicles	89.3	99.1	98.7	97.5	98	93.4	73.4	91.8	97	94.6	94.5	95.4	83.5	89.5	94.9	87.5	93.1
Large 2 Axle Vehicles	2	3	4	9	3	40	18	61	3	3	5	11	36	27	4	67	148
% Large 2 Axle Vehicles	0.8	0.9	0.3	0.5	1.5	2.1	7.9	2.6	2.3	3.3	3.9	3.1	7.5	4.9	4	5.9	2.6
3 Axle Vehicles	1	0	1	2	1	15	4	20	1	1	0	2	2	5	0	7	31
% 3 Axle Vehicles	0.4	0	0.1	0.1	0.5	0.8	1.7	0.9	0.8	1.1	0	0.6	0.4	0.9	0	0.6	0.5
4+ Axle Trucks	25	0	12	37	0	69	39	108	0	1	2	3	41	26	1	68	216
% 4+ Axle Trucks	9.5	0	0.9	2	0	3.7	17	4.7	0	1.1	1.6	0.9	8.6	4.7	1	6	3.8

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	25	56	198	279	16	266	**33**	315	15	14	9	38	**68**	64	13	145	777
07:45 AM	**39**	**63**	**220**	**322**	27	**290**	31	**348**	**17**	**16**	**20**	**53**	59	**81**	**19**	**159**	**882**
08:00 AM	33	43	141	217	**35**	264	22	321	14	15	18	47	56	70	10	136	721
08:15 AM	26	24	165	215	14	262	24	300	14	14	18	46	56	64	8	128	689
Total Volume	123	186	724	1033	92	1082	110	1284	60	59	65	184	239	279	50	568	3069
% App. Total	11.9	18	70.1		7.2	84.3	8.6		32.6	32.1	35.3		42.1	49.1	8.8		
PHF	.788	.738	.823	.802	.657	.933	.833	.922	.882	.922	.813	.868	.879	.861	.658	.893	.870

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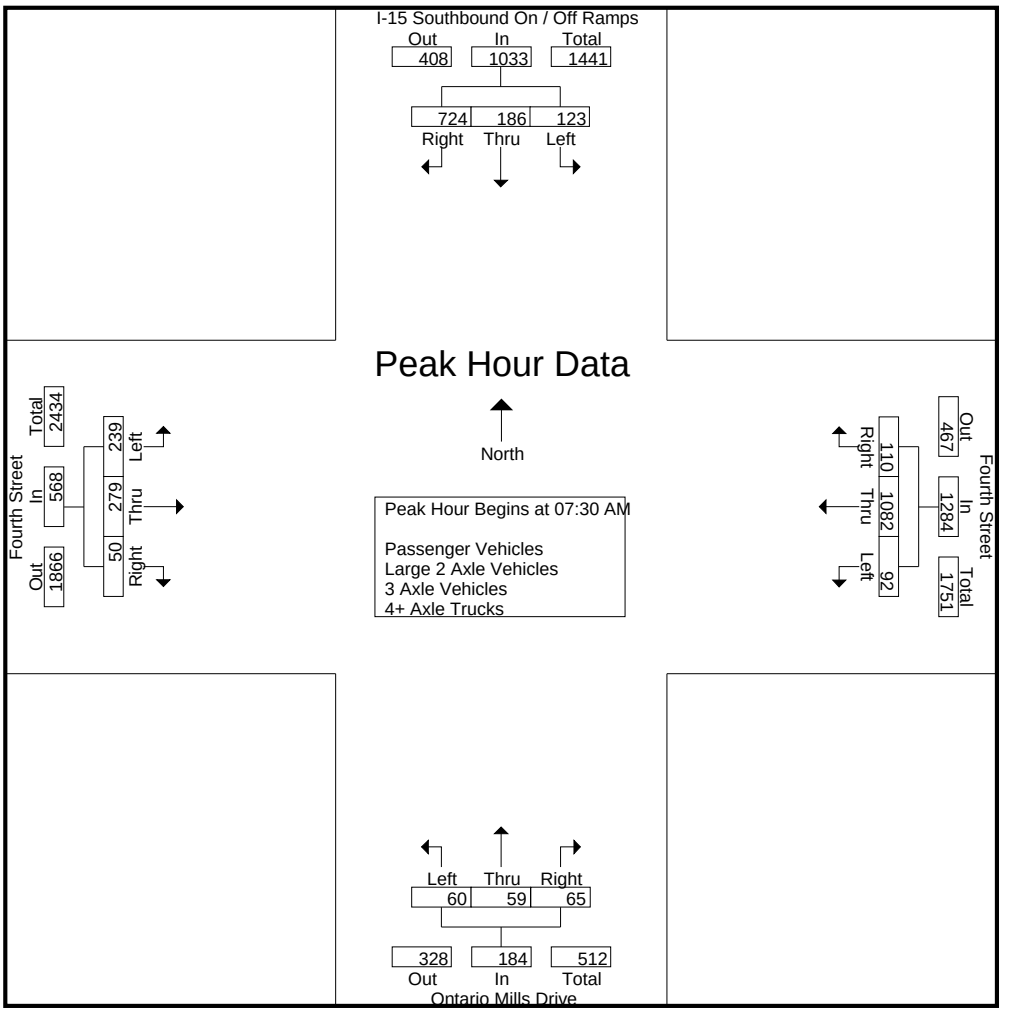
City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15S4AM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				07:45 AM				07:00 AM			
+0 mins.	**46**	27	153	226	16	266	**33**	315	17	**16**	20	**53**	69	67	8	144
+15 mins.	38	44	150	232	27	**290**	31	**348**	14	15	18	47	**74**	75	9	158
+30 mins.	25	56	198	279	**35**	264	22	321	14	14	18	46	68	64	13	145
+45 mins.	39	**63**	**220**	**322**	14	262	24	300	**22**	5	**23**	50	59	**81**	**19**	**159**
Total Volume	148	190	721	1059	92	1082	110	1284	67	50	79	196	270	287	49	606
% App. Total	14	17.9	68.1		7.2	84.3	8.6		34.2	25.5	40.3		44.6	47.4	8.1	
PHF	.804	.754	.819	.822	.657	.933	.833	.922	.761	.781	.859	.925	.912	.886	.645	.953

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15S4AM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 1

Groups Printed- Passenger Vehicles

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	40	26	152	218	18	153	21	192	16	10	11	37	56	58	8	122	569
07:15 AM	35	44	149	228	27	192	14	233	21	6	15	42	65	68	9	142	645
07:30 AM	23	55	196	274	16	249	25	290	15	13	9	37	57	59	12	128	729
07:45 AM	34	63	219	316	27	280	24	331	17	15	20	52	52	76	19	147	846
Total	132	188	716	1036	88	874	84	1046	69	44	55	168	230	261	48	539	2789
08:00 AM	29	43	139	211	33	246	17	296	12	15	18	45	48	62	9	119	671
08:15 AM	26	24	163	213	14	246	18	278	13	14	14	41	48	58	8	114	646
08:30 AM	23	36	127	186	24	216	23	263	21	5	21	47	41	57	25	123	619
08:45 AM	24	39	140	203	39	181	26	246	13	9	12	34	33	59	4	96	579
Total	102	142	569	813	110	889	84	1083	59	43	65	167	170	236	46	452	2515
Grand Total	234	330	1285	1849	198	1763	168	2129	128	87	120	335	400	497	94	991	5304
Apprch %	12.7	17.8	69.5		9.3	82.8	7.9		38.2	26	35.8		40.4	50.2	9.5		
Total %	4.4	6.2	24.2	34.9	3.7	33.2	3.2	40.1	2.4	1.6	2.3	6.3	7.5	9.4	1.8	18.7	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	23	55	196	274	16	249	**25**	290	15	13	9	37	**57**	59	12	128	729
07:45 AM	**34**	**63**	**219**	**316**	27	**280**	24	**331**	**17**	**15**	**20**	**52**	52	**76**	**19**	**147**	**846**
08:00 AM	29	43	139	211	**33**	246	17	296	12	15	18	45	48	62	9	119	671
08:15 AM	26	24	163	213	14	246	18	278	13	14	14	41	48	58	8	114	646
Total Volume	112	185	717	1014	90	1021	84	1195	57	57	61	175	205	255	48	508	2892
% App. Total	11	18.2	70.7		7.5	85.4	7		32.6	32.6	34.9		40.4	50.2	9.4		
PHF	.824	.734	.818	.802	.682	.912	.840	.903	.838	.950	.763	.841	.899	.839	.632	.864	.855

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
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File Name : RNC15S4AM
Site Code : 09814452
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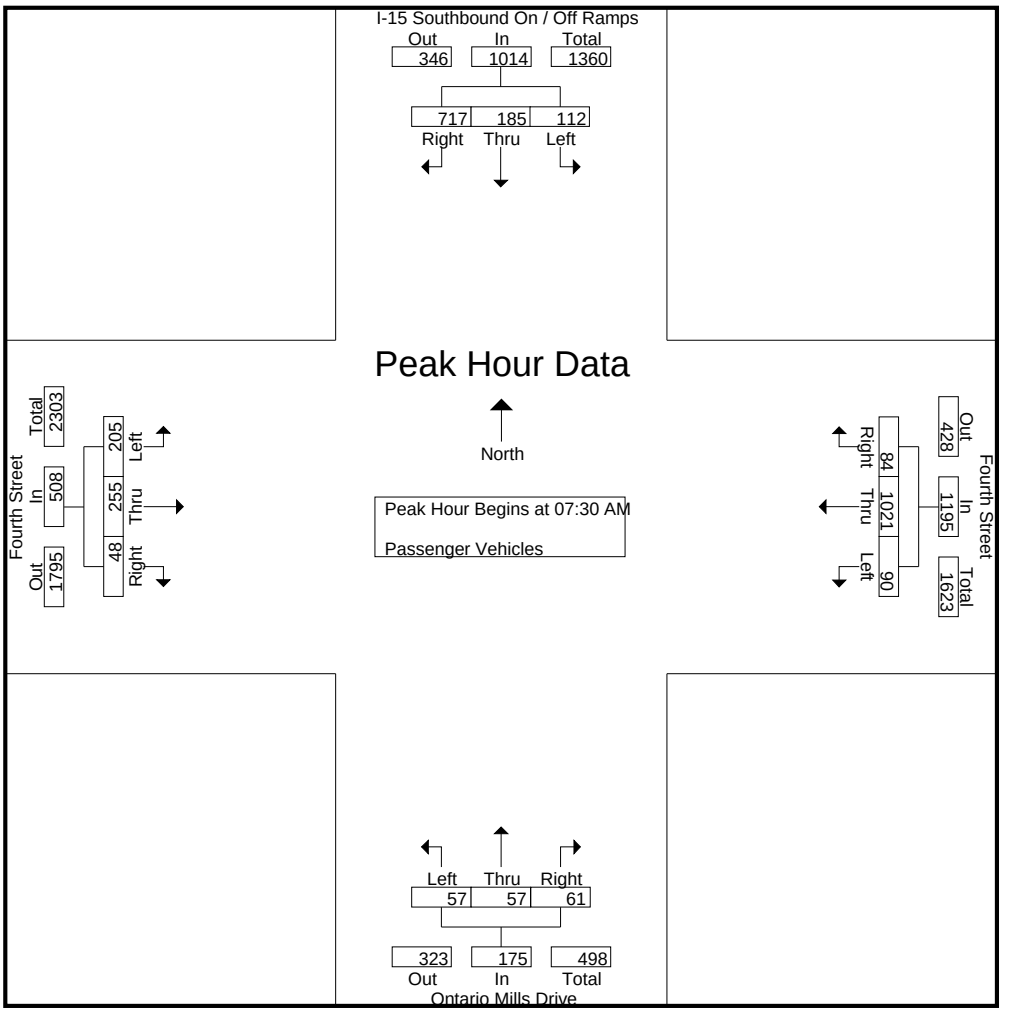

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	23	55	196	274	16	249	**25**	290	15	13	9	37	**57**	59	12	128
+15 mins.	**34**	**63**	**219**	**316**	27	**280**	24	**331**	**17**	**15**	**20**	**52**	52	**76**	**19**	**147**
+30 mins.	29	43	139	211	**33**	246	17	296	12	15	18	45	48	62	9	119
+45 mins.	26	24	163	213	14	246	18	278	13	14	14	41	48	58	8	114
Total Volume	112	185	717	1014	90	1021	84	1195	57	57	61	175	205	255	48	508
% App. Total	11	18.2	70.7		7.5	85.4	7		32.6	32.6	34.9		40.4	50.2	9.4	
PHF	.824	.734	.818	.802	.682	.912	.840	.903	.838	.950	.763	.841	.899	.839	.632	.864

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
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Weather: Clear

File Name : RNC15S4AM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	1	0	1	0	3	1	4	0	0	0	0	8	4	0	12	17
07:15 AM	0	0	0	0	1	2	3	6	0	1	0	1	6	5	0	11	18
07:30 AM	0	1	1	2	0	3	3	6	0	1	0	1	3	4	1	8	17
07:45 AM	1	0	0	1	0	4	2	6	0	1	0	1	1	0	0	1	9
Total	1	2	1	4	1	12	9	22	0	3	0	3	18	13	1	32	61
08:00 AM	0	0	0	0	1	5	1	7	1	0	0	1	3	4	1	8	16
08:15 AM	0	0	0	0	0	6	2	8	1	0	3	4	6	4	0	10	22
08:30 AM	0	0	2	2	0	5	2	7	1	0	2	3	3	3	1	7	19
08:45 AM	1	1	1	3	1	12	4	17	0	0	0	0	6	3	1	10	30
Total	1	1	3	5	2	28	9	39	3	0	5	8	18	14	3	35	87
Grand Total	2	3	4	9	3	40	18	61	3	3	5	11	36	27	4	67	148
Apprch %	22.2	33.3	44.4		4.9	65.6	29.5		27.3	27.3	45.5		53.7	40.3	6		
Total %	1.4	2	2.7	6.1	2	27	12.2	41.2	2	2	3.4	7.4	24.3	18.2	2.7	45.3	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	**1**	**1**	**2**	0	3	**3**	6	0	**1**	0	1	3	**4**	**1**	8	17
07:45 AM	**1**	0	0	1	0	4	2	6	0	1	0	1	1	0	0	1	9
08:00 AM	0	0	0	0	**1**	5	1	7	**1**	0	0	1	3	4	1	8	16
08:15 AM	0	0	0	0	0	**6**	2	**8**	1	0	**3**	**4**	**6**	4	0	**10**	**22**
Total Volume	1	1	1	3	1	18	8	27	2	2	3	7	13	12	2	27	64
% App. Total	33.3	33.3	33.3		3.7	66.7	29.6		28.6	28.6	42.9		48.1	44.4	7.4		
PHF	.250	.250	.250	.375	.250	.750	.667	.844	.500	.500	.250	.438	.542	.750	.500	.675	.727

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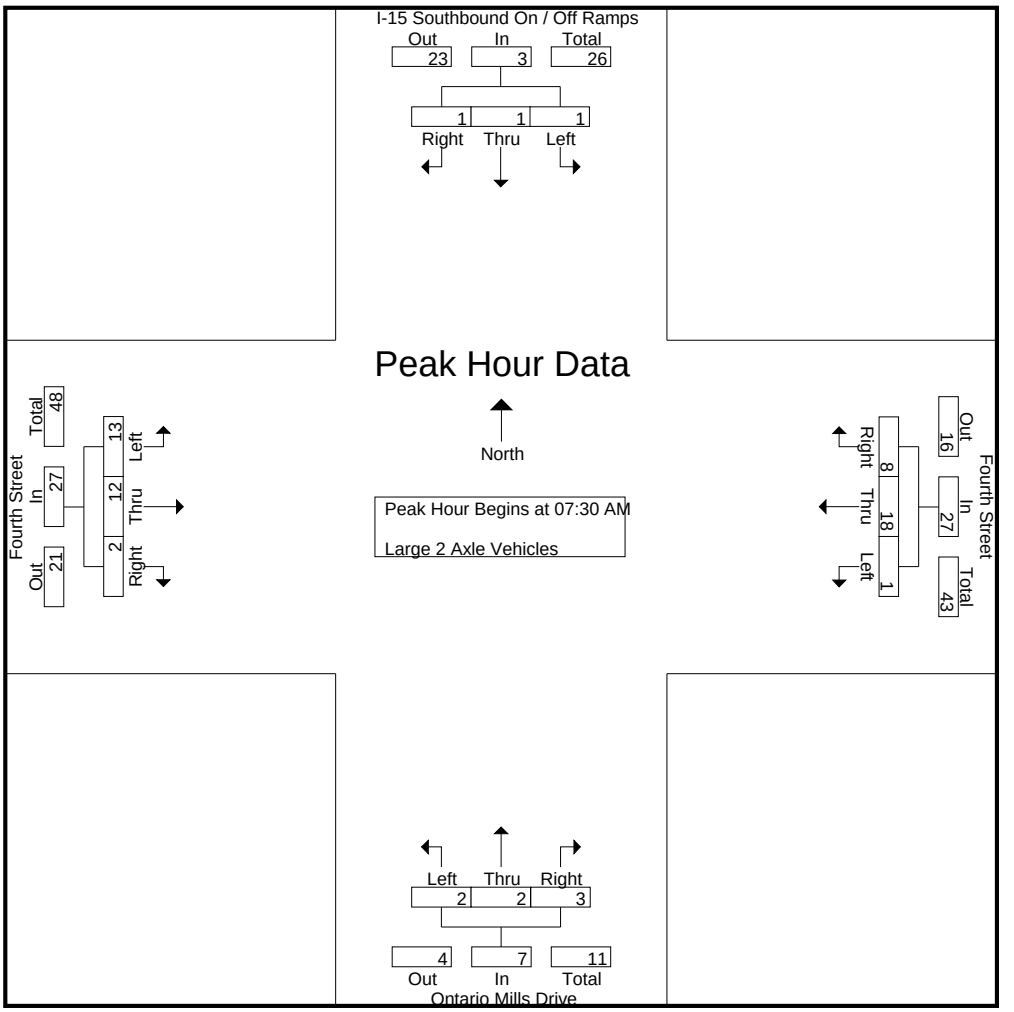

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	**1**	**1**	**2**	0	3	**3**	6	0	**1**	0	1	3	**4**	**1**	8
+15 mins.	**1**	0	0	1	0	4	2	6	0	1	0	1	1	0	0	1
+30 mins.	0	0	0	0	**1**	5	1	7	**1**	0	0	1	3	4	1	8
+45 mins.	0	0	0	0	0	**6**	2	**8**	1	0	**3**	**4**	**6**	4	0	**10**
Total Volume	1	1	1	3	1	18	8	27	2	2	3	7	13	12	2	27
% App. Total	33.3	33.3	33.3		3.7	66.7	29.6		28.6	28.6	42.9		48.1	44.4	7.4	
PHF	.250	.250	.250	.375	.250	.750	.667	.844	.500	.500	.250	.438	.542	.750	.500	.675

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15S4AM
Site Code : 09814452
Start Date : 11/20/2014
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Groups Printed- 3 Axle Vehicles

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
07:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
07:30 AM	0	0	0	0	0	2	1	3	0	0	0	0	0	1	0	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total	1	0	0	1	0	3	1	4	0	0	0	0	1	2	0	3	8
08:00 AM	0	0	1	1	1	5	1	7	1	0	0	1	0	0	0	0	9
08:15 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
08:30 AM	0	0	0	0	0	1	2	3	0	0	0	0	0	0	0	0	3
08:45 AM	0	0	0	0	0	4	0	4	0	1	0	1	1	2	0	3	8
Total	0	0	1	1	1	12	3	16	1	1	0	2	1	3	0	4	23
Grand Total	1	0	1	2	1	15	4	20	1	1	0	2	2	5	0	7	31
Apprch %	50	0	50		5	75	20		50	50	0		28.6	71.4	0		
Total %	3.2	0	3.2	6.5	3.2	48.4	12.9	64.5	3.2	3.2	0	6.5	6.5	16.1	0	22.6	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	2	**1**	3	0	0	0	0	0	**1**	0	**1**	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
08:00 AM	0	0	**1**	**1**	**1**	**5**	1	**7**	**1**	0	0	**1**	0	0	0	0	**9**
08:15 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Total Volume	0	0	1	1	1	9	2	12	1	0	0	1	0	3	0	3	17
% App. Total	0	0	100		8.3	75	16.7		100	0	0		0	100	0		
PHF	.000	.000	.250	.250	.250	.450	.500	.429	.250	.000	.000	.250	.000	.750	.000	.750	.472

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
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Weather: Clear

File Name : RNC15S4AM
Site Code : 09814452
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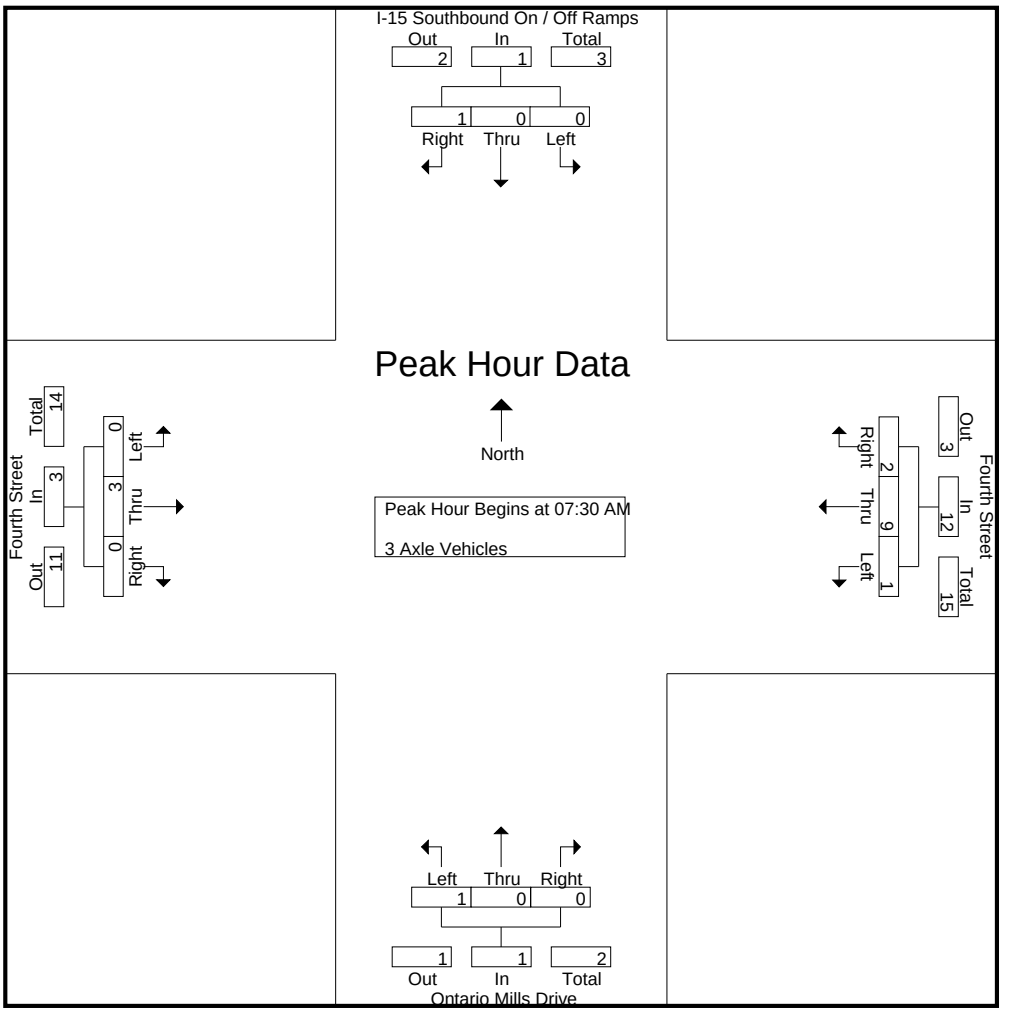

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	0	0	0	2	**1**	3	0	0	0	0	0	**1**	0	**1**
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+30 mins.	0	0	**1**	**1**	**1**	**5**	1	**7**	**1**	0	0	**1**	0	0	0	0
+45 mins.	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1
Total Volume	0	0	1	1	1	9	2	12	1	0	0	1	0	3	0	3
% App. Total	0	0	100		8.3	75	16.7		100	0	0		0	100	0	
PHF	.000	.000	.250	.250	.250	.450	.500	.429	.250	.000	.000	.250	.000	.750	.000	.750

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15S4AM
Site Code : 09814452
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Groups Printed- 4+ Axle Trucks

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	5	0	1	6	0	5	5	10	0	0	1	1	4	5	0	9	26
07:15 AM	3	0	1	4	0	2	4	6	0	1	0	1	3	2	0	5	16
07:30 AM	2	0	1	3	0	12	4	16	0	0	0	0	8	0	0	8	27
07:45 AM	4	0	1	5	0	6	5	11	0	0	0	0	6	4	0	10	26
Total	14	0	4	18	0	25	18	43	0	1	1	2	21	11	0	32	95
08:00 AM	4	0	1	5	0	8	3	11	0	0	0	0	5	4	0	9	25
08:15 AM	0	0	2	2	0	8	4	12	0	0	1	1	2	1	0	3	18
08:30 AM	4	0	0	4	0	11	9	20	0	0	0	0	6	5	1	12	36
08:45 AM	3	0	5	8	0	17	5	22	0	0	0	0	7	5	0	12	42
Total	11	0	8	19	0	44	21	65	0	0	1	1	20	15	1	36	121
Grand Total	25	0	12	37	0	69	39	108	0	1	2	3	41	26	1	68	216
Apprch %	67.6	0	32.4		0	63.9	36.1		0	33.3	66.7		60.3	38.2	1.5		
Total %	11.6	0	5.6	17.1	0	31.9	18.1	50	0	0.5	0.9	1.4	19	12	0.5	31.5	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	2	0	1	3	0	**12**	4	**16**	0	0	0	0	**8**	0	0	8	**27**
07:45 AM	**4**	0	1	**5**	0	6	**5**	11	0	0	0	0	6	**4**	0	**10**	26
08:00 AM	4	0	1	5	0	8	3	11	0	0	0	0	5	4	0	9	25
08:15 AM	0	0	**2**	2	0	8	4	12	0	0	**1**	**1**	2	1	0	3	18
Total Volume	10	0	5	15	0	34	16	50	0	0	1	1	21	9	0	30	96
% App. Total	66.7	0	33.3		0	68	32		0	0	100		70	30	0		
PHF	.625	.000	.625	.750	.000	.708	.800	.781	.000	.000	.250	.250	.656	.563	.000	.750	.889

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City of Rancho Cucamonga
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Weather: Clear

File Name : RNC15S4AM
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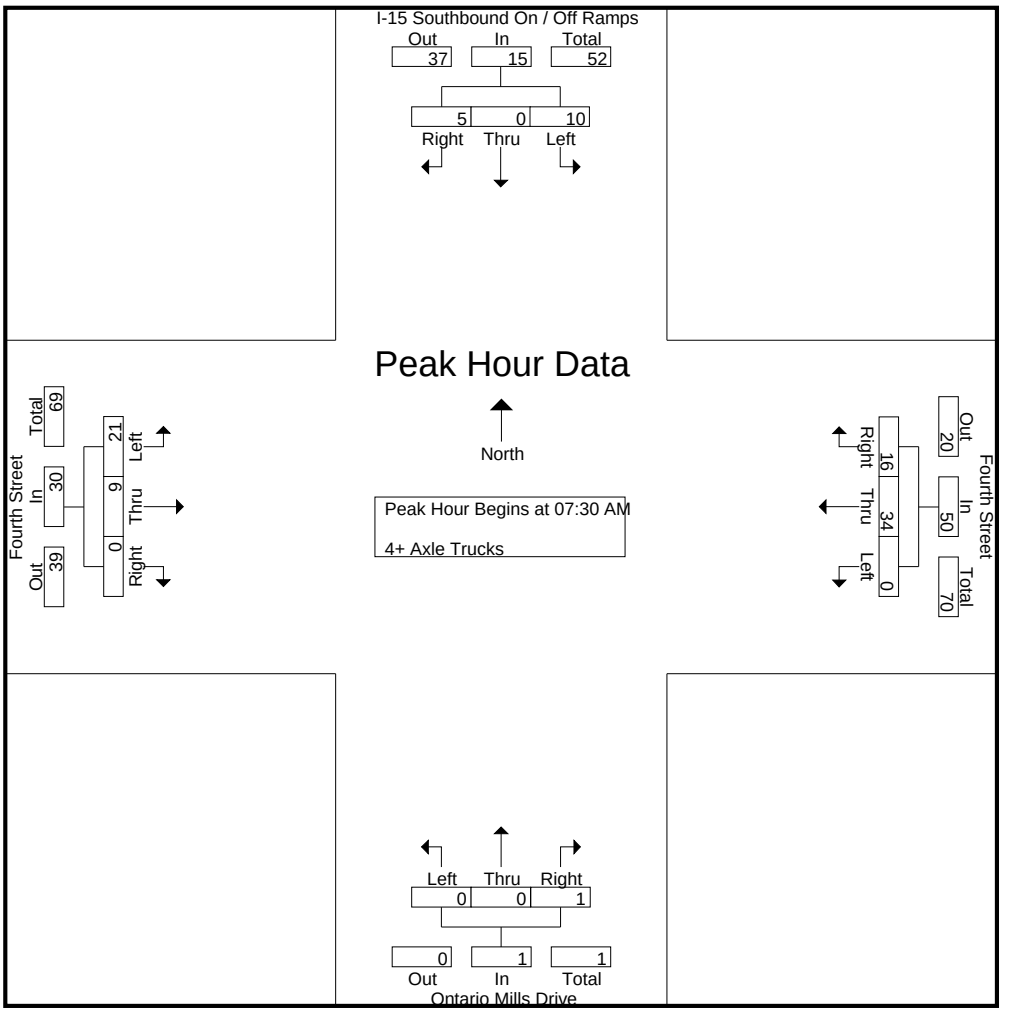

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	2	0	1	3	0	**12**	4	**16**	0	0	0	0	**8**	0	0	8
+15 mins.	**4**	0	1	**5**	0	6	**5**	11	0	0	0	0	6	**4**	0	**10**
+30 mins.	4	0	1	5	0	8	3	11	0	0	0	0	5	4	0	9
+45 mins.	0	0	**2**	2	0	8	4	12	0	0	**1**	**1**	2	1	0	3
Total Volume	10	0	5	15	0	34	16	50	0	0	1	1	21	9	0	30
% App. Total	66.7	0	33.3		0	68	32		0	0	100		70	30	0	
PHF	.625	.000	.625	.750	.000	.708	.800	.781	.000	.000	.250	.250	.656	.563	.000	.750

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City of Rancho Cucamonga
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Weather: Clear

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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	17	52	113	182	61	163	85	309	29	54	54	137	196	197	24	417	1045
04:15 PM	20	53	96	169	42	187	68	297	24	55	66	145	174	238	18	430	1041
04:30 PM	14	51	116	181	47	170	54	271	22	47	89	158	192	216	31	439	1049
04:45 PM	17	51	121	189	46	178	67	291	24	46	69	139	196	194	19	409	1028
Total	68	207	446	721	196	698	274	1168	99	202	278	579	758	845	92	1695	4163
05:00 PM	12	66	112	190	55	212	81	348	28	88	74	190	210	271	19	500	1228
05:15 PM	14	77	124	215	38	189	79	306	30	77	97	204	221	294	34	549	1274
05:30 PM	20	64	112	196	41	209	62	312	29	55	67	151	200	219	31	450	1109
05:45 PM	19	54	144	217	55	198	39	292	31	39	56	126	169	231	16	416	1051
Total	65	261	492	818	189	808	261	1258	118	259	294	671	800	1015	100	1915	4662
Grand Total	133	468	938	1539	385	1506	535	2426	217	461	572	1250	1558	1860	192	3610	8825
Apprch %	8.6	30.4	60.9		15.9	62.1	22.1		17.4	36.9	45.8		43.2	51.5	5.3		
Total %	1.5	5.3	10.6	17.4	4.4	17.1	6.1	27.5	2.5	5.2	6.5	14.2	17.7	21.1	2.2	40.9	
Passenger Vehicles	105	467	922	1494	383	1420	515	2318	215	459	571	1245	1529	1810	190	3529	8586
% Passenger Vehicles	78.9	99.8	98.3	97.1	99.5	94.3	96.3	95.5	99.1	99.6	99.8	99.6	98.1	97.3	99	97.8	97.3
Large 2 Axle Vehicles	8	0	2	10	1	31	4	36	1	1	0	2	3	13	2	18	66
% Large 2 Axle Vehicles	6	0	0.2	0.6	0.3	2.1	0.7	1.5	0.5	0.2	0	0.2	0.2	0.7	1	0.5	0.7
3 Axle Vehicles	0	1	1	2	1	11	1	13	1	1	1	3	1	13	0	14	32
% 3 Axle Vehicles	0	0.2	0.1	0.1	0.3	0.7	0.2	0.5	0.5	0.2	0.2	0.2	0.1	0.7	0	0.4	0.4
4+ Axle Trucks	20	0	13	33	0	44	15	59	0	0	0	0	25	24	0	49	141
% 4+ Axle Trucks	15	0	1.4	2.1	0	2.9	2.8	2.4	0	0	0	0	1.6	1.3	0	1.4	1.6

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	12	66	112	190	**55**	**212**	**81**	**348**	28	**88**	74	190	210	271	19	500	1228
05:15 PM	14	**77**	124	215	38	189	79	306	30	77	**97**	**204**	**221**	**294**	**34**	**549**	**1274**
05:30 PM	**20**	64	112	196	41	209	62	312	29	55	67	151	200	219	31	450	1109
05:45 PM	19	54	**144**	**217**	55	198	39	292	**31**	39	56	126	169	231	16	416	1051
Total Volume	65	261	492	818	189	808	261	1258	118	259	294	671	800	1015	100	1915	4662
% App. Total	7.9	31.9	60.1		15	64.2	20.7		17.6	38.6	43.8		41.8	53	5.2		
PHF	.813	.847	.854	.942	.859	.953	.806	.904	.952	.736	.758	.822	.905	.863	.735	.872	.915

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
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Weather: Clear

File Name : RNC15S4PM
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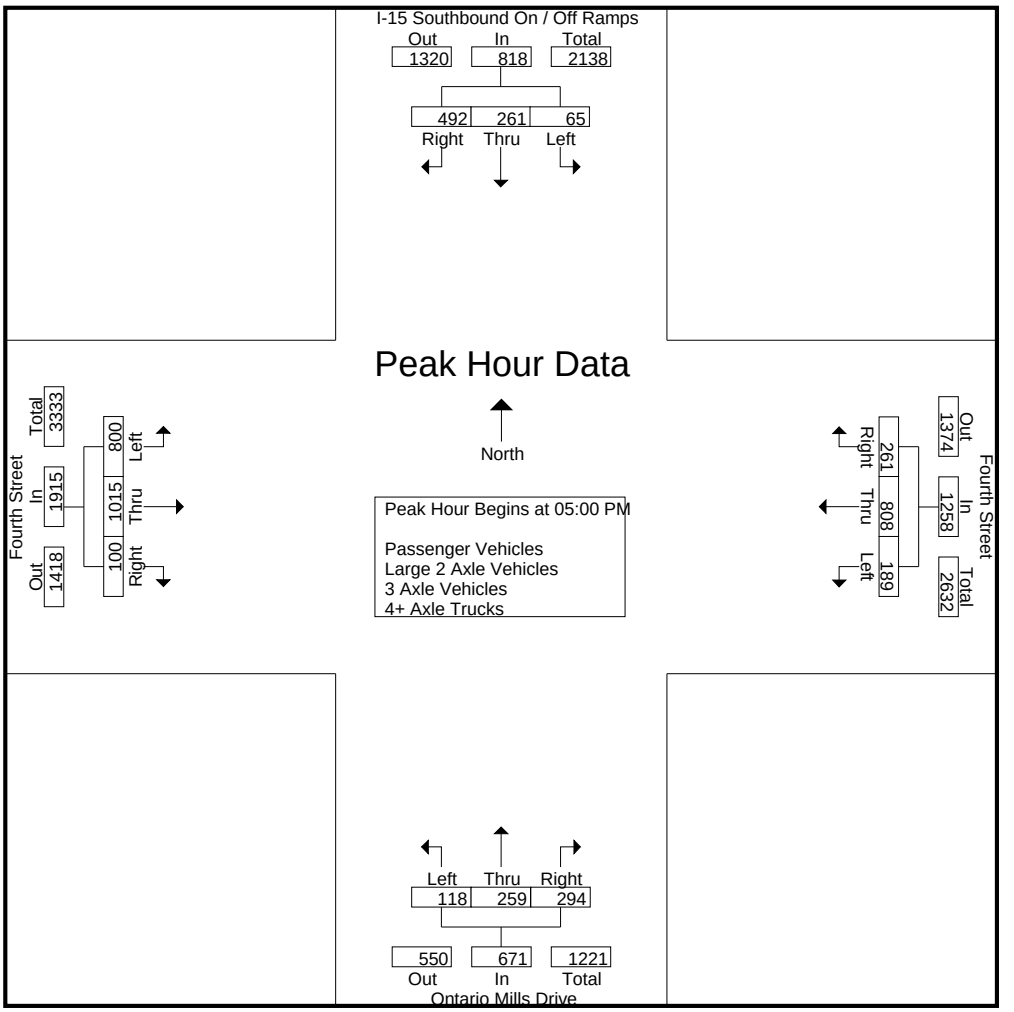

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				04:30 PM				05:00 PM			
+0 mins.	12	66	112	190	**55**	**212**	**81**	**348**	22	47	89	158	210	271	19	500
+15 mins.	14	**77**	124	215	38	189	79	306	24	46	69	139	**221**	**294**	**34**	**549**
+30 mins.	**20**	64	112	196	41	209	62	312	28	**88**	74	190	200	219	31	450
+45 mins.	19	54	**144**	**217**	55	198	39	292	**30**	77	**97**	**204**	169	231	16	416
Total Volume	65	261	492	818	189	808	261	1258	104	258	329	691	800	1015	100	1915
% App. Total	7.9	31.9	60.1		15	64.2	20.7		15.1	37.3	47.6		41.8	53	5.2	
PHF	.813	.847	.854	.942	.859	.953	.806	.904	.867	.733	.848	.847	.905	.863	.735	.872

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Groups Printed- Passenger Vehicles

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	14	52	109	175	61	154	81	296	28	54	54	136	189	193	24	406	1013
04:15 PM	16	53	95	164	42	170	63	275	24	55	65	144	173	231	17	421	1004
04:30 PM	9	50	115	174	46	159	53	258	22	47	89	158	187	211	30	428	1018
04:45 PM	13	51	120	184	45	163	64	272	24	46	69	139	195	189	19	403	998
Total	52	206	439	697	194	646	261	1101	98	202	277	577	744	824	90	1658	4033
05:00 PM	8	66	108	182	55	202	77	334	27	87	74	188	206	265	19	490	1194
05:15 PM	13	77	123	213	38	183	79	300	30	77	97	204	218	282	34	534	1251
05:30 PM	18	64	110	192	41	200	59	300	29	55	67	151	196	215	31	442	1085
05:45 PM	14	54	142	210	55	189	39	283	31	38	56	125	165	224	16	405	1023
Total	53	261	483	797	189	774	254	1217	117	257	294	668	785	986	100	1871	4553
Grand Total	105	467	922	1494	383	1420	515	2318	215	459	571	1245	1529	1810	190	3529	8586
Apprch %	7	31.3	61.7		16.5	61.3	22.2		17.3	36.9	45.9		43.3	51.3	5.4		
Total %	1.2	5.4	10.7	17.4	4.5	16.5	6	27	2.5	5.3	6.7	14.5	17.8	21.1	2.2	41.1	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	8	66	108	182	**55**	**202**	77	**334**	27	**87**	74	188	206	265	19	490	1194
05:15 PM	13	**77**	123	**213**	38	183	**79**	300	30	77	**97**	**204**	**218**	**282**	**34**	**534**	**1251**
05:30 PM	**18**	64	110	192	41	200	59	300	29	55	67	151	196	215	31	442	1085
05:45 PM	14	54	**142**	210	55	189	39	283	**31**	38	56	125	165	224	16	405	1023
Total Volume	53	261	483	797	189	774	254	1217	117	257	294	668	785	986	100	1871	4553
% App. Total	6.6	32.7	60.6		15.5	63.6	20.9		17.5	38.5	44		42	52.7	5.3		
PHF	.736	.847	.850	.935	.859	.958	.804	.911	.944	.739	.758	.819	.900	.874	.735	.876	.910

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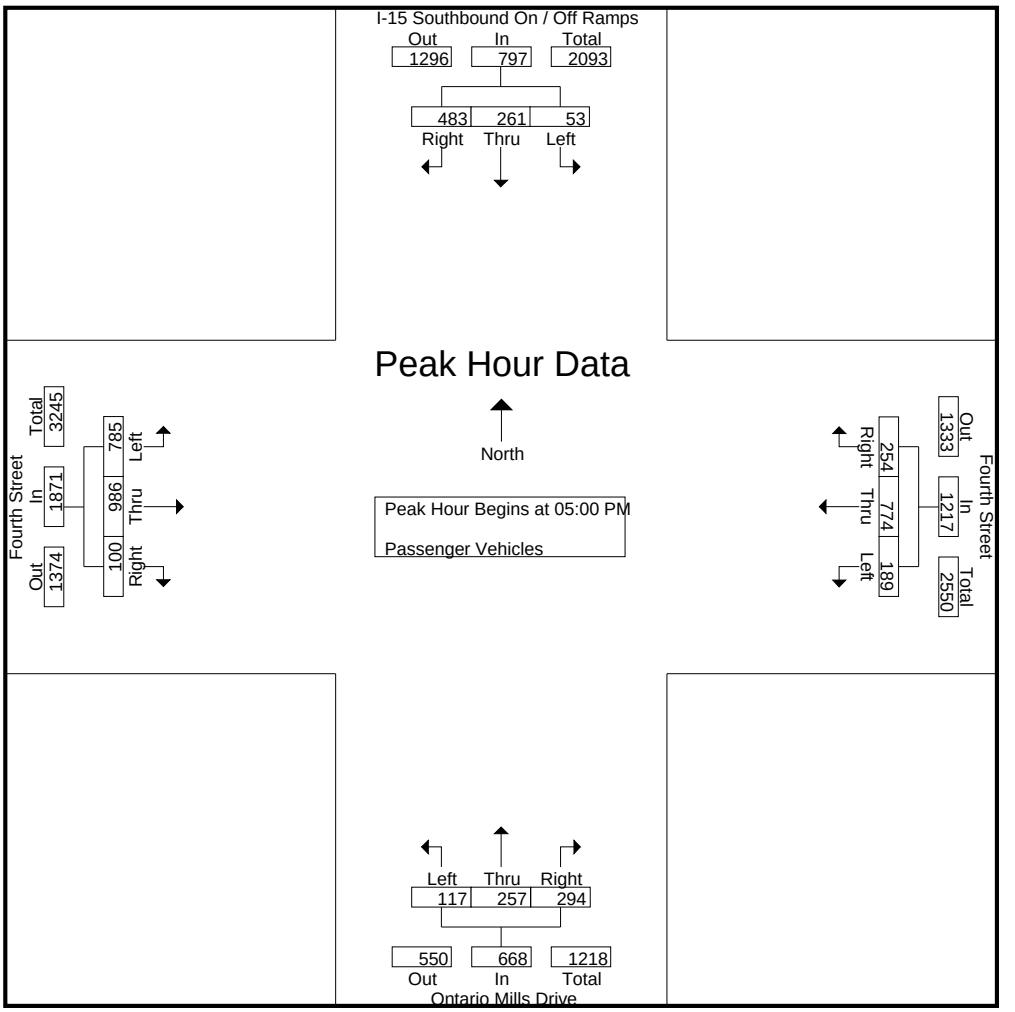

Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				04:45 PM				05:00 PM			
+0 mins.	8	66	108	182	**55**	**202**	77	**334**	24	46	69	139	206	265	19	490
+15 mins.	13	**77**	123	**213**	38	183	**79**	300	27	**87**	74	188	**218**	**282**	**34**	**534**
+30 mins.	**18**	64	110	192	41	200	59	300	**30**	77	**97**	**204**	196	215	31	442
+45 mins.	14	54	**142**	210	55	189	39	283	29	55	67	151	165	224	16	405
Total Volume	53	261	483	797	189	774	254	1217	110	265	307	682	785	986	100	1871
% App. Total	6.6	32.7	60.6		15.5	63.6	20.9		16.1	38.9	45		42	52.7	5.3	
PHF	.736	.847	.850	.935	.859	.958	.804	.911	.917	.761	.791	.836	.900	.874	.735	.876

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15S4PM
Site Code : 09814452
Start Date : 11/20/2014
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Groups Printed- Large 2 Axle Vehicles

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	2	0	0	2	0	3	1	4	1	0	0	1	1	0	0	1	8
04:15 PM	2	0	0	2	0	6	0	6	0	0	0	0	0	2	1	3	11
04:30 PM	3	0	1	4	1	4	0	5	0	0	0	0	1	2	1	4	13
04:45 PM	0	0	0	0	0	5	1	6	0	0	0	0	0	1	0	1	7
Total	7	0	1	8	1	18	2	21	1	0	0	1	2	5	2	9	39
05:00 PM	1	0	1	2	0	4	2	6	0	1	0	1	0	2	0	2	11
05:15 PM	0	0	0	0	0	3	0	3	0	0	0	0	1	3	0	4	7
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
05:45 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	2	0	2	6
Total	1	0	1	2	0	13	2	15	0	1	0	1	1	8	0	9	27
Grand Total	8	0	2	10	1	31	4	36	1	1	0	2	3	13	2	18	66
Apprch %	80	0	20		2.8	86.1	11.1		50	50	0		16.7	72.2	11.1		
Total %	12.1	0	3	15.2	1.5	47	6.1	54.5	1.5	1.5	0	3	4.5	19.7	3	27.3	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	**5**	1	**6**	0	0	0	0	0	1	0	1	7
05:00 PM	**1**	0	**1**	**2**	0	4	**2**	6	0	**1**	0	**1**	0	2	0	2	**11**
05:15 PM	0	0	0	0	0	3	0	3	0	0	0	0	**1**	**3**	0	**4**	7
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
Total Volume	1	0	1	2	0	14	3	17	0	1	0	1	1	7	0	8	28
% App. Total	50	0	50		0	82.4	17.6		0	100	0		12.5	87.5	0		
PHF	.250	.000	.250	.250	.000	.700	.375	.708	.000	.250	.000	.250	.250	.583	.000	.500	.636

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15S4PM
Site Code : 09814452
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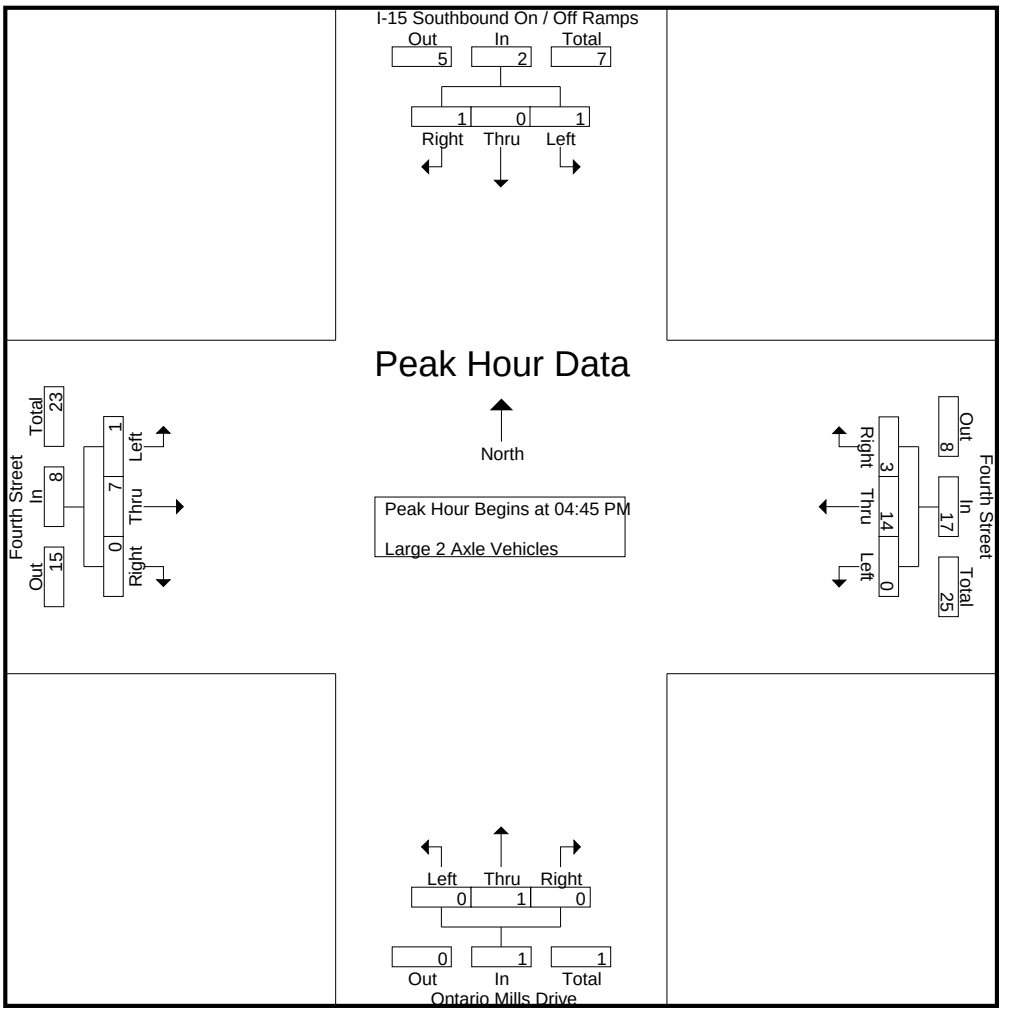

Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:45 PM				05:00 PM			
+0 mins.	0	0	0	0	0	**5**	1	**6**	0	0	0	0	0	2	0	2
+15 mins.	**1**	0	**1**	**2**	0	4	**2**	6	0	**1**	0	**1**	**1**	**3**	0	**4**
+30 mins.	0	0	0	0	0	3	0	3	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	2
Total Volume	1	0	1	2	0	14	3	17	0	1	0	1	1	8	0	9
% App. Total	50	0	50		0	82.4	17.6		0	100	0		11.1	88.9	0	
PHF	.250	.000	.250	.250	.000	.700	.375	.708	.000	.250	.000	.250	.250	.667	.000	.563

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

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Groups Printed- 3 Axle Vehicles

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
04:15 PM	0	0	0	0	0	2	0	2	0	0	1	1	0	1	0	1	4
04:30 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	2	0	2	4
04:45 PM	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	3
Total	0	1	0	1	1	5	0	6	0	0	1	1	0	4	0	4	12
05:00 PM	0	0	1	1	0	3	1	4	1	0	0	1	0	1	0	1	7
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	5
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
05:45 PM	0	0	0	0	0	1	0	1	0	1	0	1	1	2	0	3	5
Total	0	0	1	1	0	6	1	7	1	1	0	2	1	9	0	10	20
Grand Total	0	1	1	2	1	11	1	13	1	1	1	3	1	13	0	14	32
Apprch %	0	50	50		7.7	84.6	7.7		33.3	33.3	33.3		7.1	92.9	0		
Total %	0	3.1	3.1	6.2	3.1	34.4	3.1	40.6	3.1	3.1	3.1	9.4	3.1	40.6	0	43.8	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	**1**	**1**	0	**3**	**1**	**4**	**1**	0	0	**1**	0	1	0	1	**7**
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**	0	**5**	5
05:30 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
05:45 PM	0	0	0	0	0	1	0	1	0	**1**	0	1	**1**	2	0	3	5
Total Volume	0	0	1	1	0	6	1	7	1	1	0	2	1	9	0	10	20
% App. Total	0	0	100		0	85.7	14.3		50	50	0		10	90	0		
PHF	.000	.000	.250	.250	.000	.500	.250	.438	.250	.250	.000	.500	.250	.450	.000	.500	.714

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City of Rancho Cucamonga
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Weather: Clear

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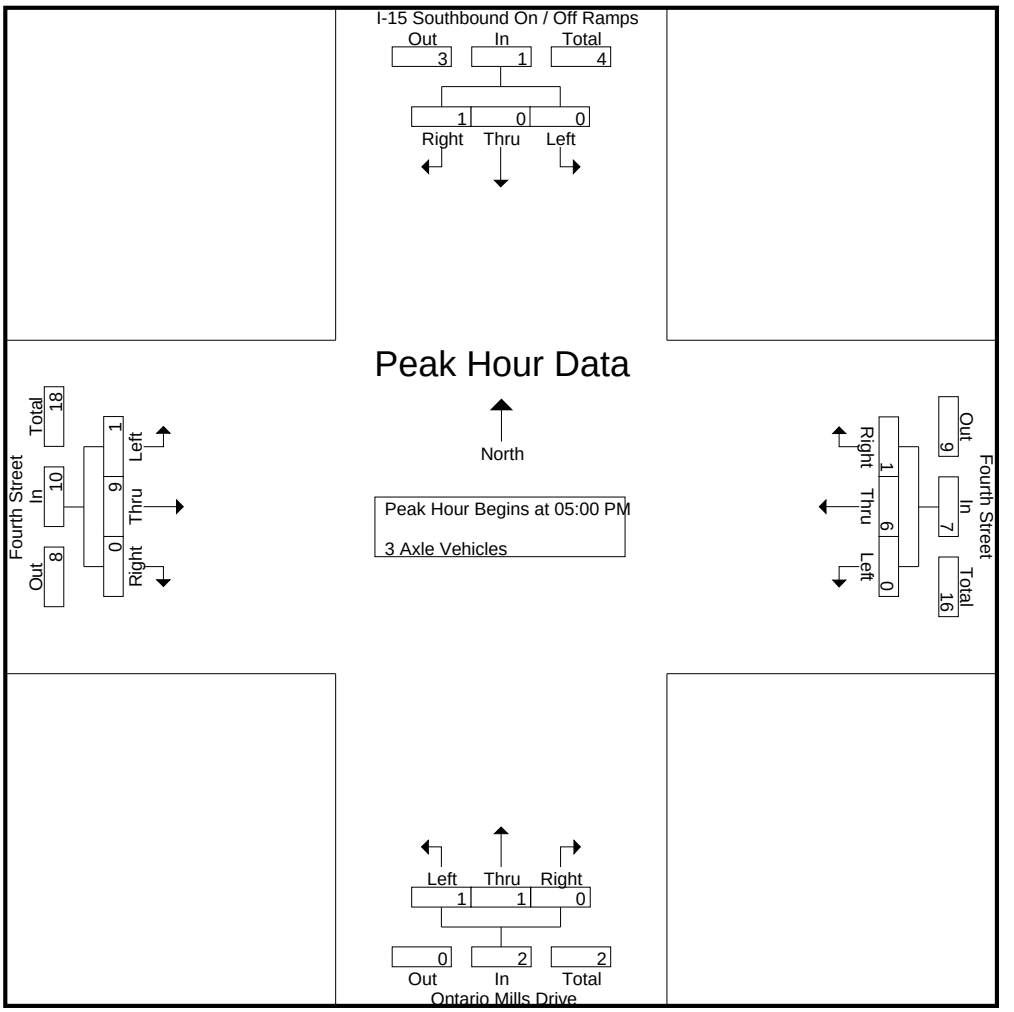

Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				05:00 PM				05:00 PM			
+0 mins.	0	0	0	0	**1**	2	0	3	**1**	0	0	**1**	0	1	0	1
+15 mins.	0	0	**1**	**1**	0	**3**	**1**	**4**	0	0	0	0	0	**5**	0	**5**
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+45 mins.	0	0	0	0	0	2	0	2	0	**1**	0	1	**1**	2	0	3
Total Volume	0	0	1	1	1	7	1	9	1	1	0	2	1	9	0	10
% App. Total	0	0	100		11.1	77.8	11.1		50	50	0		10	90	0	
PHF	.000	.000	.250	.250	.250	.583	.250	.563	.250	.250	.000	.500	.250	.450	.000	.500

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City of Rancho Cucamonga
N/S: I-15 Southbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

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Groups Printed- 4+ Axle Trucks

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	0	4	5	0	6	3	9	0	0	0	0	6	3	0	9	23
04:15 PM	2	0	1	3	0	9	5	14	0	0	0	0	1	4	0	5	22
04:30 PM	2	0	0	2	0	6	1	7	0	0	0	0	4	1	0	5	14
04:45 PM	4	0	1	5	0	8	2	10	0	0	0	0	1	4	0	5	20
Total	9	0	6	15	0	29	11	40	0	0	0	0	12	12	0	24	79
05:00 PM	3	0	2	5	0	3	1	4	0	0	0	0	4	3	0	7	16
05:15 PM	1	0	1	2	0	3	0	3	0	0	0	0	2	4	0	6	11
05:30 PM	2	0	2	4	0	5	3	8	0	0	0	0	4	2	0	6	18
05:45 PM	5	0	2	7	0	4	0	4	0	0	0	0	3	3	0	6	17
Total	11	0	7	18	0	15	4	19	0	0	0	0	13	12	0	25	62
Grand Total	20	0	13	33	0	44	15	59	0	0	0	0	25	24	0	49	141
Apprch %	60.6	0	39.4		0	74.6	25.4		0	0	0		51	49	0		
Total %	14.2	0	9.2	23.4	0	31.2	10.6	41.8	0	0	0	0	17.7	17	0	34.8	

	I-15 Southbound On / Off Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**4**	0	1	**5**	0	**8**	2	**10**	0	0	0	0	1	**4**	0	5	**20**
05:00 PM	3	0	**2**	5	0	3	1	4	0	0	0	0	**4**	3	0	**7**	16
05:15 PM	1	0	1	2	0	3	0	3	0	0	0	0	2	4	0	6	11
05:30 PM	2	0	2	4	0	5	**3**	8	0	0	0	0	4	2	0	6	18
Total Volume	10	0	6	16	0	19	6	25	0	0	0	0	11	13	0	24	65
% App. Total	62.5	0	37.5		0	76	24		0	0	0		45.8	54.2	0		
PHF	.625	.000	.750	.800	.000	.594	.500	.625	.000	.000	.000	.000	.688	.813	.000	.857	.813

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Weather: Clear

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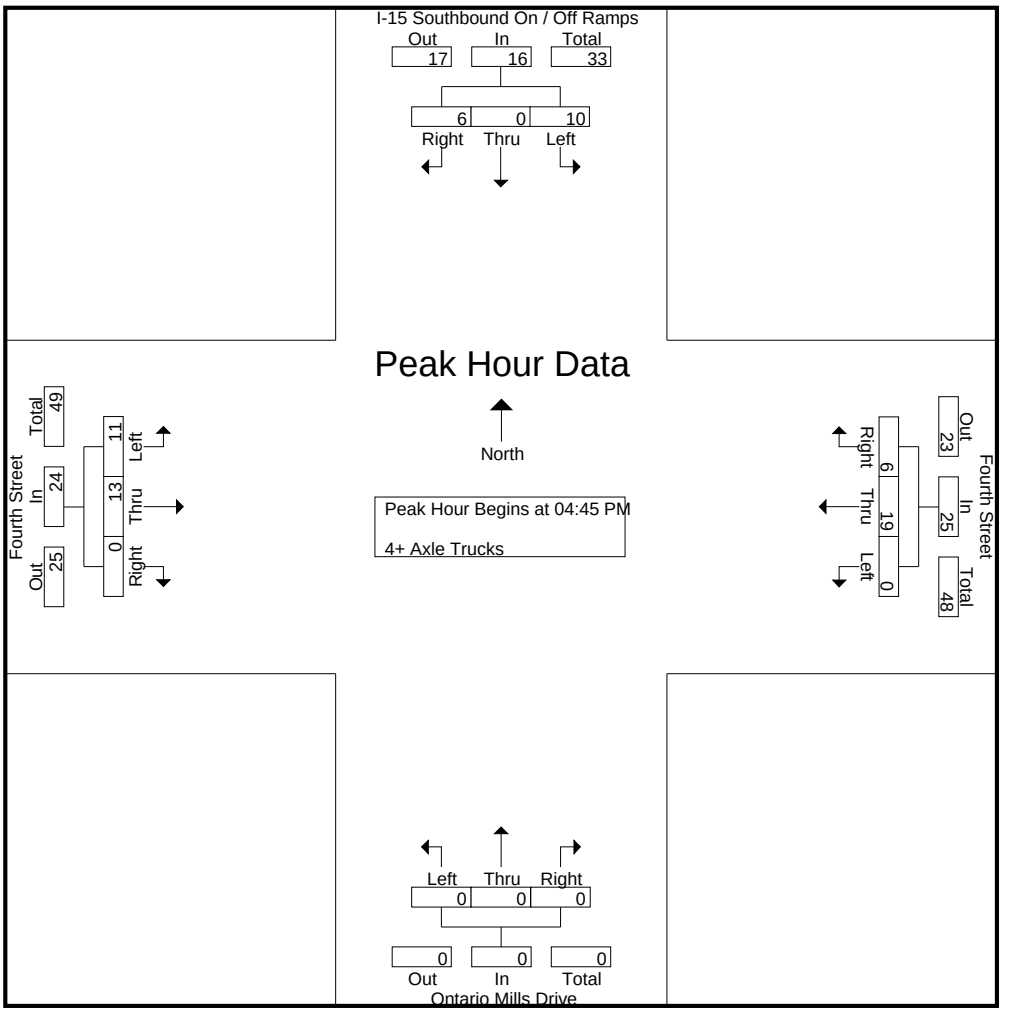

Peak Hour Analysis From 04:45 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				04:45 PM				04:45 PM				05:00 PM			
+0 mins.	3	0	**2**	5	0	**8**	2	**10**	0	0	0	0	**4**	3	0	**7**
+15 mins.	1	0	1	2	0	3	1	4	0	0	0	0	2	**4**	0	6
+30 mins.	2	0	2	4	0	3	0	3	0	0	0	0	4	2	0	6
+45 mins.	**5**	0	2	**7**	0	5	**3**	8	0	0	0	0	3	3	0	6
Total Volume	11	0	7	18	0	19	6	25	0	0	0	0	13	12	0	25
% App. Total	61.1	0	38.9		0	76	24		0	0	0		52	48	0	
PHF	.550	.000	.875	.643	.000	.594	.500	.625	.000	.000	.000	.000	.813	.750	.000	.893

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City of Rancho Cucamonga
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E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	63	19	129	211	13	75	10	98	13	10	10	33	41	67	15	123	465
07:15 AM	36	16	158	210	8	70	9	87	18	1	8	27	47	75	8	130	454
07:30 AM	62	18	193	273	9	109	13	131	29	3	13	45	32	61	12	105	554
07:45 AM	79	16	194	289	9	112	7	128	24	5	16	45	41	80	23	144	606
Total	240	69	674	983	39	366	39	444	84	19	47	150	161	283	58	502	2079
08:00 AM	86	9	202	297	15	87	16	118	23	6	9	38	43	67	18	128	581
08:15 AM	83	12	215	310	4	84	16	104	16	4	10	30	36	65	11	112	556
08:30 AM	53	11	182	246	11	79	13	103	23	6	10	39	39	60	16	115	503
08:45 AM	67	11	184	262	12	93	14	119	19	10	6	35	35	56	11	102	518
Total	289	43	783	1115	42	343	59	444	81	26	35	142	153	248	56	457	2158
Grand Total	529	112	1457	2098	81	709	98	888	165	45	82	292	314	531	114	959	4237
Apprch %	25.2	5.3	69.4		9.1	79.8	11		56.5	15.4	28.1		32.7	55.4	11.9		
Total %	12.5	2.6	34.4	49.5	1.9	16.7	2.3	21	3.9	1.1	1.9	6.9	7.4	12.5	2.7	22.6	
Passenger Vehicles	453	105	1373	1931	74	611	74	759	159	42	77	278	293	459	111	863	3831
% Passenger Vehicles	85.6	93.8	94.2	92	91.4	86.2	75.5	85.5	96.4	93.3	93.9	95.2	93.3	86.4	97.4	90	90.4
Large 2 Axle Vehicles	18	1	24	43	5	34	9	48	2	2	1	5	13	21	1	35	131
% Large 2 Axle Vehicles	3.4	0.9	1.6	2	6.2	4.8	9.2	5.4	1.2	4.4	1.2	1.7	4.1	4	0.9	3.6	3.1
3 Axle Vehicles	5	1	3	9	1	15	0	16	1	1	1	3	0	6	1	7	35
% 3 Axle Vehicles	0.9	0.9	0.2	0.4	1.2	2.1	0	1.8	0.6	2.2	1.2	1	0	1.1	0.9	0.7	0.8
4+ Axle Trucks	53	5	57	115	1	49	15	65	3	0	3	6	8	45	1	54	240
% 4+ Axle Trucks	10	4.5	3.9	5.5	1.2	6.9	15.3	7.3	1.8	0	3.7	2.1	2.5	8.5	0.9	5.6	5.7

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	62	**18**	193	273	9	109	13	**131**	**29**	3	13	**45**	32	61	12	105	554
07:45 AM	79	16	194	289	9	**112**	7	128	24	5	**16**	45	41	**80**	**23**	**144**	**606**
08:00 AM	**86**	9	202	297	**15**	87	**16**	118	23	**6**	9	38	**43**	67	18	128	581
08:15 AM	83	12	**215**	**310**	4	84	16	104	16	4	10	30	36	65	11	112	556
Total Volume	310	55	804	1169	37	392	52	481	92	18	48	158	152	273	64	489	2297
% App. Total	26.5	4.7	68.8		7.7	81.5	10.8		58.2	11.4	30.4		31.1	55.8	13.1		
PHF	.901	.764	.935	.943	.617	.875	.813	.918	.793	.750	.750	.878	.884	.853	.696	.849	.948

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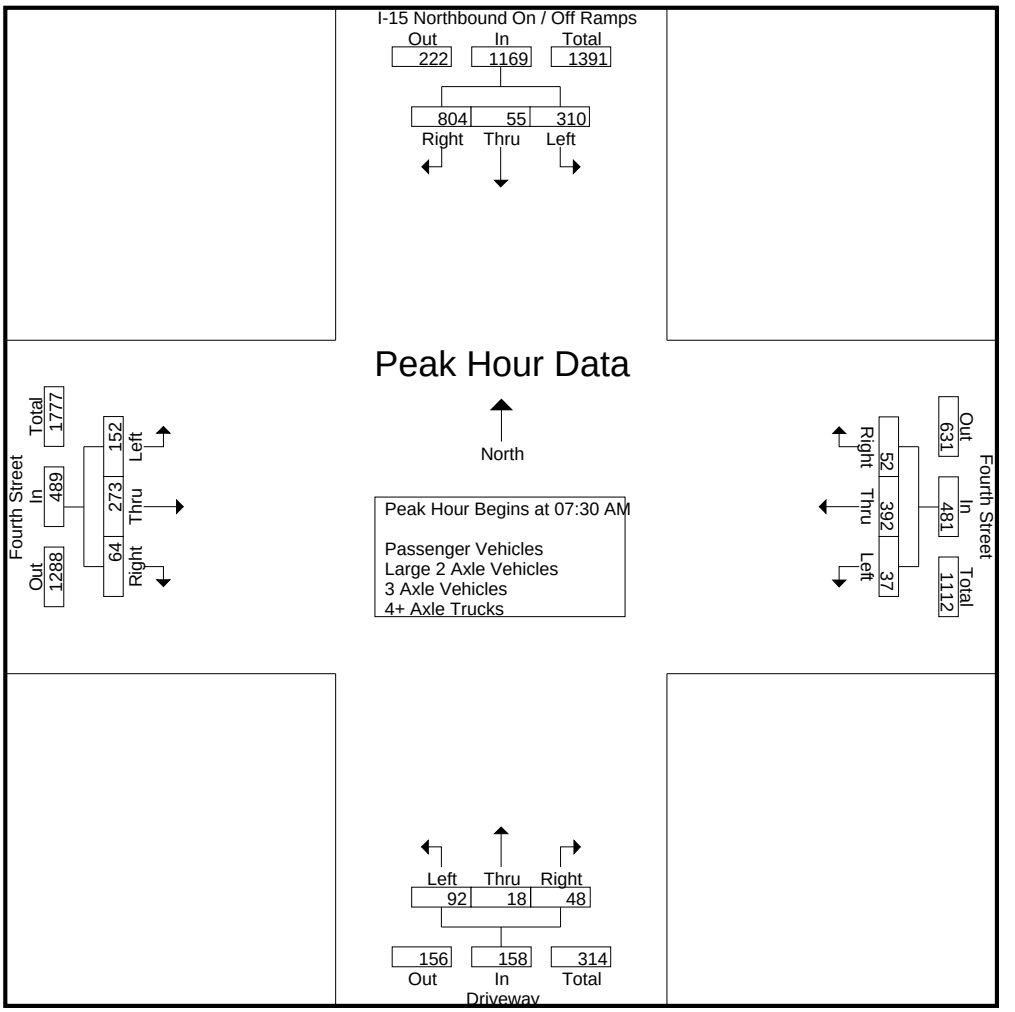

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:15 AM			
+0 mins.	62	**18**	193	273	9	109	13	**131**	**29**	3	13	**45**	**47**	75	8	130
+15 mins.	79	16	194	289	9	**112**	7	128	24	5	**16**	45	32	61	12	105
+30 mins.	**86**	9	202	297	**15**	87	**16**	118	23	**6**	9	38	41	**80**	**23**	**144**
+45 mins.	83	12	**215**	**310**	4	84	16	104	16	4	10	30	43	67	18	128
Total Volume	310	55	804	1169	37	392	52	481	92	18	48	158	163	283	61	507
% App. Total	26.5	4.7	68.8		7.7	81.5	10.8		58.2	11.4	30.4		32.1	55.8	12	
PHF	.901	.764	.935	.943	.617	.875	.813	.918	.793	.750	.750	.878	.867	.884	.663	.880

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 1

Groups Printed- Passenger Vehicles

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	56	17	122	195	11	66	10	87	13	9	9	31	34	58	15	107	420
07:15 AM	35	15	154	204	8	61	4	73	18	1	8	27	42	69	8	119	423
07:30 AM	53	18	181	252	9	96	10	115	27	3	12	42	32	55	12	99	508
07:45 AM	70	14	189	273	8	104	6	118	23	5	14	42	40	71	22	133	566
Total	214	64	646	924	36	327	30	393	81	18	43	142	148	253	57	458	1917
08:00 AM	79	7	193	279	14	74	12	100	21	5	8	34	41	56	18	115	528
08:15 AM	72	12	204	288	4	73	13	90	16	4	10	30	34	56	11	101	509
08:30 AM	40	11	169	220	11	63	9	83	23	6	10	39	36	50	15	101	443
08:45 AM	48	11	161	220	9	74	10	93	18	9	6	33	34	44	10	88	434
Total	239	41	727	1007	38	284	44	366	78	24	34	136	145	206	54	405	1914
Grand Total	453	105	1373	1931	74	611	74	759	159	42	77	278	293	459	111	863	3831
Apprch %	23.5	5.4	71.1		9.7	80.5	9.7		57.2	15.1	27.7		34	53.2	12.9		
Total %	11.8	2.7	35.8	50.4	1.9	15.9	1.9	19.8	4.2	1.1	2	7.3	7.6	12	2.9	22.5	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	53	**18**	181	252	9	96	10	115	**27**	3	12	**42**	32	55	12	99	508
07:45 AM	70	14	189	273	8	**104**	6	**118**	23	**5**	**14**	42	40	**71**	**22**	**133**	**566**
08:00 AM	**79**	7	193	279	**14**	74	12	100	21	5	8	34	**41**	56	18	115	528
08:15 AM	72	12	**204**	**288**	4	73	**13**	90	16	4	10	30	34	56	11	101	509
Total Volume	274	51	767	1092	35	347	41	423	87	17	44	148	147	238	63	448	2111
% App. Total	25.1	4.7	70.2		8.3	82	9.7		58.8	11.5	29.7		32.8	53.1	14.1		
PHF	.867	.708	.940	.948	.625	.834	.788	.896	.806	.850	.786	.881	.896	.838	.716	.842	.932

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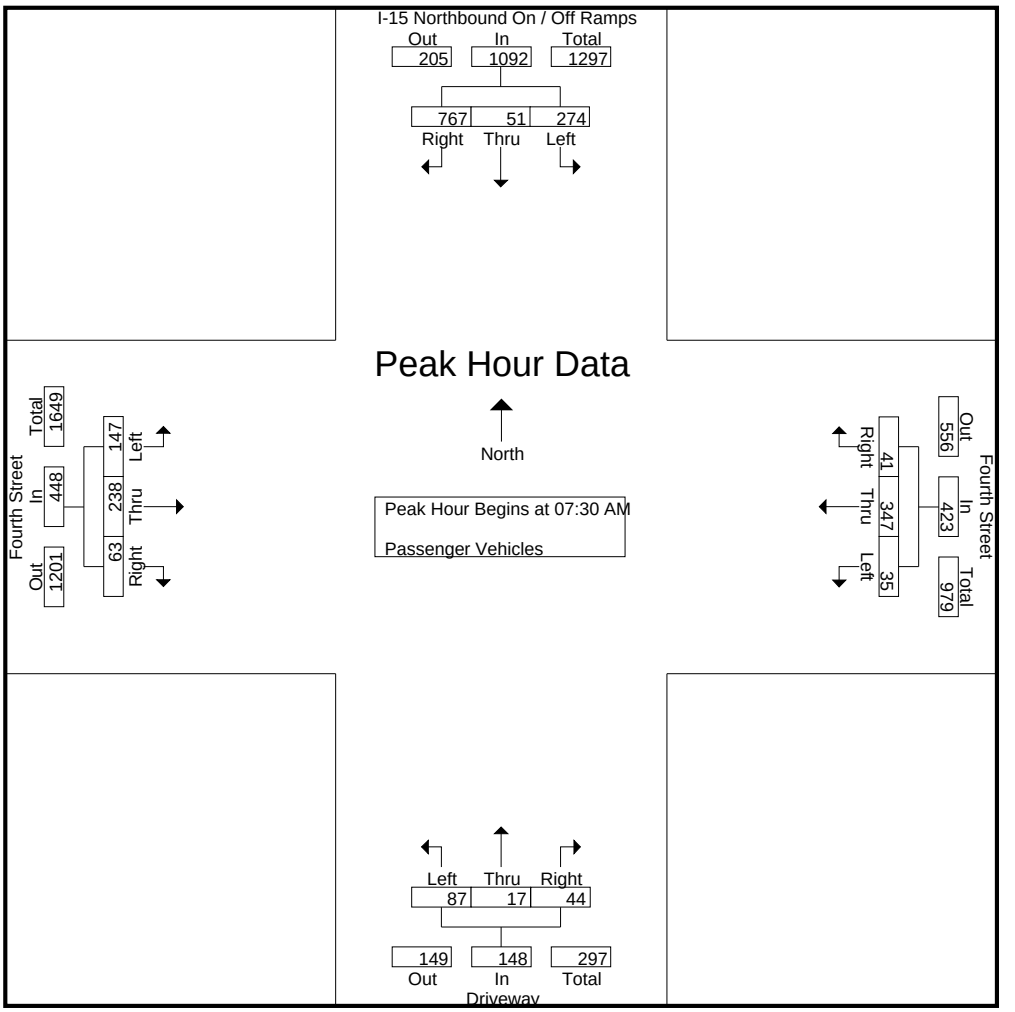
City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 2



Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	53	**18**	181	252	9	96	10	115	**27**	3	12	**42**	32	55	12	99
+15 mins.	70	14	189	273	8	**104**	6	**118**	23	**5**	**14**	42	40	**71**	**22**	**133**
+30 mins.	**79**	7	193	279	**14**	74	12	100	21	5	8	34	**41**	56	18	115
+45 mins.	72	12	**204**	**288**	4	73	**13**	90	16	4	10	30	34	56	11	101
Total Volume	274	51	767	1092	35	347	41	423	87	17	44	148	147	238	63	448
% App. Total	25.1	4.7	70.2		8.3	82	9.7		58.8	11.5	29.7		32.8	53.1	14.1	
PHF	.867	.708	.940	.948	.625	.834	.788	.896	.806	.850	.786	.881	.896	.838	.716	.842

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
Start Date : 11/20/2014
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Groups Printed- Large 2 Axle Vehicles

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	0	1	3	2	4	0	6	0	1	1	2	3	1	0	4	15
07:15 AM	1	0	2	3	0	4	3	7	0	0	0	0	3	3	0	6	16
07:30 AM	4	0	1	5	0	4	1	5	0	0	0	0	0	3	0	3	13
07:45 AM	0	0	2	2	0	3	1	4	0	0	0	0	1	0	0	1	7
Total	7	0	6	13	2	15	5	22	0	1	1	2	7	7	0	14	51
08:00 AM	1	1	2	4	1	4	1	6	1	0	0	1	1	3	0	4	15
08:15 AM	2	0	4	6	0	5	1	6	0	0	0	0	2	6	0	8	20
08:30 AM	3	0	4	7	0	3	2	5	0	0	0	0	2	2	1	5	17
08:45 AM	5	0	8	13	2	7	0	9	1	1	0	2	1	3	0	4	28
Total	11	1	18	30	3	19	4	26	2	1	0	3	6	14	1	21	80
Grand Total	18	1	24	43	5	34	9	48	2	2	1	5	13	21	1	35	131
Apprch %	41.9	2.3	55.8		10.4	70.8	18.8		40	40	20		37.1	60	2.9		
Total %	13.7	0.8	18.3	32.8	3.8	26	6.9	36.6	1.5	1.5	0.8	3.8	9.9	16	0.8	26.7	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**4**	0	1	5	0	4	**1**	5	0	0	0	0	0	3	0	3	13
07:45 AM	0	0	2	2	0	3	1	4	0	0	0	0	1	0	0	1	7
08:00 AM	1	**1**	2	4	**1**	4	1	**6**	**1**	0	0	**1**	1	3	0	4	15
08:15 AM	2	0	**4**	**6**	0	**5**	1	6	0	0	0	0	**2**	**6**	0	**8**	**20**
Total Volume	7	1	9	17	1	16	4	21	1	0	0	1	4	12	0	16	55
% App. Total	41.2	5.9	52.9		4.8	76.2	19		100	0	0		25	75	0		
PHF	.438	.250	.563	.708	.250	.800	1.00	.875	.250	.000	.000	.250	.500	.500	.000	.500	.688

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
Start Date : 11/20/2014
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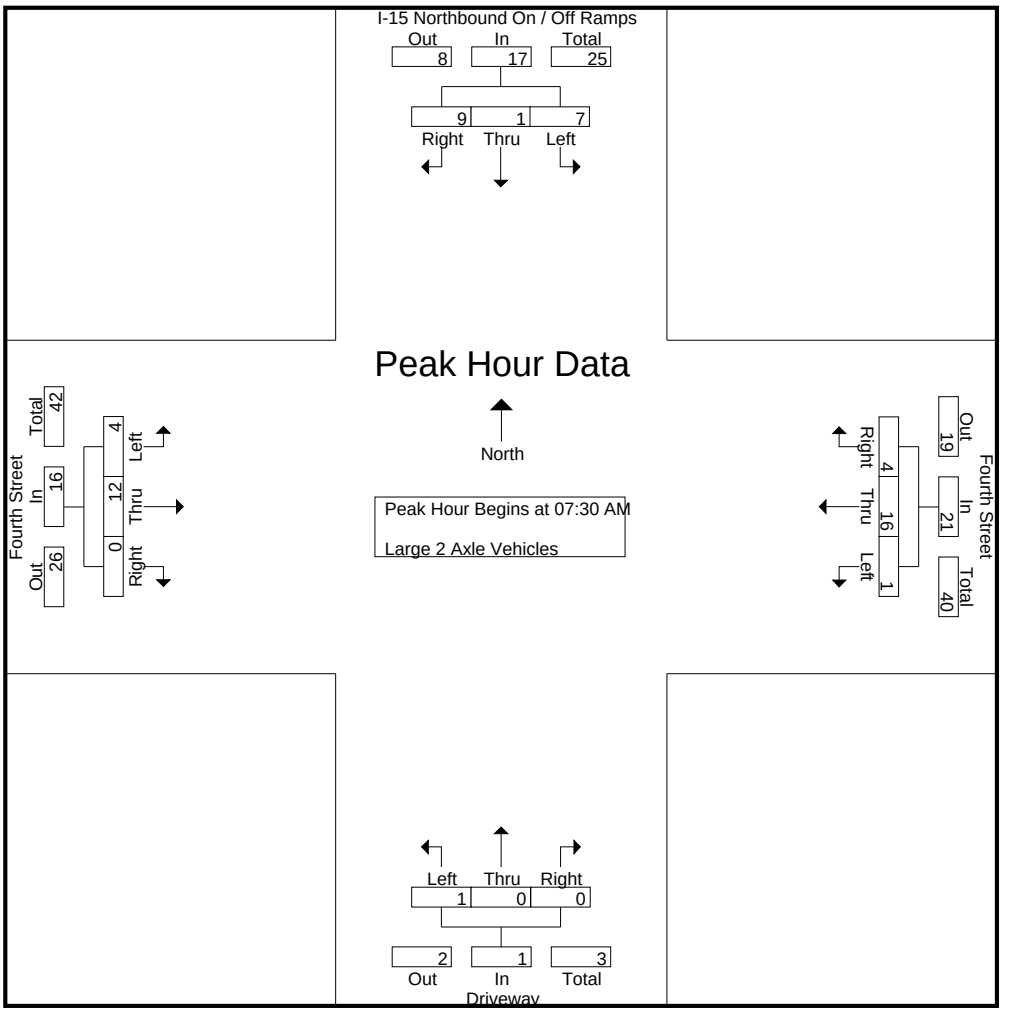

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	**4**	0	1	5	0	4	**1**	5	0	0	0	0	0	3	0	3
+15 mins.	0	0	2	2	0	3	1	4	0	0	0	0	1	0	0	1
+30 mins.	1	**1**	2	4	**1**	4	1	**6**	**1**	0	0	**1**	1	3	0	4
+45 mins.	2	0	**4**	**6**	0	**5**	1	6	0	0	0	0	**2**	**6**	0	**8**
Total Volume	7	1	9	17	1	16	4	21	1	0	0	1	4	12	0	16
% App. Total	41.2	5.9	52.9		4.8	76.2	19		100	0	0		25	75	0	
PHF	.438	.250	.563	.708	.250	.800	1.000	.875	.250	.000	.000	.250	.500	.500	.000	.500

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
Start Date : 11/20/2014
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Groups Printed- 3 Axle Vehicles

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	1	1	0	1	0	1	1	0	0	1	0	0	0	0	3
07:45 AM	0	1	0	1	0	1	0	1	0	0	1	1	0	1	1	2	5
Total	0	1	1	2	0	3	0	3	1	0	1	2	0	2	1	3	10
08:00 AM	1	0	2	3	0	4	0	4	0	1	0	1	0	0	0	0	8
08:15 AM	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
08:30 AM	2	0	0	2	0	3	0	3	0	0	0	0	0	0	0	0	5
08:45 AM	1	0	0	1	1	4	0	5	0	0	0	0	0	3	0	3	9
Total	5	0	2	7	1	12	0	13	0	1	0	1	0	4	0	4	25
Grand Total	5	1	3	9	1	15	0	16	1	1	1	3	0	6	1	7	35
Apprch %	55.6	11.1	33.3		6.2	93.8	0		33.3	33.3	33.3		0	85.7	14.3		
Total %	14.3	2.9	8.6	25.7	2.9	42.9	0	45.7	2.9	2.9	2.9	8.6	0	17.1	2.9	20	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	1	1	0	1	0	1	**1**	0	0	**1**	0	0	0	0	3
07:45 AM	0	**1**	0	1	0	1	0	1	0	0	**1**	1	0	**1**	**1**	**2**	5
08:00 AM	**1**	0	**2**	**3**	0	**4**	0	**4**	0	**1**	0	1	0	0	0	0	**8**
08:15 AM	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
Total Volume	2	1	3	6	0	7	0	7	1	1	1	3	0	2	1	3	19
% App. Total	33.3	16.7	50		0	100	0		33.3	33.3	33.3		0	66.7	33.3		
PHF	.500	.250	.375	.500	.000	.438	.000	.438	.250	.250	.250	.750	.000	.500	.250	.375	.594

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
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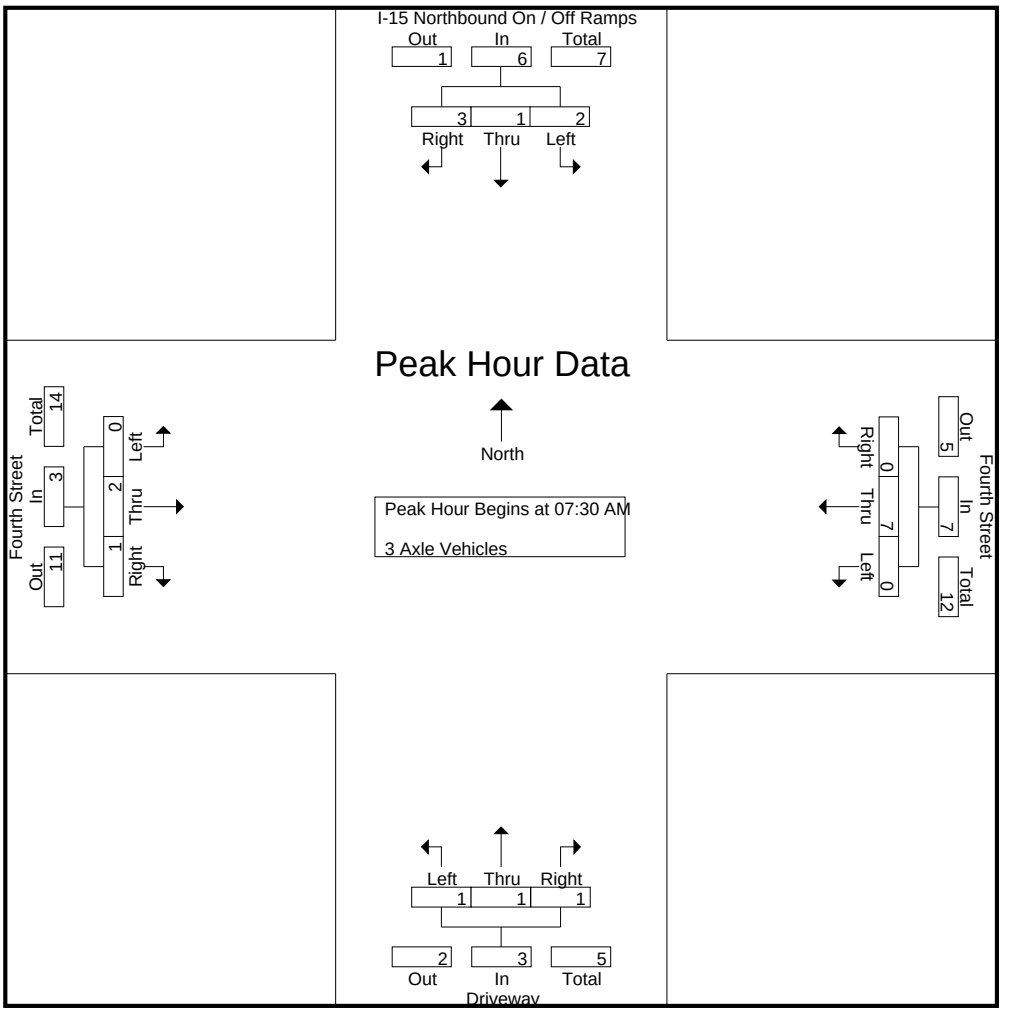

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	0	0	1	1	0	1	0	1	**1**	0	0	**1**	0	0	0	0
+15 mins.	0	**1**	0	1	0	1	0	1	0	0	**1**	1	0	**1**	**1**	**2**
+30 mins.	**1**	0	**2**	**3**	0	**4**	0	**4**	0	**1**	0	1	0	0	0	0
+45 mins.	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	1
Total Volume	2	1	3	6	0	7	0	7	1	1	1	3	0	2	1	3
% App. Total	33.3	16.7	50		0	100	0		33.3	33.3	33.3		0	66.7	33.3	
PHF	.500	.250	.375	.500	.000	.438	.000	.438	.250	.250	.250	.750	.000	.500	.250	.375

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
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Groups Printed- 4+ Axle Trucks

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	5	2	6	13	0	4	0	4	0	0	0	0	4	7	0	11	28
07:15 AM	0	1	2	3	0	5	2	7	0	0	0	0	2	3	0	5	15
07:30 AM	5	0	10	15	0	8	2	10	1	0	1	2	0	3	0	3	30
07:45 AM	9	1	3	13	1	4	0	5	1	0	1	2	0	8	0	8	28
Total	19	4	21	44	1	21	4	26	2	0	2	4	6	21	0	27	101
08:00 AM	5	1	5	11	0	5	3	8	1	0	1	2	1	8	0	9	30
08:15 AM	8	0	7	15	0	5	2	7	0	0	0	0	0	2	0	2	24
08:30 AM	8	0	9	17	0	10	2	12	0	0	0	0	1	8	0	9	38
08:45 AM	13	0	15	28	0	8	4	12	0	0	0	0	0	6	1	7	47
Total	34	1	36	71	0	28	11	39	1	0	1	2	2	24	1	27	139
Grand Total	53	5	57	115	1	49	15	65	3	0	3	6	8	45	1	54	240
Apprch %	46.1	4.3	49.6		1.5	75.4	23.1		50	0	50		14.8	83.3	1.9		
Total %	22.1	2.1	23.8	47.9	0.4	20.4	6.2	27.1	1.2	0	1.2	2.5	3.3	18.8	0.4	22.5	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	5	0	**10**	**15**	0	**8**	2	**10**	**1**	0	**1**	**2**	0	3	0	3	**30**
07:45 AM	**9**	**1**	3	13	**1**	4	0	5	1	0	1	2	0	**8**	0	8	28
08:00 AM	5	1	5	11	0	5	**3**	8	1	0	1	2	**1**	8	0	**9**	30
08:15 AM	8	0	7	15	0	5	2	7	0	0	0	0	0	2	0	2	24
Total Volume	27	2	25	54	1	22	7	30	3	0	3	6	1	21	0	22	112
% App. Total	50	3.7	46.3		3.3	73.3	23.3		50	0	50		4.5	95.5	0		
PHF	.750	.500	.625	.900	.250	.688	.583	.750	.750	.000	.750	.750	.250	.656	.000	.611	.933

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4AM
Site Code : 09814452
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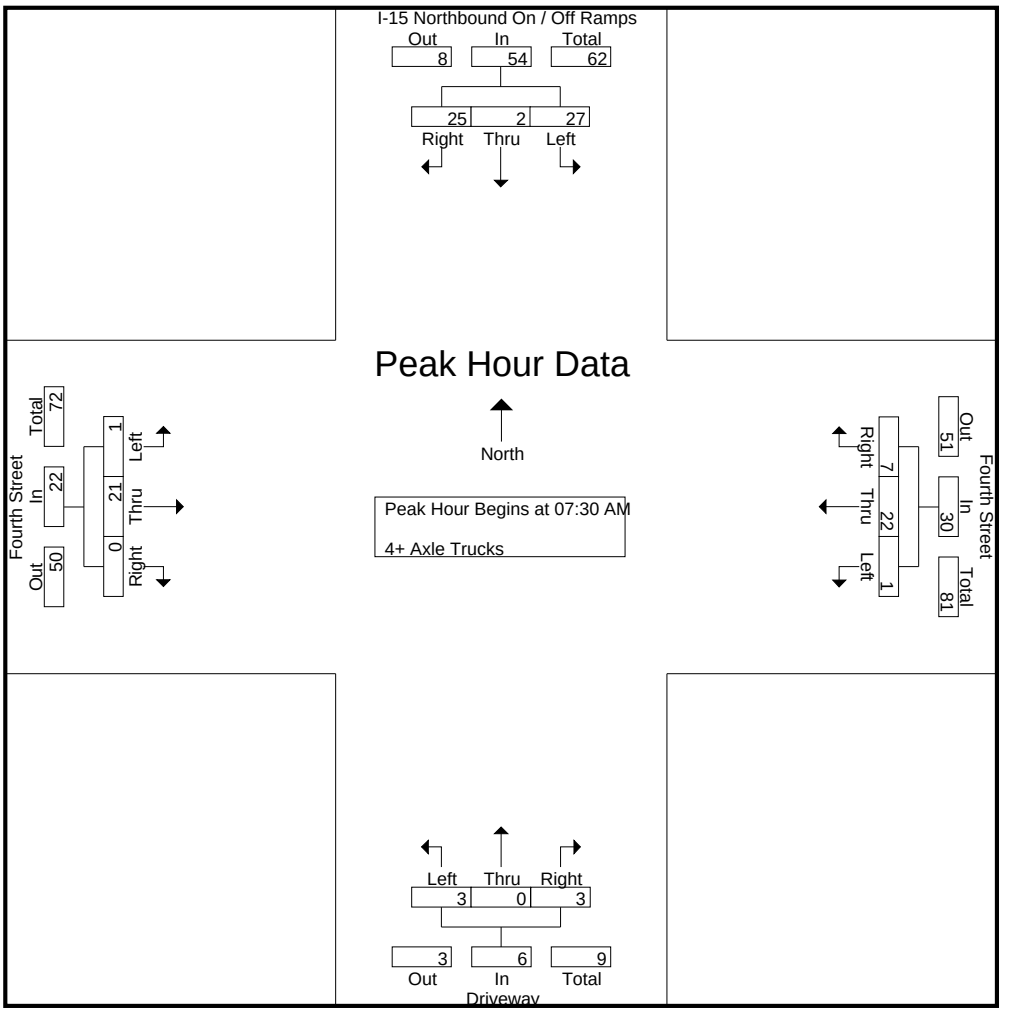

Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	5	0	**10**	**15**	0	**8**	2	**10**	**1**	0	**1**	**2**	0	3	0	3
+15 mins.	**9**	**1**	3	13	**1**	4	0	5	1	0	1	2	0	**8**	0	8
+30 mins.	5	1	5	11	0	5	**3**	8	1	0	1	2	**1**	8	0	**9**
+45 mins.	8	0	7	15	0	5	2	7	0	0	0	0	0	2	0	2
Total Volume	27	2	25	54	1	22	7	30	3	0	3	6	1	21	0	22
% App. Total	50	3.7	46.3		3.3	73.3	23.3		50	0	50		4.5	95.5	0	
PHF	.750	.500	.625	.900	.250	.688	.583	.750	.750	.000	.750	.750	.250	.656	.000	.611

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
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Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	27	11	139	177	17	165	55	237	21	16	10	47	157	113	16	286	747
04:15 PM	27	12	131	170	20	149	36	205	21	18	11	50	169	138	29	336	761
04:30 PM	31	14	139	184	18	143	36	197	28	14	9	51	174	142	20	336	768
04:45 PM	34	8	126	168	18	167	42	227	20	12	12	44	174	116	14	304	743
Total	119	45	535	699	73	624	169	866	90	60	42	192	674	509	79	1262	3019
05:00 PM	34	14	143	191	18	146	43	207	26	19	10	55	175	137	23	335	788
05:15 PM	21	21	115	157	12	168	22	202	25	19	18	62	173	195	24	392	813
05:30 PM	26	11	131	168	14	159	40	213	18	16	15	49	154	132	19	305	735
05:45 PM	29	10	135	174	14	143	24	181	17	15	15	47	147	140	16	303	705
Total	110	56	524	690	58	616	129	803	86	69	58	213	649	604	82	1335	3041
Grand Total	229	101	1059	1389	131	1240	298	1669	176	129	100	405	1323	1113	161	2597	6060
Apprch %	16.5	7.3	76.2		7.8	74.3	17.9		43.5	31.9	24.7		50.9	42.9	6.2		
Total %	3.8	1.7	17.5	22.9	2.2	20.5	4.9	27.5	2.9	2.1	1.7	6.7	21.8	18.4	2.7	42.9	
Passenger Vehicles	200	96	1020	1316	129	1178	280	1587	170	129	99	398	1310	1049	158	2517	5818
% Passenger Vehicles	87.3	95	96.3	94.7	98.5	95	94	95.1	96.6	100	99	98.3	99	94.2	98.1	96.9	96
Large 2 Axle Vehicles	8	1	8	17	2	21	2	25	3	0	1	4	2	21	2	25	71
% Large 2 Axle Vehicles	3.5	1	0.8	1.2	1.5	1.7	0.7	1.5	1.7	0	1	1	0.2	1.9	1.2	1	1.2
3 Axle Vehicles	5	4	4	13	0	12	4	16	1	0	0	1	1	8	1	10	40
% 3 Axle Vehicles	2.2	4	0.4	0.9	0	1	1.3	1	0.6	0	0	0.2	0.1	0.7	0.6	0.4	0.7
4+ Axle Trucks	16	0	27	43	0	29	12	41	2	0	0	2	10	35	0	45	131
% 4+ Axle Trucks	7	0	2.5	3.1	0	2.3	4	2.5	1.1	0	0	0.5	0.8	3.1	0	1.7	2.2

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	31	14	139	184	**18**	143	36	197	**28**	14	9	51	174	142	20	336	768
04:45 PM	**34**	8	126	168	18	167	42	**227**	20	12	12	44	174	116	14	304	743
05:00 PM	34	14	**143**	**191**	18	146	**43**	207	26	**19**	10	55	**175**	137	23	335	788
05:15 PM	21	**21**	115	157	12	**168**	22	202	25	19	**18**	**62**	173	**195**	**24**	**392**	**813**
Total Volume	120	57	523	700	66	624	143	833	99	64	49	212	696	590	81	1367	3112
% App. Total	17.1	8.1	74.7		7.9	74.9	17.2		46.7	30.2	23.1		50.9	43.2	5.9		
PHF	.882	.679	.914	.916	.917	.929	.831	.917	.884	.842	.681	.855	.994	.756	.844	.872	.957

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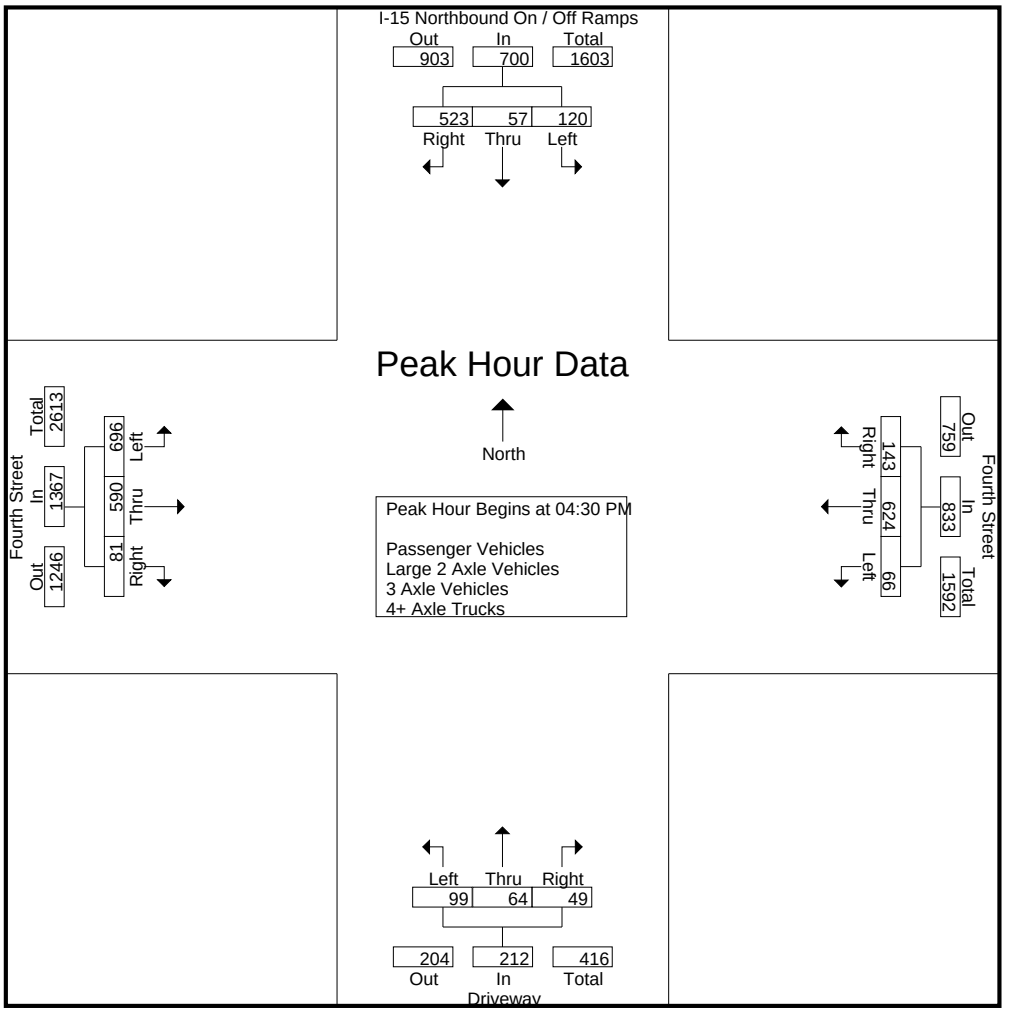
City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:00 PM				05:00 PM				04:30 PM			
+0 mins.	27	12	131	170	17	165	**55**	**237**	**26**	**19**	10	55	174	142	20	336
+15 mins.	31	**14**	139	184	**20**	149	36	205	25	19	**18**	**62**	174	116	14	304
+30 mins.	**34**	8	126	168	18	143	36	197	18	16	15	49	**175**	137	23	335
+45 mins.	34	14	**143**	**191**	18	**167**	42	227	17	15	15	47	173	**195**	**24**	**392**
Total Volume	126	48	539	713	73	624	169	866	86	69	58	213	696	590	81	1367
% App. Total	17.7	6.7	75.6		8.4	72.1	19.5		40.4	32.4	27.2		50.9	43.2	5.9	
PHF	.926	.857	.942	.933	.913	.934	.768	.914	.827	.908	.806	.859	.994	.756	.844	.872

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
Site Code : 09814452
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Groups Printed- Passenger Vehicles

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	23	11	129	163	16	162	50	228	21	16	10	47	156	106	16	278	716
04:15 PM	21	12	125	158	19	138	32	189	20	18	11	49	165	128	29	322	718
04:30 PM	29	11	134	174	18	136	36	190	25	14	9	48	174	134	19	327	739
04:45 PM	33	8	120	161	18	156	41	215	20	12	12	44	171	110	13	294	714
Total	106	42	508	656	71	592	159	822	86	60	42	188	666	478	77	1221	2887
05:00 PM	29	14	140	183	18	140	42	200	24	19	9	52	173	132	22	327	762
05:15 PM	19	21	113	153	12	162	20	194	25	19	18	62	172	184	24	380	789
05:30 PM	21	9	127	157	14	147	39	200	18	16	15	49	153	126	19	298	704
05:45 PM	25	10	132	167	14	137	20	171	17	15	15	47	146	129	16	291	676
Total	94	54	512	660	58	586	121	765	84	69	57	210	644	571	81	1296	2931
Grand Total	200	96	1020	1316	129	1178	280	1587	170	129	99	398	1310	1049	158	2517	5818
Apprch %	15.2	7.3	77.5		8.1	74.2	17.6		42.7	32.4	24.9		52	41.7	6.3		
Total %	3.4	1.7	17.5	22.6	2.2	20.2	4.8	27.3	2.9	2.2	1.7	6.8	22.5	18	2.7	43.3	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	29	11	134	174	**18**	136	36	190	**25**	14	9	48	**174**	134	19	327	739
04:45 PM	**33**	8	120	161	18	156	41	**215**	20	12	12	44	171	110	13	294	714
05:00 PM	29	14	**140**	**183**	18	140	**42**	200	24	**19**	9	52	173	132	22	327	762
05:15 PM	19	**21**	113	153	12	**162**	20	194	25	19	**18**	**62**	172	**184**	**24**	**380**	**789**
Total Volume	110	54	507	671	66	594	139	799	94	64	48	206	690	560	78	1328	3004
% App. Total	16.4	8	75.6		8.3	74.3	17.4		45.6	31.1	23.3		52	42.2	5.9		
PHF	.833	.643	.905	.917	.917	.917	.827	.929	.940	.842	.667	.831	.991	.761	.813	.874	.952

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
Site Code : 09814452
Start Date : 11/20/2014
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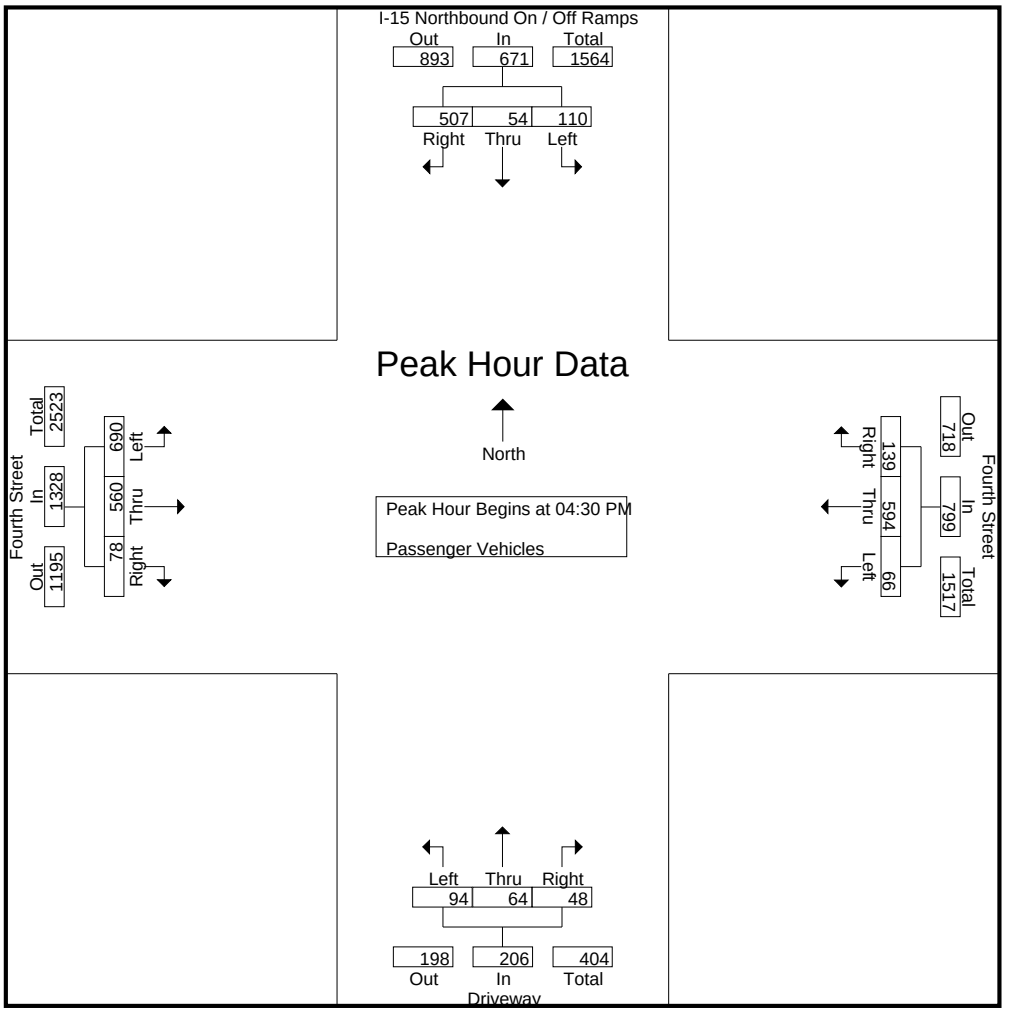

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	29	11	134	174	**18**	136	36	190	**25**	14	9	48	**174**	134	19	327
+15 mins.	**33**	8	120	161	18	156	41	**215**	20	12	12	44	171	110	13	294
+30 mins.	29	14	**140**	**183**	18	140	**42**	200	24	**19**	9	52	173	132	22	327
+45 mins.	19	**21**	113	153	12	**162**	20	194	25	19	**18**	**62**	172	**184**	**24**	**380**
Total Volume	110	54	507	671	66	594	139	799	94	64	48	206	690	560	78	1328
% App. Total	16.4	8	75.6		8.3	74.3	17.4		45.6	31.1	23.3		52	42.2	5.9	
PHF	.833	.643	.905	.917	.917	.917	.827	.929	.940	.842	.667	.831	.991	.761	.813	.874

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
Site Code : 09814452
Start Date : 11/20/2014
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Groups Printed- Large 2 Axle Vehicles

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	3	3	1	0	1	2	0	0	0	0	0	2	0	2	7
04:15 PM	3	0	2	5	1	2	1	4	1	0	0	1	1	5	0	6	16
04:30 PM	1	1	0	2	0	5	0	5	2	0	0	2	0	4	1	5	14
04:45 PM	1	0	1	2	0	5	0	5	0	0	0	0	1	0	0	1	8
Total	5	1	6	12	2	12	2	16	3	0	0	3	2	11	1	14	45
05:00 PM	0	0	1	1	0	1	0	1	0	0	1	1	0	2	1	3	6
05:15 PM	0	0	0	0	0	5	0	5	0	0	0	0	0	5	0	5	10
05:30 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1	2
05:45 PM	3	0	0	3	0	3	0	3	0	0	0	0	0	2	0	2	8
Total	3	0	2	5	0	9	0	9	0	0	1	1	0	10	1	11	26
Grand Total	8	1	8	17	2	21	2	25	3	0	1	4	2	21	2	25	71
Apprch %	47.1	5.9	47.1		8	84	8		75	0	25		8	84	8		
Total %	11.3	1.4	11.3	23.9	2.8	29.6	2.8	35.2	4.2	0	1.4	5.6	2.8	29.6	2.8	35.2	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**1**	**1**	0	**2**	0	**5**	0	**5**	**2**	0	0	**2**	0	4	**1**	**5**	**14**
04:45 PM	1	0	**1**	2	0	5	0	5	0	0	0	0	**1**	0	0	1	8
05:00 PM	0	0	1	1	0	1	0	1	0	0	**1**	1	0	2	1	3	6
05:15 PM	0	0	0	0	0	5	0	5	0	0	0	0	0	**5**	0	5	10
Total Volume	2	1	2	5	0	16	0	16	2	0	1	3	1	11	2	14	38
% App. Total	40	20	40		0	100	0		66.7	0	33.3		7.1	78.6	14.3		
PHF	.500	.250	.500	.625	.000	.800	.000	.800	.250	.000	.250	.375	.250	.550	.500	.700	.679

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
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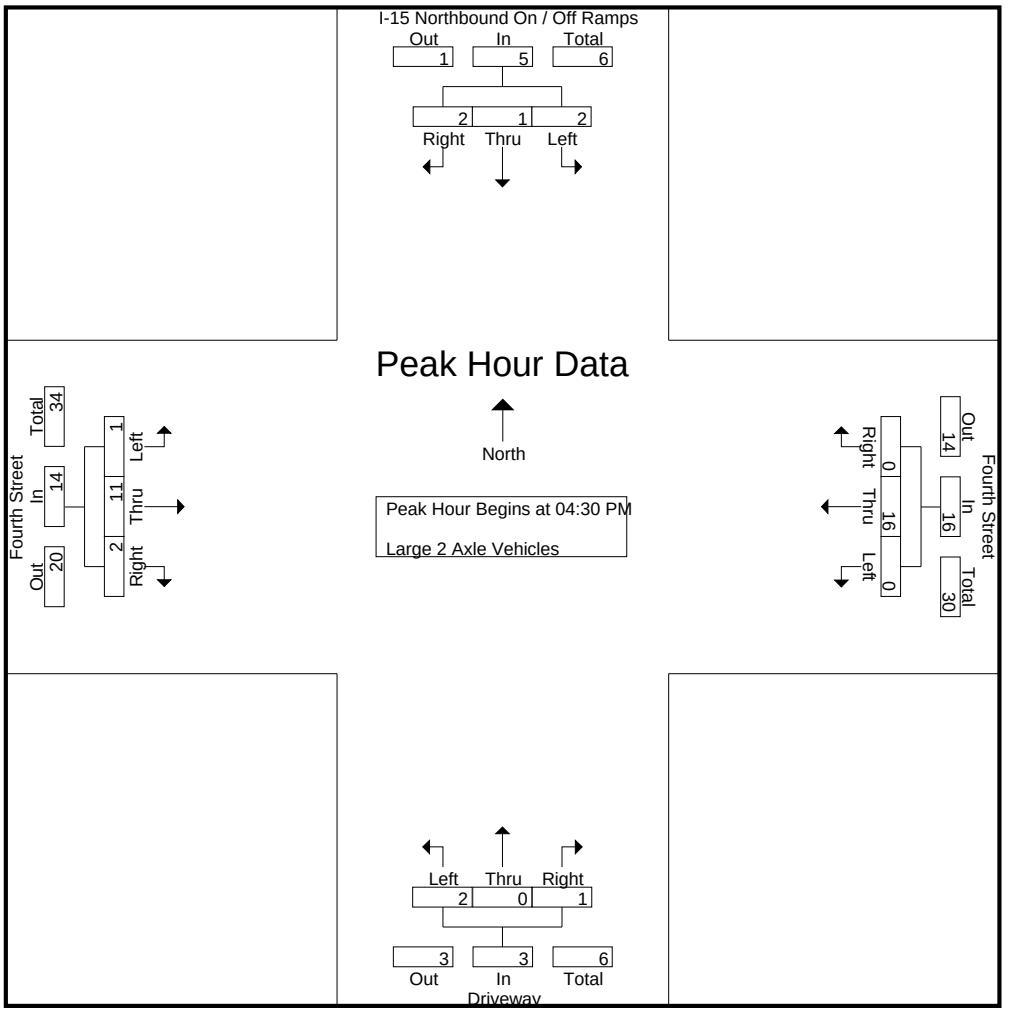

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	**1**	**1**	0	**2**	0	**5**	0	**5**	**2**	0	0	**2**	0	4	**1**	**5**
+15 mins.	1	0	**1**	2	0	5	0	5	0	0	0	0	**1**	0	0	1
+30 mins.	0	0	1	1	0	1	0	1	0	0	**1**	1	0	2	1	3
+45 mins.	0	0	0	0	0	5	0	5	0	0	0	0	0	**5**	0	5
Total Volume	2	1	2	5	0	16	0	16	2	0	1	3	1	11	2	14
% App. Total	40	20	40		0	100	0		66.7	0	33.3		7.1	78.6	14.3	
PHF	.500	.250	.500	.625	.000	.800	.000	.800	.250	.000	.250	.375	.250	.550	.500	.700

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
Site Code : 09814452
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Groups Printed- 3 Axle Vehicles

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
04:15 PM	1	0	0	1	0	2	0	2	0	0	0	0	0	1	0	1	4
04:30 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	1	0	1	3
04:45 PM	0	0	1	1	0	1	0	1	0	0	0	0	1	0	1	2	4
Total	1	2	1	4	0	3	0	3	0	0	0	0	1	4	1	6	13
05:00 PM	1	0	0	1	0	2	1	3	1	0	0	1	0	0	0	0	5
05:15 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	2	0	2	3
05:30 PM	2	2	2	6	0	6	0	6	0	0	0	0	0	1	0	1	13
05:45 PM	1	0	1	2	0	1	2	3	0	0	0	0	0	1	0	1	6
Total	4	2	3	9	0	9	4	13	1	0	0	1	0	4	0	4	27
Grand Total	5	4	4	13	0	12	4	16	1	0	0	1	1	8	1	10	40
Apprch %	38.5	30.8	30.8		0	75	25		100	0	0		10	80	10		
Total %	12.5	10	10	32.5	0	30	10	40	2.5	0	0	2.5	2.5	20	2.5	25	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	1	0	1	3
04:45 PM	0	0	**1**	1	0	1	0	1	0	0	0	0	**1**	0	**1**	**2**	4
05:00 PM	**1**	0	0	1	0	**2**	**1**	**3**	**1**	0	0	**1**	0	0	0	0	**5**
05:15 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	**2**	0	2	3
Total Volume	1	2	1	4	0	3	2	5	1	0	0	1	1	3	1	5	15
% App. Total	25	50	25		0	60	40		100	0	0		20	60	20		
PHF	.250	.250	.250	.500	.000	.375	.500	.417	.250	.000	.000	.250	.250	.375	.250	.625	.750

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City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
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Weather: Clear

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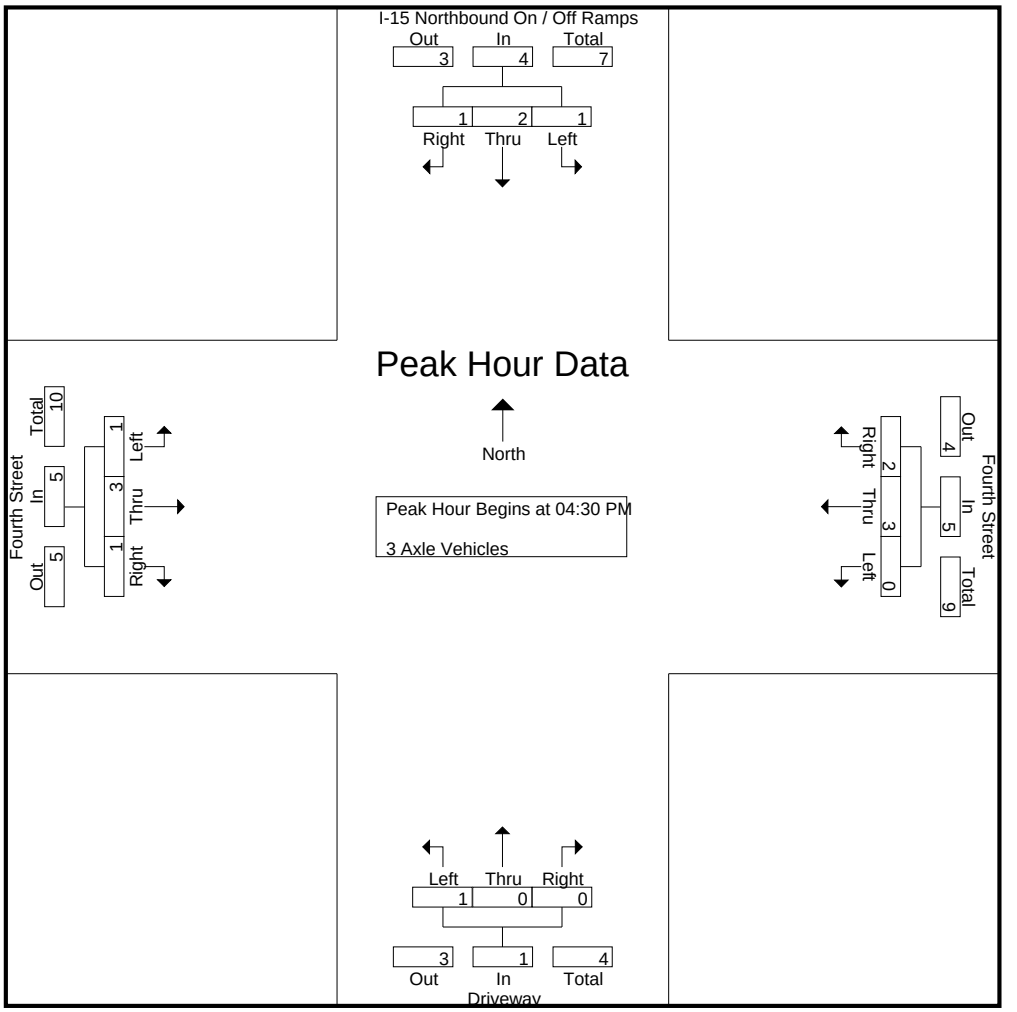

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	1	0	1
+15 mins.	0	0	**1**	1	0	1	0	1	0	0	0	0	**1**	0	**1**	**2**
+30 mins.	**1**	0	0	1	0	**2**	**1**	**3**	**1**	0	0	**1**	0	0	0	0
+45 mins.	0	0	0	0	0	0	1	1	0	0	0	0	0	**2**	0	2
Total Volume	1	2	1	4	0	3	2	5	1	0	0	1	1	3	1	5
% App. Total	25	50	25		0	60	40		100	0	0		20	60	20	
PHF	.250	.250	.250	.500	.000	.375	.500	.417	.250	.000	.000	.250	.250	.375	.250	.625

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N/S: I-15 Northbound On / Off Ramps
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Weather: Clear

File Name : RNC15N4PM
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Groups Printed- 4+ Axle Trucks

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	0	7	11	0	3	4	7	0	0	0	0	1	3	0	4	22
04:15 PM	2	0	4	6	0	7	3	10	0	0	0	0	3	4	0	7	23
04:30 PM	1	0	5	6	0	2	0	2	1	0	0	1	0	3	0	3	12
04:45 PM	0	0	4	4	0	5	1	6	0	0	0	0	1	6	0	7	17
Total	7	0	20	27	0	17	8	25	1	0	0	1	5	16	0	21	74
05:00 PM	4	0	2	6	0	3	0	3	1	0	0	1	2	3	0	5	15
05:15 PM	2	0	2	4	0	1	1	2	0	0	0	0	1	4	0	5	11
05:30 PM	3	0	1	4	0	6	1	7	0	0	0	0	1	4	0	5	16
05:45 PM	0	0	2	2	0	2	2	4	0	0	0	0	1	8	0	9	15
Total	9	0	7	16	0	12	4	16	1	0	0	1	5	19	0	24	57
Grand Total	16	0	27	43	0	29	12	41	2	0	0	2	10	35	0	45	131
Apprch %	37.2	0	62.8		0	70.7	29.3		100	0	0		22.2	77.8	0		
Total %	12.2	0	20.6	32.8	0	22.1	9.2	31.3	1.5	0	0	1.5	7.6	26.7	0	34.4	

	I-15 Northbound On / Off Ramps Southbound				Fourth Street Westbound				Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	1	0	**5**	**6**	0	2	0	2	**1**	0	0	**1**	0	3	0	3	12
04:45 PM	0	0	4	4	0	**5**	**1**	**6**	0	0	0	0	1	**6**	0	**7**	**17**
05:00 PM	**4**	0	2	6	0	3	0	3	1	0	0	1	**2**	3	0	5	15
05:15 PM	2	0	2	4	0	1	1	2	0	0	0	0	1	4	0	5	11
Total Volume	7	0	13	20	0	11	2	13	2	0	0	2	4	16	0	20	55
% App. Total	35	0	65		0	84.6	15.4		100	0	0		20	80	0		
PHF	.438	.000	.650	.833	.000	.550	.500	.542	.500	.000	.000	.500	.500	.667	.000	.714	.809

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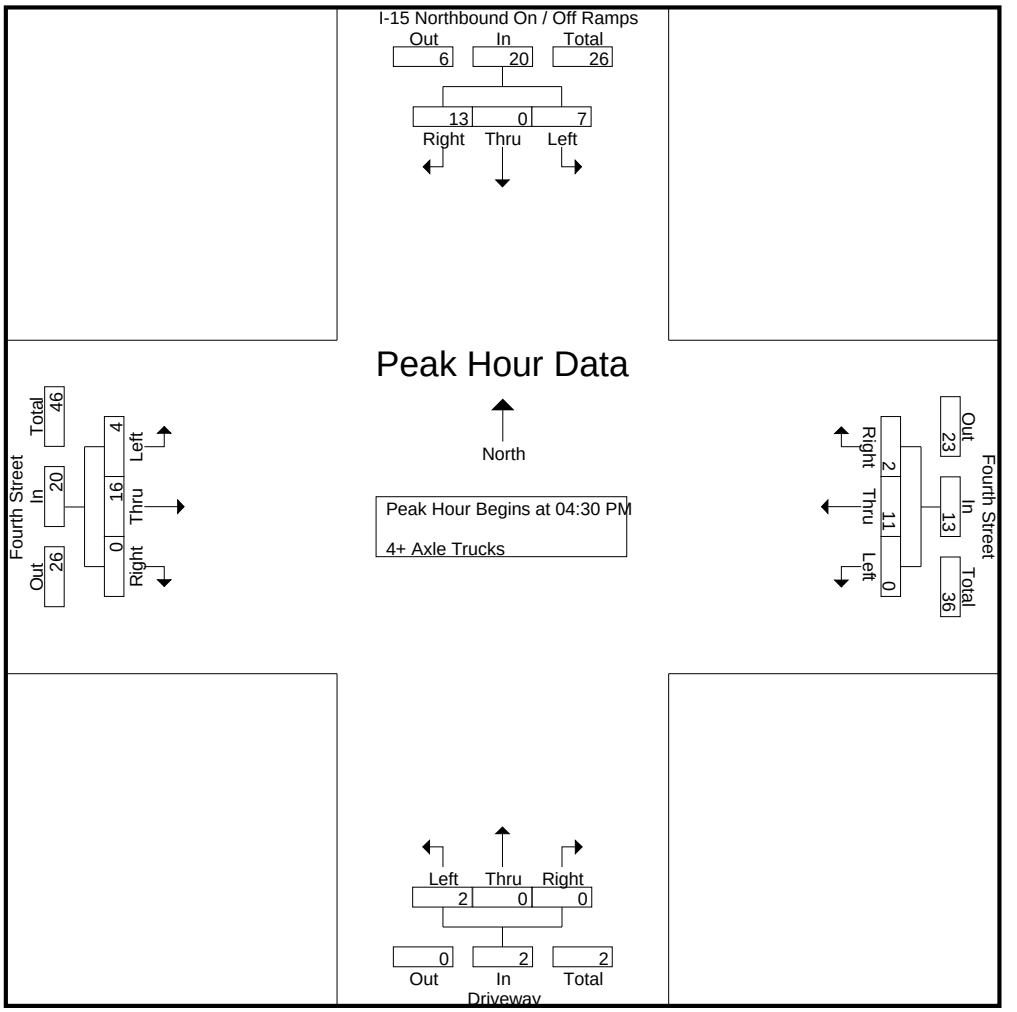
City of Rancho Cucamonga
N/S: I-15 Northbound On / Off Ramps
E/W: Fourth Street
Weather: Clear

File Name : RNC15N4PM
Site Code : 09814452
Start Date : 11/20/2014
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	1	0	**5**	**6**	0	2	0	2	**1**	0	0	**1**	0	3	0	3
+15 mins.	0	0	4	4	0	**5**	**1**	**6**	0	0	0	0	1	**6**	0	**7**
+30 mins.	**4**	0	2	6	0	3	0	3	1	0	0	1	**2**	3	0	5
+45 mins.	2	0	2	4	0	1	1	2	0	0	0	0	1	4	0	5
Total Volume	7	0	13	20	0	11	2	13	2	0	0	2	4	16	0	20
% App. Total	35	0	65		0	84.6	15.4		100	0	0		20	80	0	
PHF	.438	.000	.650	.833	.000	.550	.500	.542	.500	.000	.000	.500	.500	.667	.000	.714

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	19	312	6	337	38	7	0	45	12	350	24	386	2	5	19	26	794
07:15 AM	16	337	9	362	50	11	4	65	16	329	22	367	4	2	17	23	817
07:30 AM	13	315	10	338	35	16	3	54	11	381	32	424	4	10	23	37	853
07:45 AM	35	331	17	383	39	19	2	60	16	466	41	523	7	13	19	39	1005
Total	83	1295	42	1420	162	53	9	224	55	1526	119	1700	17	30	78	125	3469
08:00 AM	25	288	4	317	27	9	7	43	22	494	31	547	4	16	16	36	943
08:15 AM	19	278	5	302	18	14	4	36	16	399	35	450	1	6	16	23	811
08:30 AM	17	262	5	284	31	9	3	43	12	385	22	419	3	10	21	34	780
08:45 AM	22	238	9	269	15	5	3	23	21	421	20	462	4	3	15	22	776
Total	83	1066	23	1172	91	37	17	145	71	1699	108	1878	12	35	68	115	3310
Grand Total	166	2361	65	2592	253	90	26	369	126	3225	227	3578	29	65	146	240	6779
Apprch %	6.4	91.1	2.5		68.6	24.4	7		3.5	90.1	6.3		12.1	27.1	60.8		
Total %	2.4	34.8	1	38.2	3.7	1.3	0.4	5.4	1.9	47.6	3.3	52.8	0.4	1	2.2	3.5	
Passenger Vehicles	163	2201	64	2428	248	89	26	363	123	3076	223	3422	29	64	144	237	6450
% Passenger Vehicles	98.2	93.2	98.5	93.7	98	98.9	100	98.4	97.6	95.4	98.2	95.6	100	98.5	98.6	98.8	95.1
Large 2 Axle Vehicles	2	67	0	69	4	1	0	5	2	79	4	85	0	0	1	1	160
% Large 2 Axle Vehicles	1.2	2.8	0	2.7	1.6	1.1	0	1.4	1.6	2.4	1.8	2.4	0	0	0.7	0.4	2.4
3 Axle Vehicles	1	10	0	11	1	0	0	1	1	12	0	13	0	1	0	1	26
% 3 Axle Vehicles	0.6	0.4	0	0.4	0.4	0	0	0.3	0.8	0.4	0	0.4	0	1.5	0	0.4	0.4
4+ Axle Trucks	0	83	1	84	0	0	0	0	0	58	0	58	0	0	1	1	143
% 4+ Axle Trucks	0	3.5	1.5	3.2	0	0	0	0	0	1.8	0	1.6	0	0	0.7	0.4	2.1

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	16	**337**	9	362	**50**	11	4	**65**	16	329	22	367	4	2	17	23	817
07:30 AM	13	315	10	338	35	16	3	54	11	381	32	424	4	10	**23**	37	853
07:45 AM	**35**	331	**17**	**383**	39	**19**	2	60	16	466	**41**	523	**7**	13	19	**39**	**1005**
08:00 AM	25	288	4	317	27	9	**7**	43	**22**	**494**	31	**547**	4	**16**	16	36	943
Total Volume	89	1271	40	1400	151	55	16	222	65	1670	126	1861	19	41	75	135	3618
% App. Total	6.4	90.8	2.9		68	24.8	7.2		3.5	89.7	6.8		14.1	30.4	55.6		
PHF	.636	.943	.588	.914	.755	.724	.571	.854	.739	.845	.768	.851	.679	.641	.815	.865	.900

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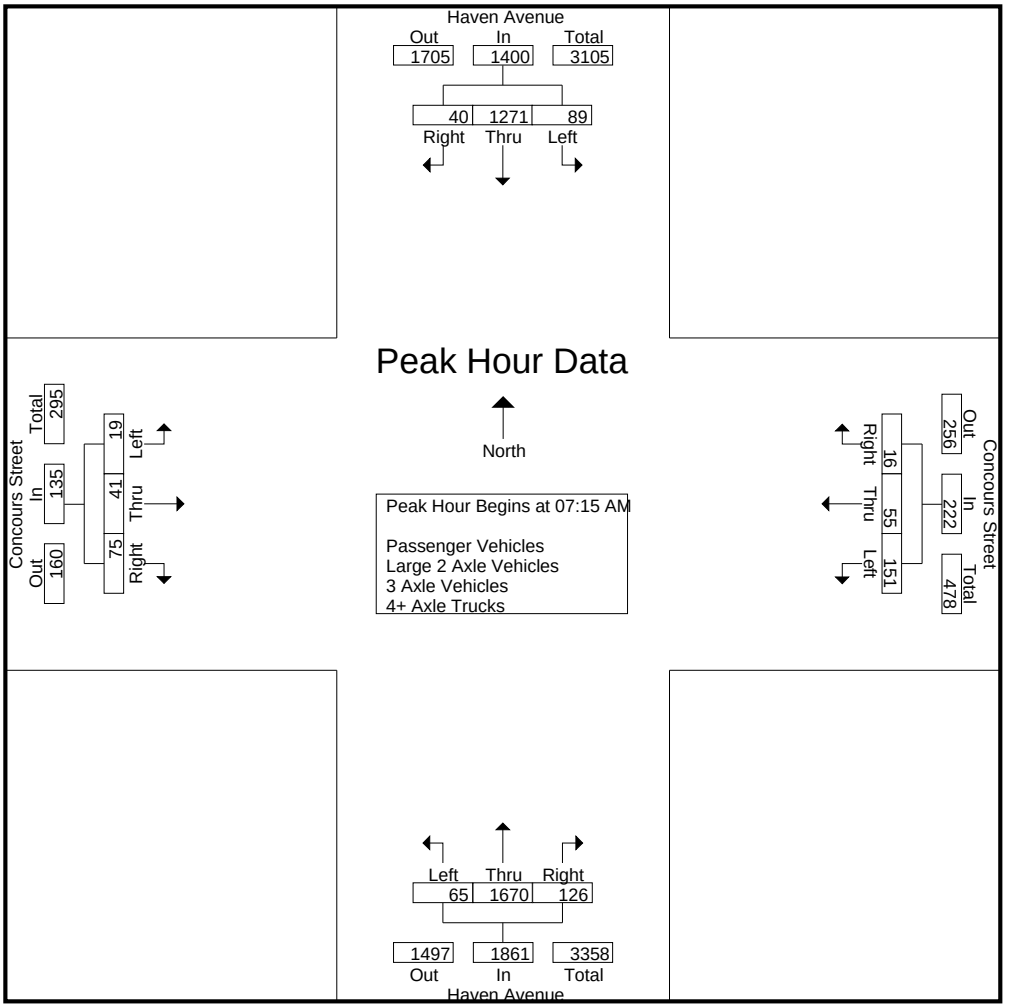
City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:30 AM				07:15 AM			
+0 mins.	19	312	6	337	38	7	0	45	11	381	32	424	4	2	17	23
+15 mins.	16	**337**	9	362	**50**	11	**4**	**65**	16	466	**41**	523	4	10	**23**	37
+30 mins.	13	315	10	338	35	16	3	54	**22**	**494**	31	**547**	**7**	13	19	**39**
+45 mins.	**35**	331	**17**	**383**	39	**19**	2	60	16	399	35	450	4	**16**	16	36
Total Volume	83	1295	42	1420	162	53	9	224	65	1740	139	1944	19	41	75	135
% App. Total	5.8	91.2	3		72.3	23.7	4		3.3	89.5	7.2		14.1	30.4	55.6	
PHF	.593	.961	.618	.927	.810	.697	.563	.862	.739	.881	.848	.888	.679	.641	.815	.865

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	19	288	6	313	37	7	0	44	11	332	24	367	2	5	19	26	750
07:15 AM	16	320	9	345	50	11	4	65	15	317	22	354	4	1	17	22	786
07:30 AM	13	300	10	323	35	16	3	54	11	371	31	413	4	10	23	37	827
07:45 AM	34	312	17	363	39	19	2	60	16	454	41	511	7	13	19	39	973
Total	82	1220	42	1344	161	53	9	223	53	1474	118	1645	17	29	78	124	3336
08:00 AM	25	271	4	300	26	8	7	41	22	466	30	518	4	16	16	36	895
08:15 AM	18	259	4	281	18	14	4	36	16	383	35	434	1	6	16	23	774
08:30 AM	17	234	5	256	29	9	3	41	12	362	21	395	3	10	20	33	725
08:45 AM	21	217	9	247	14	5	3	22	20	391	19	430	4	3	14	21	720
Total	81	981	22	1084	87	36	17	140	70	1602	105	1777	12	35	66	113	3114
Grand Total	163	2201	64	2428	248	89	26	363	123	3076	223	3422	29	64	144	237	6450
Apprch %	6.7	90.7	2.6		68.3	24.5	7.2		3.6	89.9	6.5		12.2	27	60.8		
Total %	2.5	34.1	1	37.6	3.8	1.4	0.4	5.6	1.9	47.7	3.5	53.1	0.4	1	2.2	3.7	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	16	**320**	9	345	**50**	11	4	**65**	15	317	22	354	4	1	17	22	786
07:30 AM	13	300	10	323	35	16	3	54	11	371	31	413	4	10	**23**	37	827
07:45 AM	**34**	312	**17**	**363**	39	**19**	2	60	16	454	**41**	511	**7**	13	19	**39**	**973**
08:00 AM	25	271	4	300	26	8	**7**	41	**22**	**466**	30	**518**	4	**16**	16	36	895
Total Volume	88	1203	40	1331	150	54	16	220	64	1608	124	1796	19	40	75	134	3481
% App. Total	6.6	90.4	3		68.2	24.5	7.3		3.6	89.5	6.9		14.2	29.9	56		
PHF	.647	.940	.588	.917	.750	.711	.571	.846	.727	.863	.756	.867	.679	.625	.815	.859	.894

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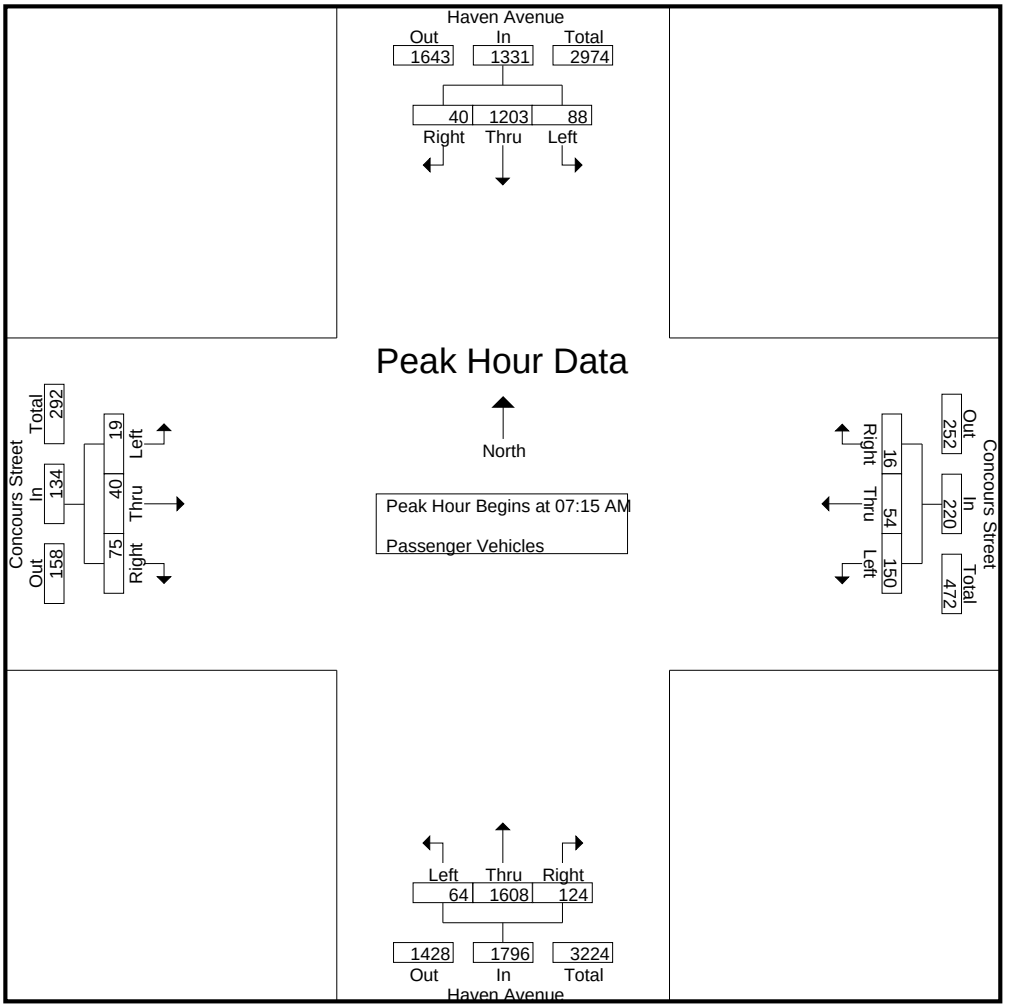
City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:15 AM				07:15 AM				07:15 AM			
+0 mins.	16	**320**	9	345	**50**	11	4	**65**	15	317	22	354	4	1	17	22
+15 mins.	13	300	10	323	35	16	3	54	11	371	31	413	4	10	**23**	37
+30 mins.	**34**	312	**17**	**363**	39	**19**	2	60	16	454	**41**	511	**7**	13	19	**39**
+45 mins.	25	271	4	300	26	8	**7**	41	**22**	**466**	30	**518**	4	**16**	16	36
Total Volume	88	1203	40	1331	150	54	16	220	64	1608	124	1796	19	40	75	134
% App. Total	6.6	90.4	3		68.2	24.5	7.3		3.6	89.5	6.9		14.2	29.9	56	
PHF	.647	.940	.588	.917	.750	.711	.571	.846	.727	.863	.756	.867	.679	.625	.815	.859

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	10	0	10	1	0	0	1	1	8	0	9	0	0	0	0	20
07:15 AM	0	8	0	8	0	0	0	0	0	9	0	9	0	0	0	0	17
07:30 AM	0	6	0	6	0	0	0	0	0	7	1	8	0	0	0	0	14
07:45 AM	0	8	0	8	0	0	0	0	0	5	0	5	0	0	0	0	13
Total	0	32	0	32	1	0	0	1	1	29	1	31	0	0	0	0	64
08:00 AM	0	4	0	4	1	1	0	2	0	11	1	12	0	0	0	0	18
08:15 AM	1	9	0	10	0	0	0	0	0	7	0	7	0	0	0	0	17
08:30 AM	0	13	0	13	2	0	0	2	0	13	1	14	0	0	0	0	29
08:45 AM	1	9	0	10	0	0	0	0	1	19	1	21	0	0	1	1	32
Total	2	35	0	37	3	1	0	4	1	50	3	54	0	0	1	1	96
Grand Total	2	67	0	69	4	1	0	5	2	79	4	85	0	0	1	1	160
Apprch %	2.9	97.1	0		80	20	0		2.4	92.9	4.7		0	0	100		
Total %	1.2	41.9	0	43.1	2.5	0.6	0	3.1	1.2	49.4	2.5	53.1	0	0	0.6	0.6	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**8**	0	**8**	0	0	0	0	0	9	0	9	0	0	0	0	17
07:30 AM	0	6	0	6	0	0	0	0	0	7	**1**	8	0	0	0	0	14
07:45 AM	0	8	0	8	0	0	0	0	0	5	0	5	0	0	0	0	13
08:00 AM	0	4	0	4	**1**	**1**	0	**2**	0	**11**	1	**12**	0	0	0	0	**18**
Total Volume	0	26	0	26	1	1	0	2	0	32	2	34	0	0	0	0	62
% App. Total	0	100	0		50	50	0		0	94.1	5.9		0	0	0		
PHF	.000	.813	.000	.813	.250	.250	.000	.250	.000	.727	.500	.708	.000	.000	.000	.000	.861

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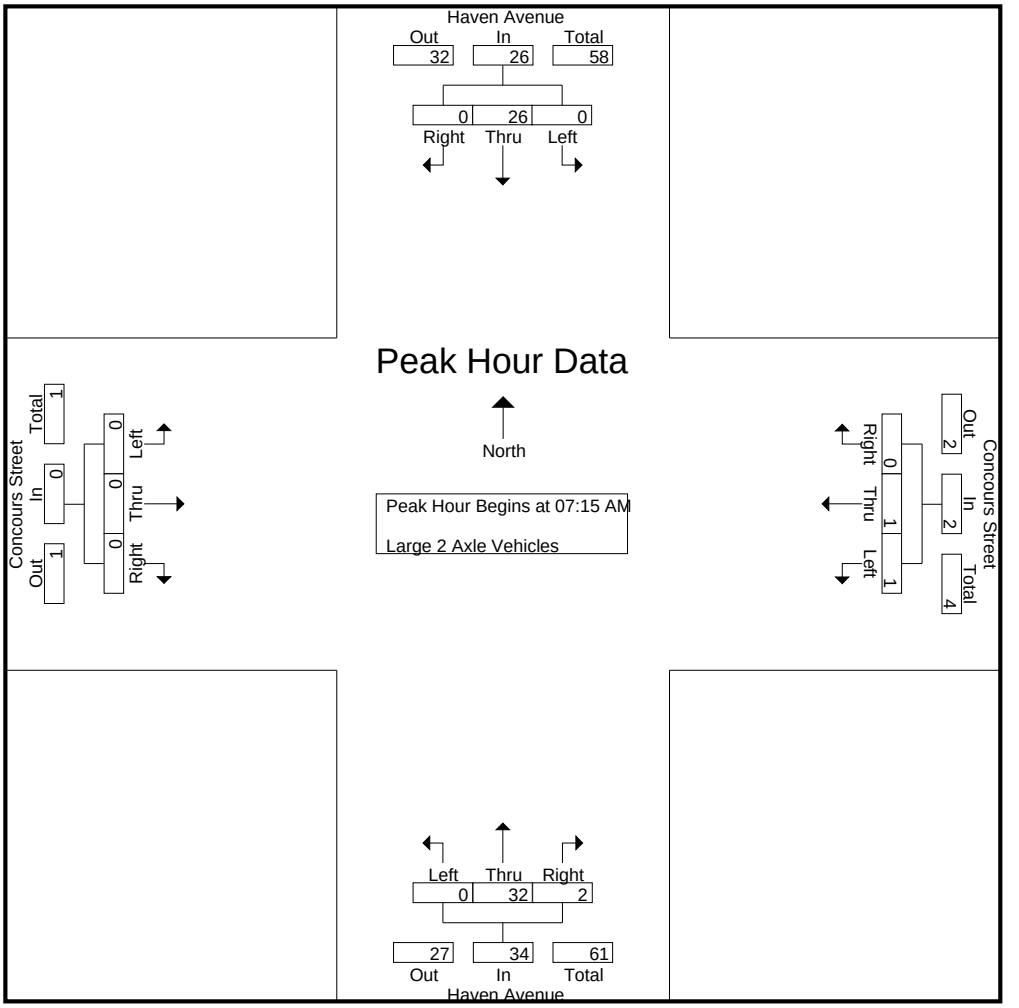
City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:15 AM				07:15 AM				07:15 AM			
+0 mins.	0	**8**	0	**8**	0	0	0	0	0	9	0	9	0	0	0	0
+15 mins.	0	6	0	6	0	0	0	0	0	7	**1**	8	0	0	0	0
+30 mins.	0	8	0	8	0	0	0	0	0	5	0	5	0	0	0	0
+45 mins.	0	4	0	4	**1**	**1**	0	**2**	0	**11**	1	**12**	0	0	0	0
Total Volume	0	26	0	26	1	1	0	2	0	32	2	34	0	0	0	0
% App. Total	0	100	0		50	50	0		0	94.1	5.9		0	0	0	
PHF	.000	.813	.000	.813	.250	.250	.000	.250	.000	.727	.500	.708	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	3	0	3	0	0	0	0	0	2	0	2	0	0	0	0	5
07:15 AM	0	1	0	1	0	0	0	0	1	0	0	1	0	1	0	1	3
07:30 AM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
07:45 AM	1	0	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
Total	1	5	0	6	0	0	0	0	1	5	0	6	0	1	0	1	13
08:00 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
08:15 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
08:30 AM	0	2	0	2	0	0	0	0	0	1	0	1	0	0	0	0	3
08:45 AM	0	2	0	2	1	0	0	1	0	2	0	2	0	0	0	0	5
Total	0	5	0	5	1	0	0	1	0	7	0	7	0	0	0	0	13
Grand Total	1	10	0	11	1	0	0	1	1	12	0	13	0	1	0	1	26
Apprch %	9.1	90.9	0		100	0	0		7.7	92.3	0		0	100	0		
Total %	3.8	38.5	0	42.3	3.8	0	0	3.8	3.8	46.2	0	50	0	3.8	0	3.8	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**1**	0	**1**	0	0	0	0	**1**	0	0	1	0	**1**	0	**1**	**3**
07:30 AM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
07:45 AM	**1**	0	0	1	0	0	0	0	0	**2**	0	**2**	0	0	0	0	3
08:00 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
Total Volume	1	3	0	4	0	0	0	0	1	5	0	6	0	1	0	1	11
% App. Total	25	75	0		0	0	0		16.7	83.3	0		0	100	0		
PHF	.250	.750	.000	1.00	.000	.000	.000	.000	.250	.625	.000	.750	.000	.250	.000	.250	.917

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
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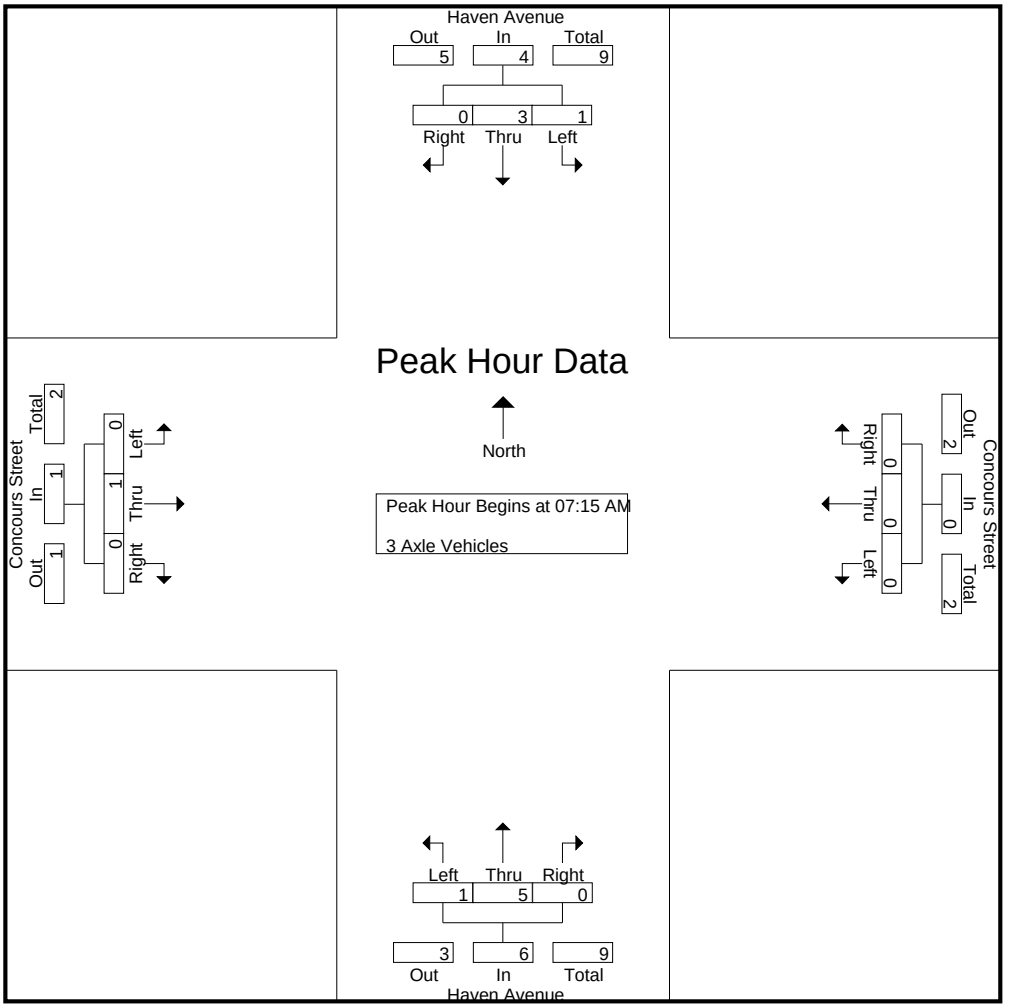

Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:15 AM				07:15 AM				07:15 AM			
+0 mins.	0	**1**	0	**1**	0	0	0	0	**1**	0	0	1	0	**1**	0	**1**
+15 mins.	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0
+30 mins.	**1**	0	0	1	0	0	0	0	0	**2**	0	**2**	0	0	0	0
+45 mins.	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0
Total Volume	1	3	0	4	0	0	0	0	1	5	0	6	0	1	0	1
% App. Total	25	75	0		0	0	0		16.7	83.3	0		0	100	0	
PHF	.250	.750	.000	1.000	.000	.000	.000	.000	.250	.625	.000	.750	.000	.250	.000	.250

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	11	0	11	0	0	0	0	0	8	0	8	0	0	0	0	19
07:15 AM	0	8	0	8	0	0	0	0	0	3	0	3	0	0	0	0	11
07:30 AM	0	8	0	8	0	0	0	0	0	2	0	2	0	0	0	0	10
07:45 AM	0	11	0	11	0	0	0	0	0	5	0	5	0	0	0	0	16
Total	0	38	0	38	0	0	0	0	0	18	0	18	0	0	0	0	56
08:00 AM	0	12	0	12	0	0	0	0	0	15	0	15	0	0	0	0	27
08:15 AM	0	10	1	11	0	0	0	0	0	7	0	7	0	0	0	0	18
08:30 AM	0	13	0	13	0	0	0	0	0	9	0	9	0	0	1	1	23
08:45 AM	0	10	0	10	0	0	0	0	0	9	0	9	0	0	0	0	19
Total	0	45	1	46	0	0	0	0	0	40	0	40	0	0	1	1	87
Grand Total	0	83	1	84	0	0	0	0	0	58	0	58	0	0	1	1	143
Apprch %	0	98.8	1.2		0	0	0		0	100	0		0	0	100		
Total %	0	58	0.7	58.7	0	0	0	0	0	40.6	0	40.6	0	0	0.7	0.7	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	8	0	8	0	0	0	0	0	3	0	3	0	0	0	0	11
07:30 AM	0	8	0	8	0	0	0	0	0	2	0	2	0	0	0	0	10
07:45 AM	0	11	0	11	0	0	0	0	0	5	0	5	0	0	0	0	16
08:00 AM	0	**12**	0	**12**	0	0	0	0	0	**15**	0	**15**	0	0	0	0	**27**
Total Volume	0	39	0	39	0	0	0	0	0	25	0	25	0	0	0	0	64
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.813	.000	.813	.000	.000	.000	.000	.000	.417	.000	.417	.000	.000	.000	.000	.593

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City of Rancho Cucamonga
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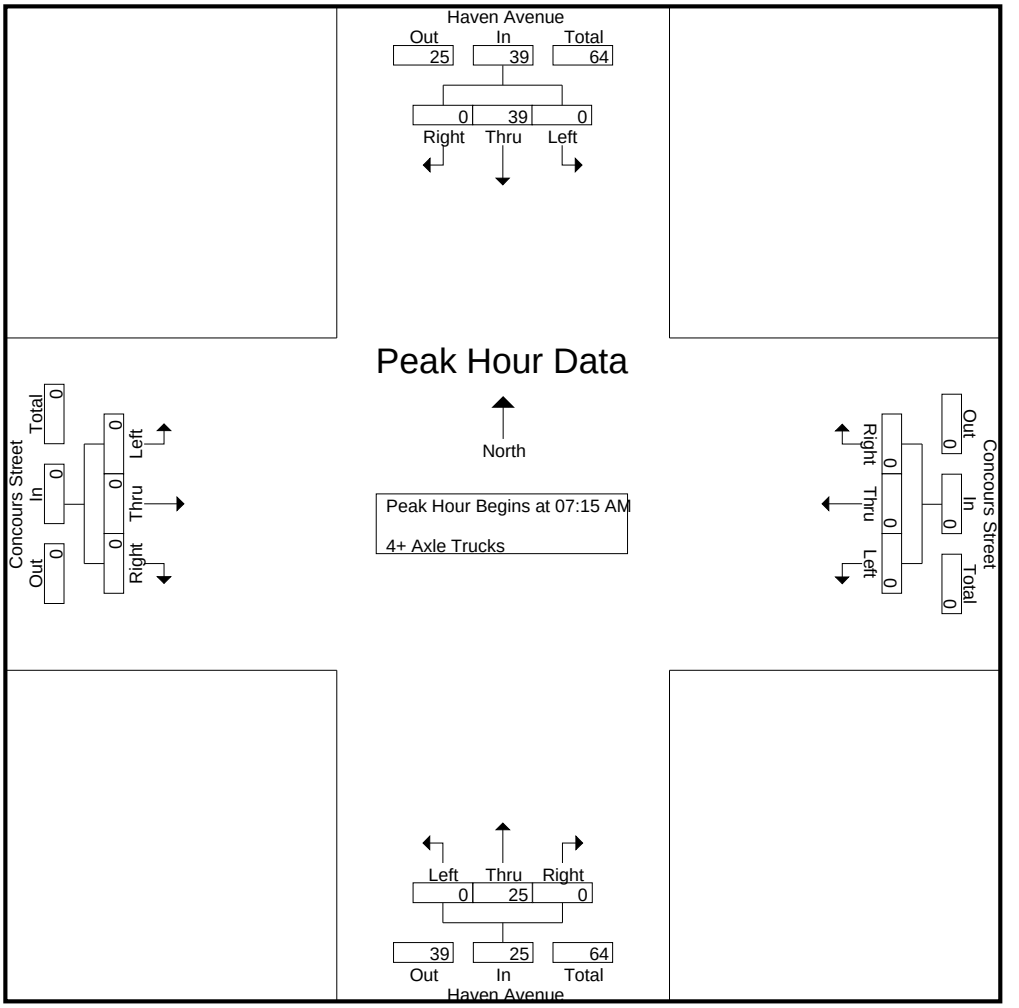
File Name : 04_RNC_Haven_Concours AM
Site Code : 99919439
Start Date : 5/23/2019



Peak Hour Analysis From 07:15 AM to 08:00 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				07:15 AM				07:15 AM				07:15 AM			
+0 mins.	0	8	0	8	0	0	0	0	0	3	0	3	0	0	0	0
+15 mins.	0	8	0	8	0	0	0	0	0	2	0	2	0	0	0	0
+30 mins.	0	11	0	11	0	0	0	0	0	5	0	5	0	0	0	0
+45 mins.	0	**12**	0	**12**	0	0	0	0	0	**15**	0	**15**	0	0	0	0
Total Volume	0	39	0	39	0	0	0	0	0	25	0	25	0	0	0	0
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0	
PHF	.000	.813	.000	.813	.000	.000	.000	.000	.000	.417	.000	.417	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	15	400	4	419	22	14	16	52	8	503	71	582	7	11	16	34	1087
04:15 PM	21	346	2	369	28	9	25	62	16	521	45	582	2	7	4	13	1026
04:30 PM	13	435	7	455	38	15	28	81	3	593	39	635	6	4	7	17	1188
04:45 PM	7	398	4	409	43	23	16	82	12	531	55	598	5	8	14	27	1116
Total	56	1579	17	1652	131	61	85	277	39	2148	210	2397	20	30	41	91	4417
05:00 PM	10	489	7	506	39	26	21	86	8	502	40	550	5	11	20	36	1178
05:15 PM	10	440	8	458	44	23	24	91	21	546	35	602	8	14	19	41	1192
05:30 PM	11	318	5	334	31	33	31	95	15	496	31	542	5	10	12	27	998
05:45 PM	8	317	11	336	40	16	30	86	11	500	43	554	7	6	10	23	999
Total	39	1564	31	1634	154	98	106	358	55	2044	149	2248	25	41	61	127	4367
Grand Total	95	3143	48	3286	285	159	191	635	94	4192	359	4645	45	71	102	218	8784
Apprch %	2.9	95.6	1.5		44.9	25	30.1		2	90.2	7.7		20.6	32.6	46.8		
Total %	1.1	35.8	0.5	37.4	3.2	1.8	2.2	7.2	1.1	47.7	4.1	52.9	0.5	0.8	1.2	2.5	
Passenger Vehicles	94	3045	47	3186	281	158	191	630	94	4078	355	4527	45	70	102	217	8560
% Passenger Vehicles	98.9	96.9	97.9	97	98.6	99.4	100	99.2	100	97.3	98.9	97.5	100	98.6	100	99.5	97.4
Large 2 Axle Vehicles	1	40	1	42	4	0	0	4	0	44	4	48	0	1	0	1	95
% Large 2 Axle Vehicles	1.1	1.3	2.1	1.3	1.4	0	0	0.6	0	1	1.1	1	0	1.4	0	0.5	1.1
3 Axle Vehicles	0	9	0	9	0	1	0	1	0	10	0	10	0	0	0	0	20
% 3 Axle Vehicles	0	0.3	0	0.3	0	0.6	0	0.2	0	0.2	0	0.2	0	0	0	0	0.2
4+ Axle Trucks	0	49	0	49	0	0	0	0	0	60	0	60	0	0	0	0	109
% 4+ Axle Trucks	0	1.6	0	1.5	0	0	0	0	0	1.4	0	1.3	0	0	0	0	1.2

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**13**	435	7	455	38	15	**28**	81	3	**593**	39	**635**	6	4	7	17	1188
04:45 PM	7	398	4	409	43	23	16	82	12	531	**55**	598	5	8	14	27	1116
05:00 PM	10	**489**	7	**506**	39	**26**	21	86	8	502	40	550	5	11	**20**	36	1178
05:15 PM	10	440	**8**	458	**44**	23	24	**91**	**21**	546	35	602	**8**	**14**	19	**41**	**1192**
Total Volume	40	1762	26	1828	164	87	89	340	44	2172	169	2385	24	37	60	121	4674
% App. Total	2.2	96.4	1.4		48.2	25.6	26.2		1.8	91.1	7.1		19.8	30.6	49.6		
PHF	.769	.901	.813	.903	.932	.837	.795	.934	.524	.916	.768	.939	.750	.661	.750	.738	.980

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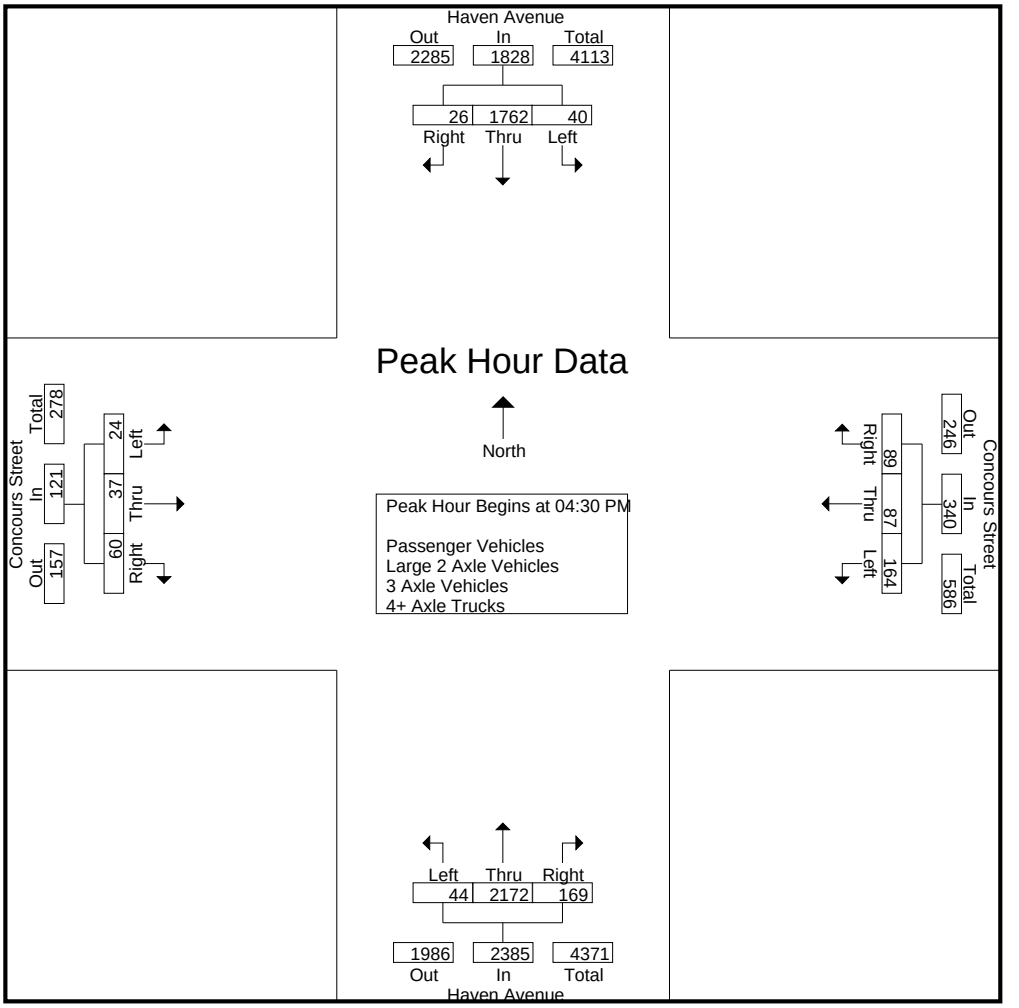
File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				05:00 PM				04:00 PM				04:45 PM			
+0 mins.	**13**	435	7	455	39	26	21	86	8	503	**71**	582	5	8	14	27
+15 mins.	7	398	4	409	**44**	23	24	91	**16**	521	45	582	5	11	**20**	36
+30 mins.	10	**489**	7	**506**	31	**33**	**31**	**95**	3	**593**	39	**635**	**8**	**14**	19	**41**
+45 mins.	10	440	**8**	458	40	16	30	86	12	531	55	598	5	10	12	27
Total Volume	40	1762	26	1828	154	98	106	358	39	2148	210	2397	23	43	65	131
% App. Total	2.2	96.4	1.4		43	27.4	29.6		1.6	89.6	8.8		17.6	32.8	49.6	
PHF	.769	.901	.813	.903	.875	.742	.855	.942	.609	.906	.739	.944	.719	.768	.813	.799

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File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	14	381	4	399	21	13	16	50	8	487	70	565	7	11	16	34	1048
04:15 PM	21	336	2	359	28	9	25	62	16	509	45	570	2	7	4	13	1004
04:30 PM	13	419	7	439	37	15	28	80	3	575	39	617	6	4	7	17	1153
04:45 PM	7	390	4	401	43	23	16	82	12	517	54	583	5	8	14	27	1093
Total	55	1526	17	1598	129	60	85	274	39	2088	208	2335	20	30	41	91	4298
05:00 PM	10	484	7	501	38	26	21	85	8	493	40	541	5	11	20	36	1163
05:15 PM	10	425	7	442	44	23	24	91	21	531	33	585	8	14	19	41	1159
05:30 PM	11	305	5	321	31	33	31	95	15	481	31	527	5	9	12	26	969
05:45 PM	8	305	11	324	39	16	30	85	11	485	43	539	7	6	10	23	971
Total	39	1519	30	1588	152	98	106	356	55	1990	147	2192	25	40	61	126	4262
Grand Total	94	3045	47	3186	281	158	191	630	94	4078	355	4527	45	70	102	217	8560
Apprch %	3	95.6	1.5		44.6	25.1	30.3		2.1	90.1	7.8		20.7	32.3	47		
Total %	1.1	35.6	0.5	37.2	3.3	1.8	2.2	7.4	1.1	47.6	4.1	52.9	0.5	0.8	1.2	2.5	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	**13**	419	**7**	439	37	15	**28**	80	3	**575**	39	**617**	6	4	7	17	1153
04:45 PM	7	390	4	401	43	23	16	82	12	517	**54**	583	5	8	14	27	1093
05:00 PM	10	**484**	7	**501**	38	**26**	21	85	8	493	40	541	5	11	**20**	36	**1163**
05:15 PM	10	425	7	442	**44**	23	24	**91**	**21**	531	33	585	**8**	**14**	19	**41**	1159
Total Volume	40	1718	25	1783	162	87	89	338	44	2116	166	2326	24	37	60	121	4568
% App. Total	2.2	96.4	1.4		47.9	25.7	26.3		1.9	91	7.1		19.8	30.6	49.6		
PHF	.769	.887	.893	.890	.920	.837	.795	.929	.524	.920	.769	.942	.750	.661	.750	.738	.982

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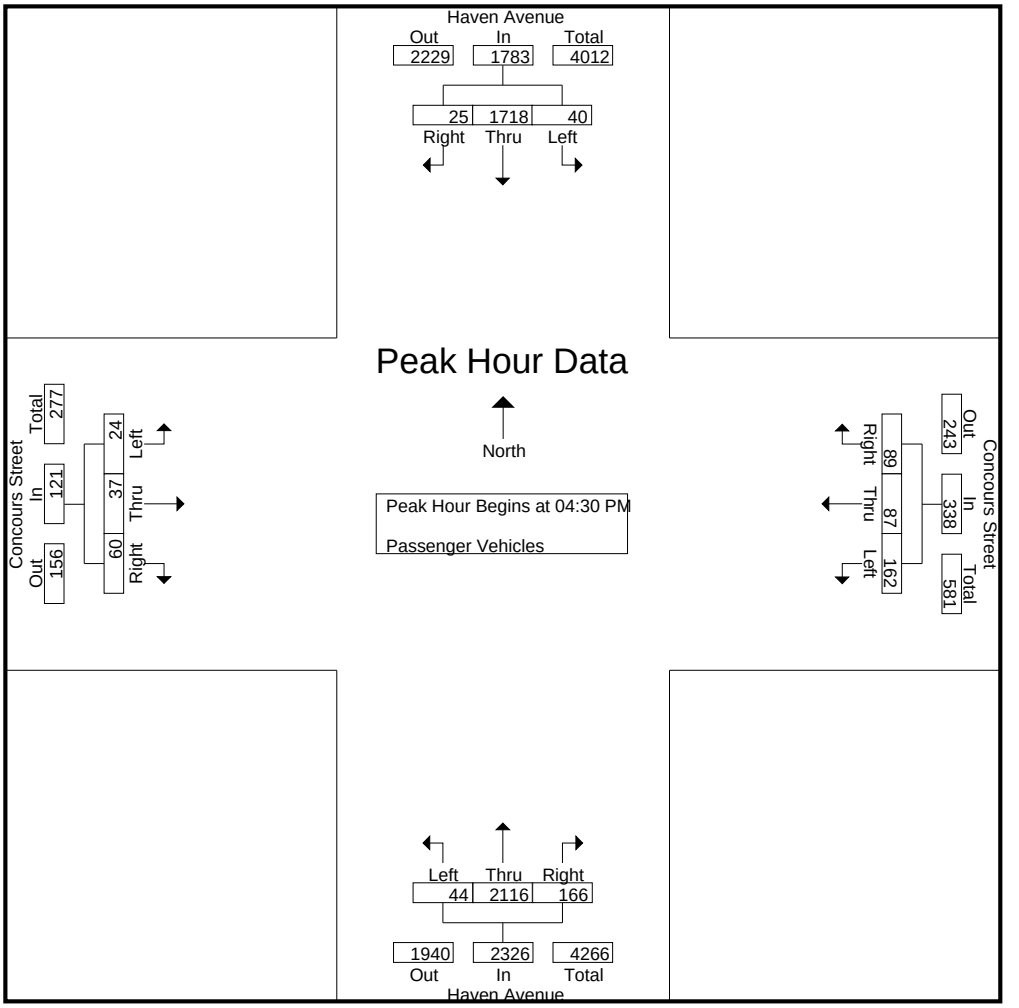

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	**13**	419	**7**	439	37	15	**28**	80	3	**575**	39	**617**	6	4	7	17
+15 mins.	7	390	4	401	43	23	16	82	12	517	**54**	583	5	8	14	27
+30 mins.	10	**484**	7	**501**	38	**26**	21	85	8	493	40	541	5	11	**20**	36
+45 mins.	10	425	7	442	**44**	23	24	**91**	**21**	531	33	585	**8**	**14**	19	**41**
Total Volume	40	1718	25	1783	162	87	89	338	44	2116	166	2326	24	37	60	121
% App. Total	2.2	96.4	1.4		47.9	25.7	26.3		1.9	91	7.1		19.8	30.6	49.6	
PHF	.769	.887	.893	.890	.920	.837	.795	.929	.524	.920	.769	.942	.750	.661	.750	.738

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File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019
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Groups Printed- Large 2 Axle Vehicles

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	9	0	10	1	0	0	1	0	9	1	10	0	0	0	0	21
04:15 PM	0	3	0	3	0	0	0	0	0	5	0	5	0	0	0	0	8
04:30 PM	0	4	0	4	1	0	0	1	0	6	0	6	0	0	0	0	11
04:45 PM	0	2	0	2	0	0	0	0	0	7	1	8	0	0	0	0	10
Total	1	18	0	19	2	0	0	2	0	27	2	29	0	0	0	0	50
05:00 PM	0	3	0	3	1	0	0	1	0	3	0	3	0	0	0	0	7
05:15 PM	0	8	1	9	0	0	0	0	0	2	2	4	0	0	0	0	13
05:30 PM	0	4	0	4	0	0	0	0	0	3	0	3	0	1	0	1	8
05:45 PM	0	7	0	7	1	0	0	1	0	9	0	9	0	0	0	0	17
Total	0	22	1	23	2	0	0	2	0	17	2	19	0	1	0	1	45
Grand Total	1	40	1	42	4	0	0	4	0	44	4	48	0	1	0	1	95
Apprch %	2.4	95.2	2.4		100	0	0		0	91.7	8.3		0	100	0		
Total %	1.1	42.1	1.1	44.2	4.2	0	0	4.2	0	46.3	4.2	50.5	0	1.1	0	1.1	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	4	0	4	**1**	0	0	**1**	0	6	0	6	0	0	0	0	11
04:45 PM	0	2	0	2	0	0	0	0	0	**7**	1	**8**	0	0	0	0	10
05:00 PM	0	3	0	3	1	0	0	1	0	3	0	3	0	0	0	0	7
05:15 PM	0	**8**	**1**	**9**	0	0	0	0	0	2	**2**	4	0	0	0	0	**13**
Total Volume	0	17	1	18	2	0	0	2	0	18	3	21	0	0	0	0	41
% App. Total	0	94.4	5.6		100	0	0		0	85.7	14.3		0	0	0		
PHF	.000	.531	.250	.500	.500	.000	.000	.500	.000	.643	.375	.656	.000	.000	.000	.000	.788

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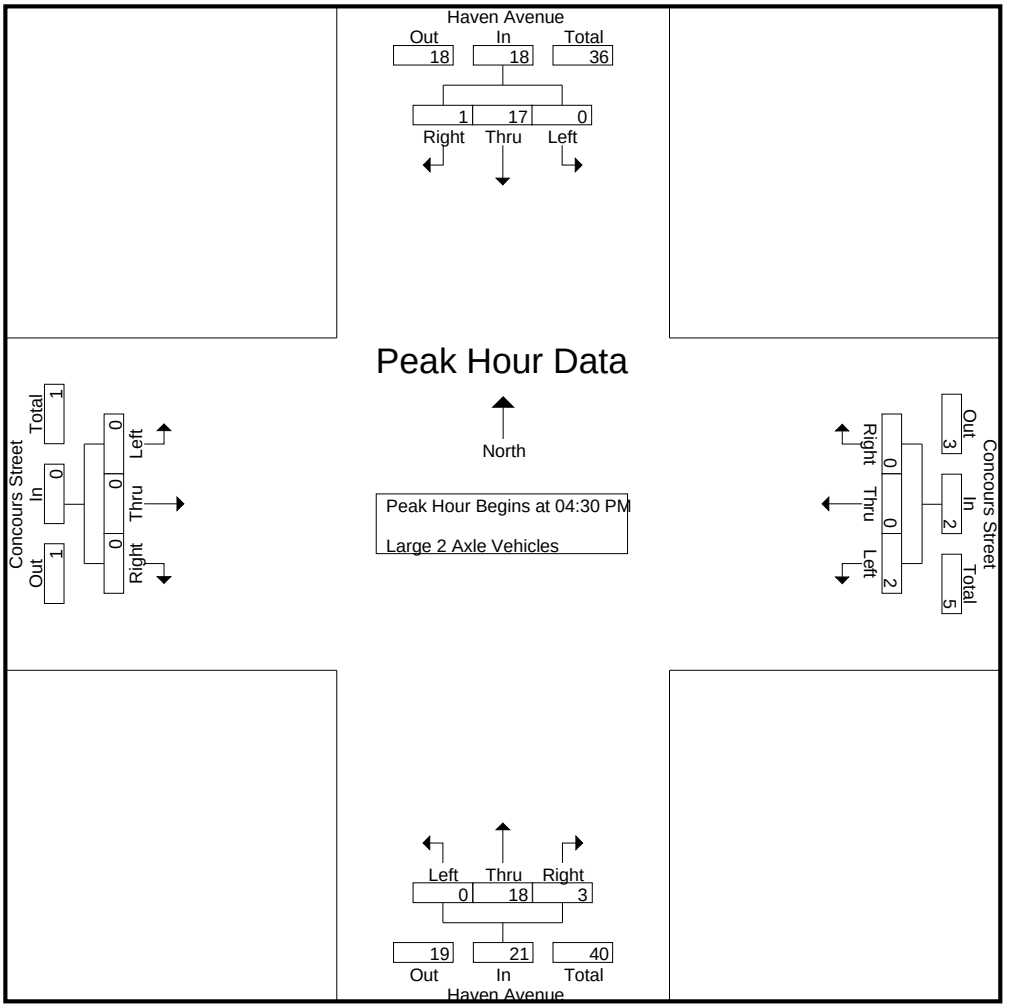

Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	4	0	4	**1**	0	0	**1**	0	6	0	6	0	0	0	0
+15 mins.	0	2	0	2	0	0	0	0	0	**7**	1	**8**	0	0	0	0
+30 mins.	0	3	0	3	1	0	0	1	0	3	0	3	0	0	0	0
+45 mins.	0	**8**	**1**	**9**	0	0	0	0	0	2	**2**	4	0	0	0	0
Total Volume	0	17	1	18	2	0	0	2	0	18	3	21	0	0	0	0
% App. Total	0	94.4	5.6		100	0	0		0	85.7	14.3		0	0	0	
PHF	.000	.531	.250	.500	.500	.000	.000	.500	.000	.643	.375	.656	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
04:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	4	0	4	0	0	0	0	0	4	0	4	0	0	0	0	8
04:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	6	0	6	0	1	0	1	0	4	0	4	0	0	0	0	11
05:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
05:15 PM	0	2	0	2	0	0	0	0	0	3	0	3	0	0	0	0	5
05:30 PM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	3	0	3	0	0	0	0	0	6	0	6	0	0	0	0	9
Grand Total	0	9	0	9	0	1	0	1	0	10	0	10	0	0	0	0	20
Apprch %	0	100	0		0	100	0		0	100	0		0	0	0		
Total %	0	45	0	45	0	5	0	5	0	50	0	50	0	0	0	0	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**4**	0	**4**	0	0	0	0	0	**4**	0	**4**	0	0	0	0	**8**
04:45 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
05:15 PM	0	2	0	2	0	0	0	0	0	3	0	3	0	0	0	0	5
Total Volume	0	7	0	7	0	0	0	0	0	8	0	8	0	0	0	0	15
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.438	.000	.438	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000	.469

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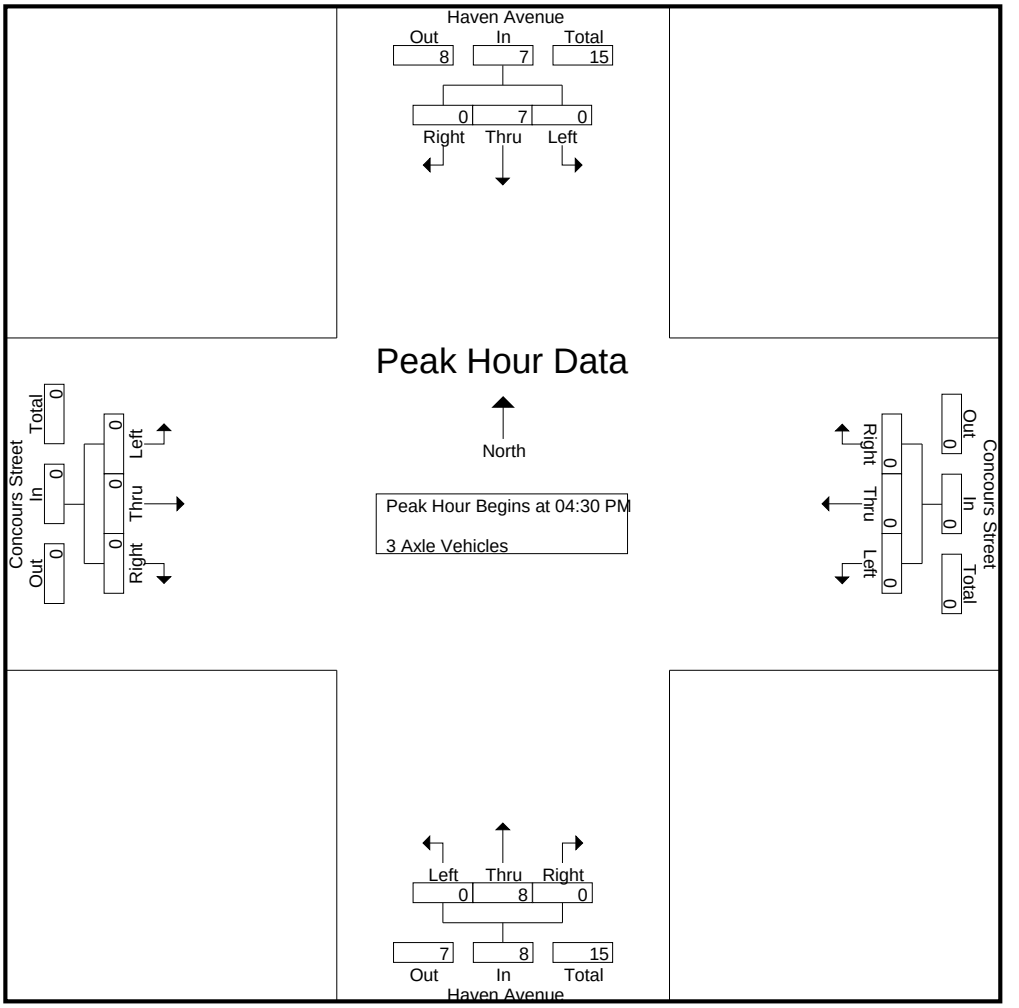
City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	**4**	0	**4**	0	0	0	0	0	**4**	0	**4**	0	0	0	0
+15 mins.	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
+45 mins.	0	2	0	2	0	0	0	0	0	3	0	3	0	0	0	0
Total Volume	0	7	0	7	0	0	0	0	0	8	0	8	0	0	0	0
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0	
PHF	.000	.438	.000	.438	.000	.000	.000	.000	.000	.500	.000	.500	.000	.000	.000	.000

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City of Rancho Cucamonga
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	10	0	10	0	0	0	0	0	7	0	7	0	0	0	0	17
04:15 PM	0	6	0	6	0	0	0	0	0	7	0	7	0	0	0	0	13
04:30 PM	0	8	0	8	0	0	0	0	0	8	0	8	0	0	0	0	16
04:45 PM	0	5	0	5	0	0	0	0	0	7	0	7	0	0	0	0	12
Total	0	29	0	29	0	0	0	0	0	29	0	29	0	0	0	0	58
05:00 PM	0	2	0	2	0	0	0	0	0	5	0	5	0	0	0	0	7
05:15 PM	0	5	0	5	0	0	0	0	0	10	0	10	0	0	0	0	15
05:30 PM	0	8	0	8	0	0	0	0	0	10	0	10	0	0	0	0	18
05:45 PM	0	5	0	5	0	0	0	0	0	6	0	6	0	0	0	0	11
Total	0	20	0	20	0	0	0	0	0	31	0	31	0	0	0	0	51
Grand Total	0	49	0	49	0	0	0	0	0	60	0	60	0	0	0	0	109
Apprch %	0	100	0		0	0	0		0	100	0		0	0	0		
Total %	0	45	0	45	0	0	0	0	0	55	0	55	0	0	0	0	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**8**	0	**8**	0	0	0	0	0	8	0	8	0	0	0	0	**16**
04:45 PM	0	5	0	5	0	0	0	0	0	7	0	7	0	0	0	0	12
05:00 PM	0	2	0	2	0	0	0	0	0	5	0	5	0	0	0	0	7
05:15 PM	0	5	0	5	0	0	0	0	0	**10**	0	**10**	0	0	0	0	15
Total Volume	0	20	0	20	0	0	0	0	0	30	0	30	0	0	0	0	50
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.625	.000	.625	.000	.000	.000	.000	.000	.750	.000	.750	.000	.000	.000	.000	.781

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City of Rancho Cucamonga
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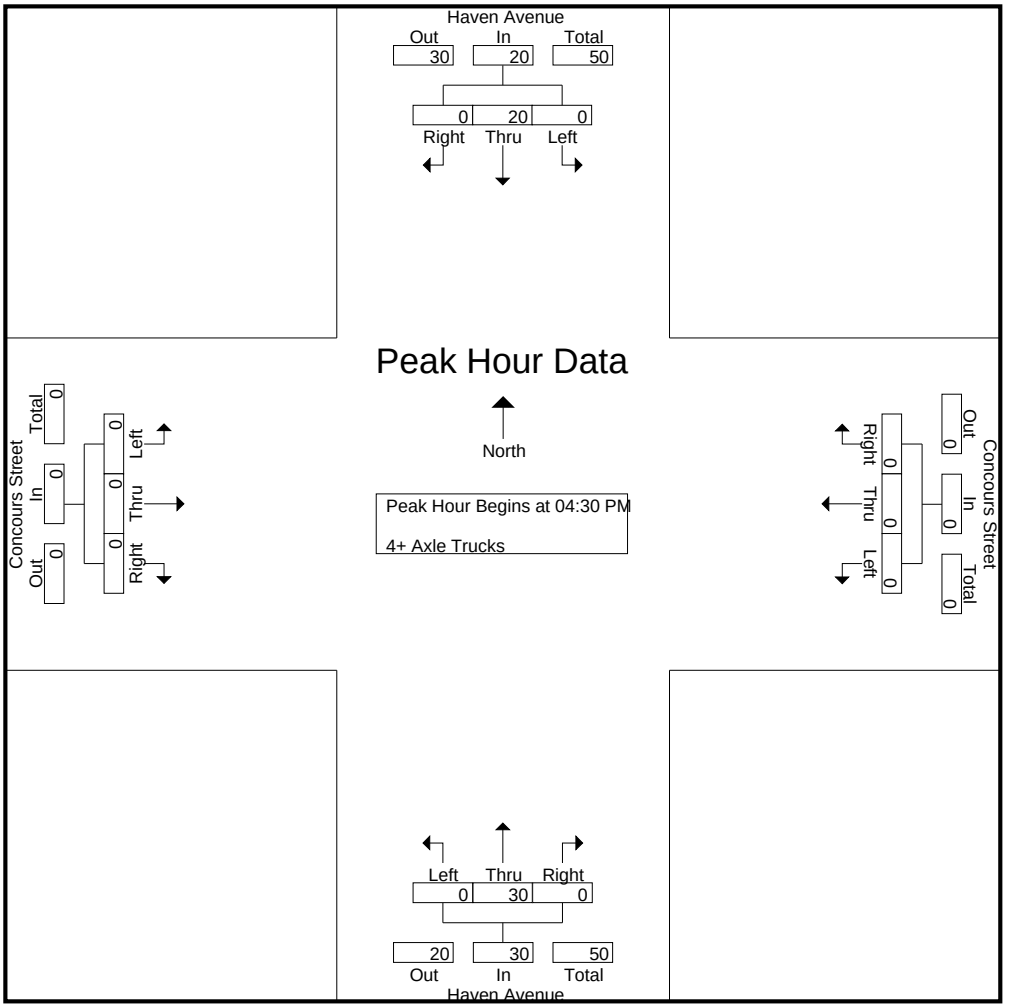
Weather: Clear

File Name : 04_RNC_Haven_Concours PM
Site Code : 99919439
Start Date : 5/23/2019



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	**8**	0	**8**	0	0	0	0	0	8	0	8	0	0	0	0
+15 mins.	0	5	0	5	0	0	0	0	0	7	0	7	0	0	0	0
+30 mins.	0	2	0	2	0	0	0	0	0	5	0	5	0	0	0	0
+45 mins.	0	5	0	5	0	0	0	0	0	**10**	0	**10**	0	0	0	0
Total Volume	0	20	0	20	0	0	0	0	0	30	0	30	0	0	0	0
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0	
PHF	.000	.625	.000	.625	.000	.000	.000	.000	.000	.750	.000	.750	.000	.000	.000	.000

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City of Ontario
N/S: Concours Street
E/W: Ontario Center Parkway
Weather: Clear

File Name : 09_ONT_Concours_Ontario Center_AM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 1

Groups Printed- Total Volume

	Concours Street Southbound				Driveway Westbound				Concours Street Northbound				Ontario Center Parkway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	98	8	106	0	0	0	0	5	66	2	73	1	0	2	3	182
07:15 AM	0	108	8	116	0	0	0	0	4	67	2	73	1	0	0	1	190
07:30 AM	1	122	9	132	2	1	0	3	11	78	5	94	0	0	0	0	229
07:45 AM	0	136	11	147	0	0	0	0	8	100	3	111	0	0	0	0	258
Total	1	464	36	501	2	1	0	3	28	311	12	351	2	0	2	4	859
08:00 AM	0	110	8	118	0	0	0	0	3	74	3	80	0	0	2	2	200
08:15 AM	0	116	12	128	0	0	1	1	5	99	4	108	0	0	0	0	237
08:30 AM	0	106	5	111	2	0	1	3	2	96	2	100	2	0	2	4	218
08:45 AM	0	114	4	118	1	0	1	2	7	97	3	107	4	0	0	4	231
Total	0	446	29	475	3	0	3	6	17	366	12	395	6	0	4	10	886
Grand Total	1	910	65	976	5	1	3	9	45	677	24	746	8	0	6	14	1745
Apprch %	0.1	93.2	6.7		55.6	11.1	33.3		6	90.8	3.2		57.1	0	42.9		
Total %	0.1	52.1	3.7	55.9	0.3	0.1	0.2	0.5	2.6	38.8	1.4	42.8	0.5	0	0.3	0.8	

	Concours Street Southbound				Driveway Westbound				Concours Street Northbound				Ontario Center Parkway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**1**	122	9	132	**2**	**1**	0	**3**	**11**	78	**5**	94	0	0	0	0	229
07:45 AM	0	**136**	11	**147**	0	0	0	0	8	**100**	3	**111**	0	0	0	0	**258**
08:00 AM	0	110	8	118	0	0	0	0	3	74	3	80	0	0	**2**	**2**	200
08:15 AM	0	116	**12**	128	0	0	**1**	1	5	99	4	108	0	0	0	0	237
Total Volume	1	484	40	525	2	1	1	4	27	351	15	393	0	0	2	2	924
% App. Total	0.2	92.2	7.6		50	25	25		6.9	89.3	3.8		0	0	100		
PHF	.250	.890	.833	.893	.250	.250	.250	.333	.614	.878	.750	.885	.000	.000	.250	.250	.895

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City of Ontario
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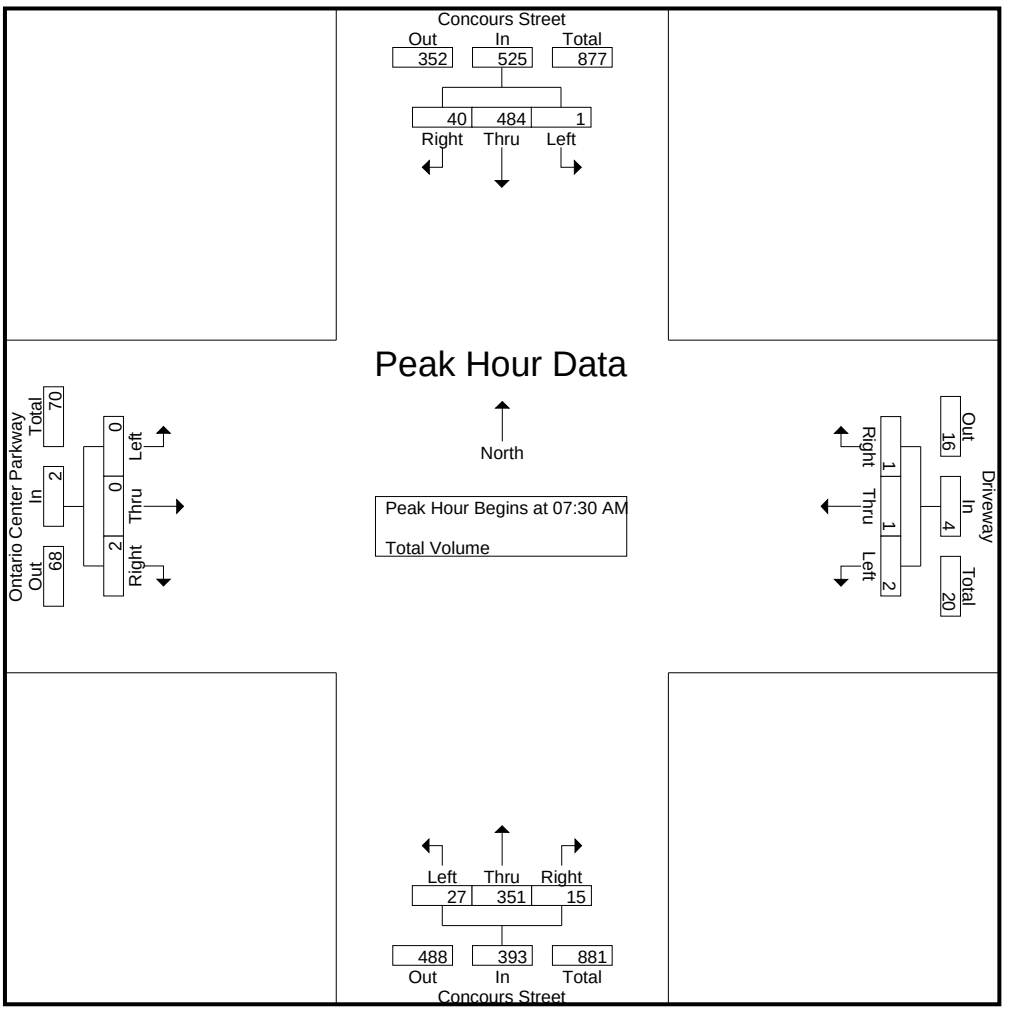
E/W: Ontario Center Parkway
Weather: Clear

File Name : 09_ONT_Concours_Ontario Center_AM
Site Code : 10521235
Start Date : 5/27/2021



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				08:00 AM				07:45 AM				08:00 AM			
+0 mins.	**1**	122	9	132	0	0	0	0	**8**	**100**	3	**111**	0	0	**2**	2
+15 mins.	0	**136**	11	**147**	0	0	**1**	1	3	74	3	80	0	0	0	0
+30 mins.	0	110	8	118	**2**	0	1	**3**	5	99	**4**	108	2	0	2	**4**
+45 mins.	0	116	**12**	128	1	0	1	2	2	96	2	100	**4**	0	0	4
Total Volume	1	484	40	525	3	0	3	6	18	369	12	399	6	0	4	10
% App. Total	0.2	92.2	7.6		50	0	50		4.5	92.5	3		60	0	40	
PHF	.250	.890	.833	.893	.375	.000	.750	.500	.563	.923	.750	.899	.375	.000	.500	.625

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City of Ontario
N/S: Concours Street
E/W: Ontario Center Parkway
Weather: Clear

File Name : 09_ONT_Concours_Ontario Center_PM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 1

Groups Printed- Total Volume

	Concours Street Southbound				Driveway Westbound				Concours Street Northbound				Ontario Center Parkway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	199	0	199	1	0	0	1	1	276	1	278	6	1	3	10	488
04:15 PM	0	190	1	191	1	0	0	1	3	290	3	296	6	0	1	7	495
04:30 PM	1	190	1	192	2	0	3	5	1	330	1	332	10	0	2	12	541
04:45 PM	0	206	2	208	1	0	3	4	0	286	0	286	5	0	1	6	504
Total	1	785	4	790	5	0	6	11	5	1182	5	1192	27	1	7	35	2028
05:00 PM	0	192	2	194	2	0	2	4	2	326	1	329	22	0	3	25	552
05:15 PM	0	189	1	190	3	0	0	3	0	292	1	293	5	0	2	7	493
05:30 PM	0	181	2	183	2	0	2	4	0	333	0	333	1	0	1	2	522
05:45 PM	1	208	5	214	3	0	3	6	1	326	2	329	5	0	3	8	557
Total	1	770	10	781	10	0	7	17	3	1277	4	1284	33	0	9	42	2124
Grand Total	2	1555	14	1571	15	0	13	28	8	2459	9	2476	60	1	16	77	4152
Apprch %	0.1	99	0.9		53.6	0	46.4		0.3	99.3	0.4		77.9	1.3	20.8		
Total %	0	37.5	0.3	37.8	0.4	0	0.3	0.7	0.2	59.2	0.2	59.6	1.4	0	0.4	1.9	

	Concours Street Southbound				Driveway Westbound				Concours Street Northbound				Ontario Center Parkway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	192	2	194	2	0	2	4	**2**	326	1	329	**22**	0	**3**	**25**	552
05:15 PM	0	189	1	190	**3**	0	0	3	0	292	1	293	5	0	2	7	493
05:30 PM	0	181	2	183	2	0	2	4	0	**333**	0	**333**	1	0	1	2	522
05:45 PM	**1**	**208**	**5**	**214**	3	0	**3**	**6**	1	326	**2**	329	5	0	3	8	**557**
Total Volume	1	770	10	781	10	0	7	17	3	1277	4	1284	33	0	9	42	2124
% App. Total	0.1	98.6	1.3		58.8	0	41.2		0.2	99.5	0.3		78.6	0	21.4		
PHF	.250	.925	.500	.912	.833	.000	.583	.708	.375	.959	.500	.964	.375	.000	.750	.420	.953

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City of Ontario
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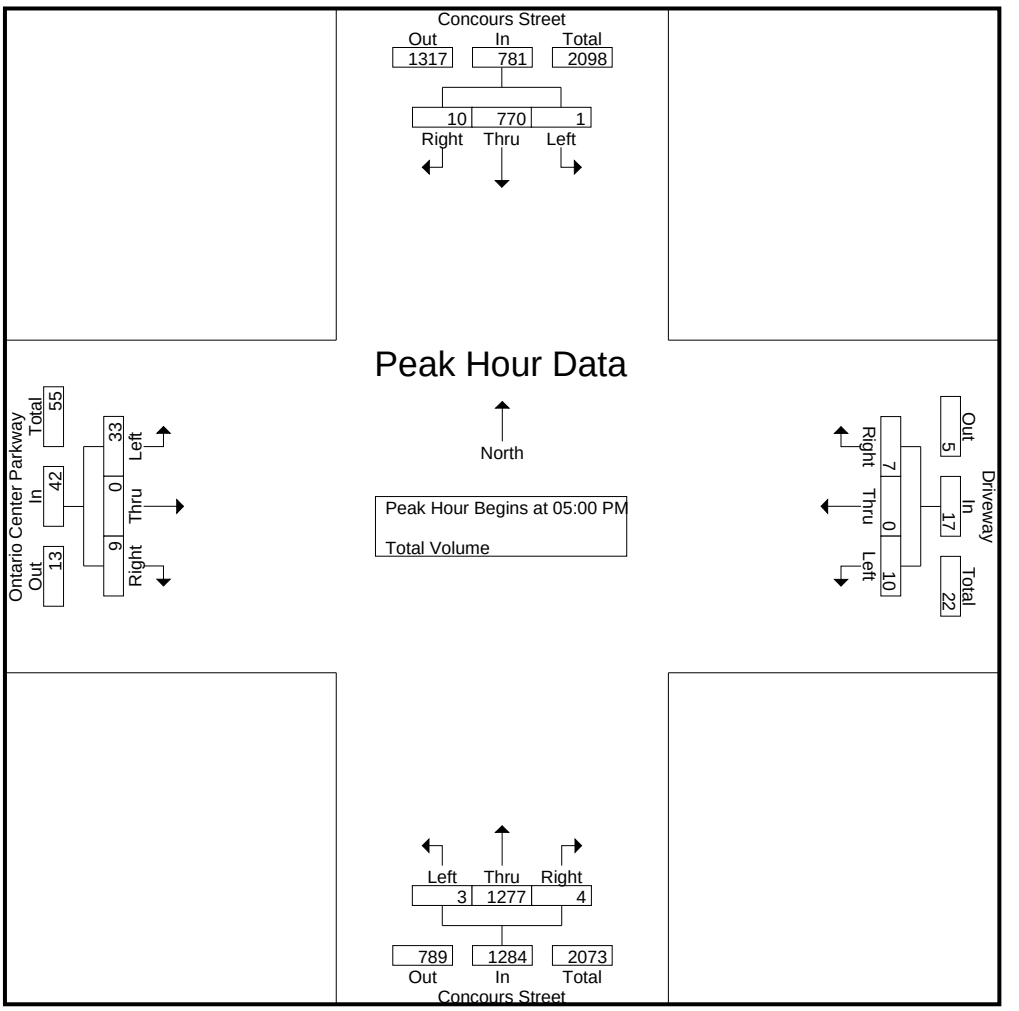
E/W: Ontario Center Parkway
Weather: Clear

File Name : 09_ONT_Concours_Ontario Center_PM
Site Code : 10521235
Start Date : 5/27/2021
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				05:00 PM				04:15 PM			
+0 mins.	0	199	0	199	2	0	2	4	**2**	326	1	329	6	0	1	7
+15 mins.	0	190	1	191	**3**	0	0	3	0	292	1	293	10	0	2	12
+30 mins.	**1**	190	1	192	2	0	2	4	0	**333**	0	**333**	5	0	1	6
+45 mins.	0	**206**	**2**	**208**	3	0	**3**	**6**	1	326	**2**	329	**22**	0	**3**	**25**
Total Volume	1	785	4	790	10	0	7	17	3	1277	4	1284	43	0	7	50
% App. Total	0.1	99.4	0.5		58.8	0	41.2		0.2	99.5	0.3		86	0	14	
PHF	.250	.953	.500	.950	.833	.000	.583	.708	.375	.959	.500	.964	.489	.000	.583	.500

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City of Ontario
N/S: Milliken Avenue
E/W: Concours Street
Weather: Clear

File Name : ONTMICOAM
Site Code : 04216253
Start Date : 7/6/2016
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Concours Street Westbound				Milliken Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	11	149	28	188	9	5	2	16	28	117	5	150	7	2	4	13	367
07:15 AM	15	174	36	225	10	7	9	26	23	129	10	162	11	2	10	23	436
07:30 AM	12	184	61	257	14	14	11	39	25	198	21	244	14	6	13	33	573
07:45 AM	9	243	56	308	10	21	11	42	32	244	7	283	18	8	12	38	671
Total	47	750	181	978	43	47	33	123	108	688	43	839	50	18	39	107	2047
08:00 AM	13	163	46	222	10	20	3	33	49	196	14	259	16	2	12	30	544
08:15 AM	12	193	42	247	9	13	9	31	29	179	10	218	13	5	7	25	521
08:30 AM	14	190	25	229	12	19	2	33	23	147	5	175	25	8	6	39	476
08:45 AM	23	180	28	231	10	16	13	39	35	183	6	224	13	5	15	33	527
Total	62	726	141	929	41	68	27	136	136	705	35	876	67	20	40	127	2068
Grand Total	109	1476	322	1907	84	115	60	259	244	1393	78	1715	117	38	79	234	4115
Apprch %	5.7	77.4	16.9		32.4	44.4	23.2		14.2	81.2	4.5		50	16.2	33.8		
Total %	2.6	35.9	7.8	46.3	2	2.8	1.5	6.3	5.9	33.9	1.9	41.7	2.8	0.9	1.9	5.7	

	Milliken Avenue Southbound				Concours Street Westbound				Milliken Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	12	184	**61**	257	**14**	14	**11**	39	25	198	**21**	244	14	6	**13**	33	573
07:45 AM	9	**243**	56	**308**	10	**21**	11	**42**	32	**244**	7	**283**	**18**	**8**	12	**38**	**671**
08:00 AM	**13**	163	46	222	10	20	3	33	**49**	196	14	259	16	2	12	30	544
08:15 AM	12	193	42	247	9	13	9	31	29	179	10	218	13	5	7	25	521
Total Volume	46	783	205	1034	43	68	34	145	135	817	52	1004	61	21	44	126	2309
% App. Total	4.4	75.7	19.8		29.7	46.9	23.4		13.4	81.4	5.2		48.4	16.7	34.9		
PHF	.885	.806	.840	.839	.768	.810	.773	.863	.689	.837	.619	.887	.847	.656	.846	.829	.860

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City of Ontario
N/S: Milliken Avenue
E/W: Concours Street
Weather: Clear

File Name : ONTMICOAM
Site Code : 04216253
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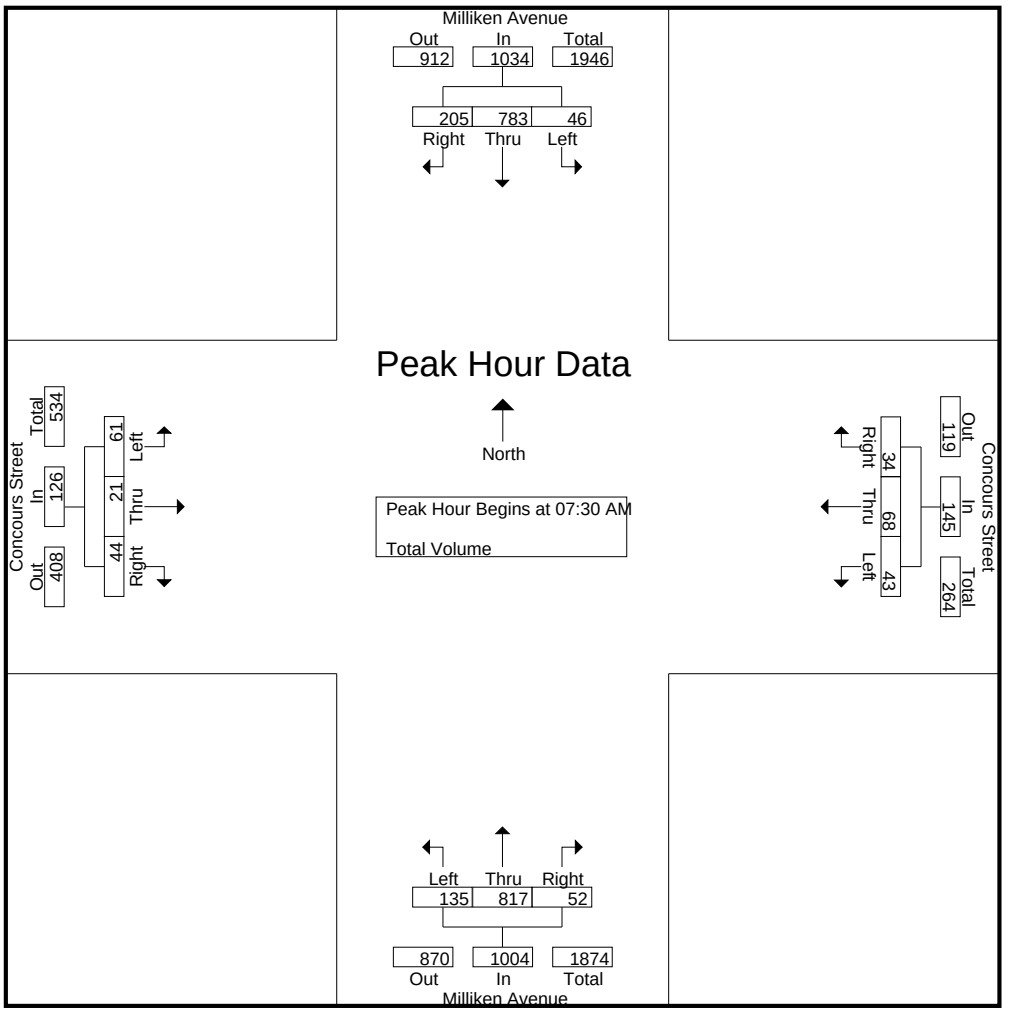

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:30 AM				07:45 AM			
+0 mins.	12	184	**61**	257	**14**	14	**11**	39	25	198	**21**	244	18	**8**	**12**	38
+15 mins.	9	**243**	56	**308**	10	**21**	11	**42**	32	**244**	7	**283**	16	2	12	30
+30 mins.	**13**	163	46	222	10	20	3	33	**49**	196	14	259	13	5	7	25
+45 mins.	12	193	42	247	9	13	9	31	29	179	10	218	**25**	8	6	**39**
Total Volume	46	783	205	1034	43	68	34	145	135	817	52	1004	72	23	37	132
% App. Total	4.4	75.7	19.8		29.7	46.9	23.4		13.4	81.4	5.2		54.5	17.4	28	
PHF	.885	.806	.840	.839	.768	.810	.773	.863	.689	.837	.619	.887	.720	.719	.771	.846

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City of Ontario
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Groups Printed- Total Volume

	Milliken Avenue Southbound				Concours Street Westbound				Milliken Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	100	249	15	364	28	20	27	75	43	262	34	339	65	17	33	115	893
04:15 PM	63	199	21	283	37	18	17	72	40	254	31	325	74	24	37	135	815
04:30 PM	52	246	24	322	32	10	21	63	55	280	18	353	57	16	46	119	857
04:45 PM	51	269	26	346	50	20	18	88	43	333	26	402	55	20	32	107	943
Total	266	963	86	1315	147	68	83	298	181	1129	109	1419	251	77	148	476	3508
05:00 PM	28	291	33	352	28	14	23	65	38	345	25	408	83	43	30	156	981
05:15 PM	44	260	28	332	34	13	28	75	37	402	31	470	90	25	31	146	1023
05:30 PM	37	259	25	321	38	13	32	83	44	368	31	443	67	28	32	127	974
05:45 PM	34	210	20	264	33	15	17	65	40	301	31	372	75	18	23	116	817
Total	143	1020	106	1269	133	55	100	288	159	1416	118	1693	315	114	116	545	3795
Grand Total	409	1983	192	2584	280	123	183	586	340	2545	227	3112	566	191	264	1021	7303
Apprch %	15.8	76.7	7.4		47.8	21	31.2		10.9	81.8	7.3		55.4	18.7	25.9		
Total %	5.6	27.2	2.6	35.4	3.8	1.7	2.5	8	4.7	34.8	3.1	42.6	7.8	2.6	3.6	14	

	Milliken Avenue Southbound				Concours Street Westbound				Milliken Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**51**	269	26	346	**50**	**20**	18	**88**	43	333	26	402	55	20	**32**	107	943
05:00 PM	28	**291**	**33**	**352**	28	14	23	65	38	345	25	408	83	**43**	30	**156**	981
05:15 PM	44	260	28	332	34	13	28	75	37	**402**	**31**	**470**	**90**	25	31	146	**1023**
05:30 PM	37	259	25	321	38	13	**32**	83	**44**	368	31	443	67	28	32	127	974
Total Volume	160	1079	112	1351	150	60	101	311	162	1448	113	1723	295	116	125	536	3921
% App. Total	11.8	79.9	8.3		48.2	19.3	32.5		9.4	84	6.6		55	21.6	23.3		
PHF	.784	.927	.848	.960	.750	.750	.789	.884	.920	.900	.911	.916	.819	.674	.977	.859	.958

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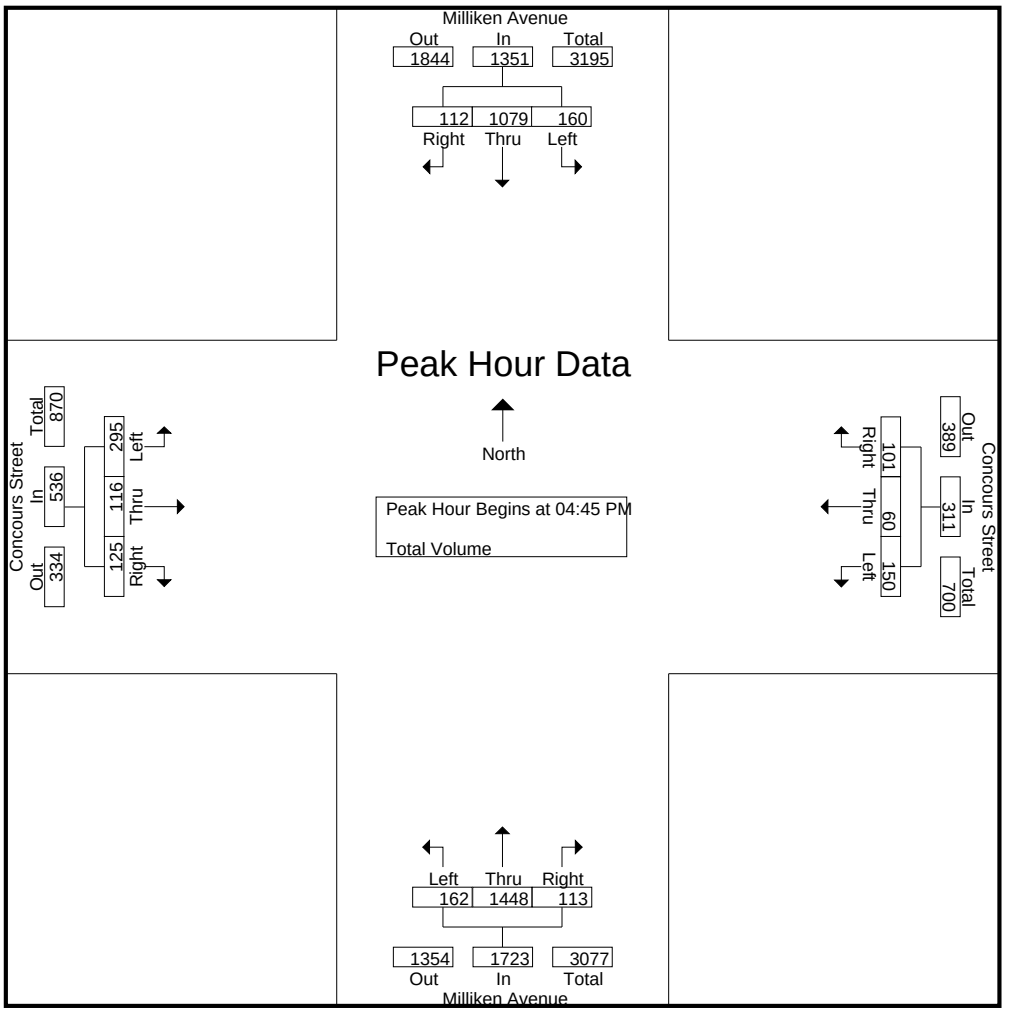

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				04:45 PM				05:00 PM			
+0 mins.	**52**	246	24	322	**50**	**20**	18	**88**	43	333	26	402	83	**43**	30	**156**
+15 mins.	51	269	26	346	28	14	23	65	38	345	25	408	**90**	25	31	146
+30 mins.	28	**291**	**33**	**352**	34	13	28	75	37	**402**	**31**	**470**	67	28	**32**	127
+45 mins.	44	260	28	332	38	13	**32**	83	**44**	368	31	443	75	18	23	116
Total Volume	175	1066	111	1352	150	60	101	311	162	1448	113	1723	315	114	116	545
% App. Total	12.9	78.8	8.2		48.2	19.3	32.5		9.4	84	6.6		57.8	20.9	21.3	
PHF	.841	.916	.841	.960	.750	.750	.789	.884	.920	.900	.911	.916	.875	.663	.906	.873

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City of Ontario
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Weather: Clear

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Groups Printed- Total Volume

	Haven Avenue Southbound				Inland Empire Boulevard Westbound				Haven Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	259	6	269	11	8	1	20	53	343	39	435	7	10	44	61	785
07:15 AM	10	278	12	300	20	16	2	38	68	388	71	527	3	12	43	58	923
07:30 AM	13	312	14	339	28	27	7	62	105	385	128	618	10	12	54	76	1095
07:45 AM	14	303	21	338	30	24	2	56	117	525	115	757	16	28	42	86	1237
Total	41	1152	53	1246	89	75	12	176	343	1641	353	2337	36	62	183	281	4040
08:00 AM	6	284	21	311	20	24	8	52	96	412	173	681	14	26	61	101	1145
08:15 AM	12	279	9	300	24	15	1	40	82	489	147	718	6	19	51	76	1134
08:30 AM	7	257	13	277	41	15	5	61	86	395	122	603	9	19	54	82	1023
08:45 AM	6	313	21	340	30	24	13	67	102	437	118	657	14	18	60	92	1156
Total	31	1133	64	1228	115	78	27	220	366	1733	560	2659	43	82	226	351	4458
Grand Total	72	2285	117	2474	204	153	39	396	709	3374	913	4996	79	144	409	632	8498
Apprch %	2.9	92.4	4.7		51.5	38.6	9.8		14.2	67.5	18.3		12.5	22.8	64.7		
Total %	0.8	26.9	1.4	29.1	2.4	1.8	0.5	4.7	8.3	39.7	10.7	58.8	0.9	1.7	4.8	7.4	

	Haven Avenue Southbound				Inland Empire Boulevard Westbound				Haven Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	13	**312**	14	**339**	28	**27**	7	**62**	105	385	128	618	10	12	54	76	1095
07:45 AM	**14**	303	**21**	338	**30**	24	2	56	**117**	**525**	115	**757**	**16**	**28**	42	86	**1237**
08:00 AM	6	284	21	311	20	24	**8**	52	96	412	**173**	681	14	26	**61**	**101**	1145
08:15 AM	12	279	9	300	24	15	1	40	82	489	147	718	6	19	51	76	1134
Total Volume	45	1178	65	1288	102	90	18	210	400	1811	563	2774	46	85	208	339	4611
% App. Total	3.5	91.5	5		48.6	42.9	8.6		14.4	65.3	20.3		13.6	25.1	61.4		
PHF	.804	.944	.774	.950	.850	.833	.563	.847	.855	.862	.814	.916	.719	.759	.852	.839	.932

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City of Ontario
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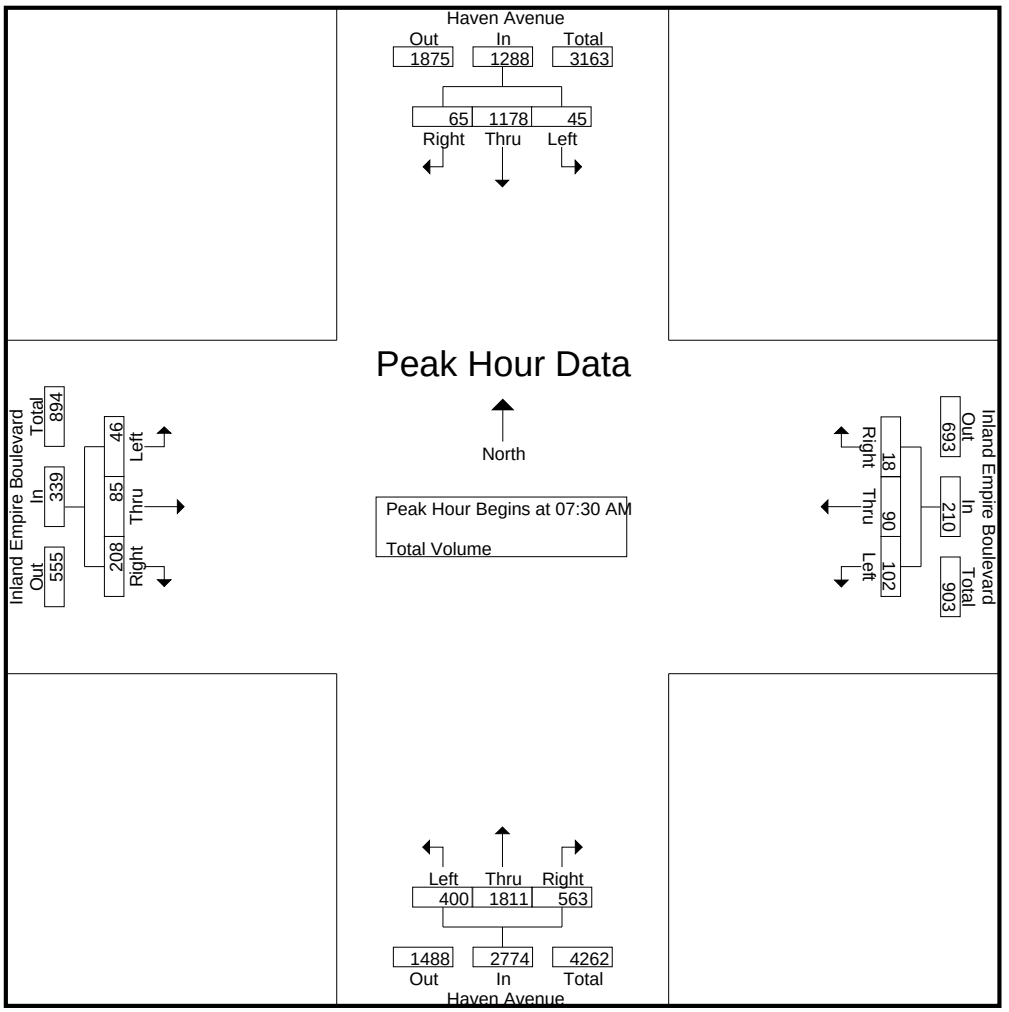

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM				08:00 AM				07:30 AM				08:00 AM			
+0 mins.	10	278	12	300	20	**24**	8	52	105	385	128	618	**14**	**26**	**61**	**101**
+15 mins.	13	**312**	14	**339**	24	15	1	40	**117**	**525**	115	**757**	6	19	51	76
+30 mins.	**14**	303	**21**	338	**41**	15	5	61	96	412	**173**	681	9	19	54	82
+45 mins.	6	284	21	311	30	24	**13**	**67**	82	489	147	718	14	18	60	92
Total Volume	43	1177	68	1288	115	78	27	220	400	1811	563	2774	43	82	226	351
% App. Total	3.3	91.4	5.3		52.3	35.5	12.3		14.4	65.3	20.3		12.3	23.4	64.4	
PHF	.768	.943	.810	.950	.701	.813	.519	.821	.855	.862	.814	.916	.768	.788	.926	.869

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Groups Printed- Total Volume

	Haven Avenue Southbound				Inland Empire Boulevard Westbound				Haven Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	7	524	17	548	108	31	13	152	60	421	95	576	23	29	83	135	1411
04:15 PM	11	431	6	448	89	29	9	127	76	399	85	560	29	28	77	134	1269
04:30 PM	7	454	12	473	130	30	6	166	71	384	73	528	30	47	125	202	1369
04:45 PM	7	427	12	446	103	32	12	147	84	428	96	608	31	44	100	175	1376
Total	32	1836	47	1915	430	122	40	592	291	1632	349	2272	113	148	385	646	5425
05:00 PM	10	481	7	498	198	41	7	246	90	417	102	609	37	52	120	209	1562
05:15 PM	12	566	9	587	124	34	10	168	61	420	108	589	50	47	75	172	1516
05:30 PM	17	362	9	388	126	25	12	163	73	418	99	590	31	38	75	144	1285
05:45 PM	14	351	15	380	88	36	6	130	66	403	116	585	18	44	69	131	1226
Total	53	1760	40	1853	536	136	35	707	290	1658	425	2373	136	181	339	656	5589
Grand Total	85	3596	87	3768	966	258	75	1299	581	3290	774	4645	249	329	724	1302	11014
Apprch %	2.3	95.4	2.3		74.4	19.9	5.8		12.5	70.8	16.7		19.1	25.3	55.6		
Total %	0.8	32.6	0.8	34.2	8.8	2.3	0.7	11.8	5.3	29.9	7	42.2	2.3	3	6.6	11.8	

	Haven Avenue Southbound				Inland Empire Boulevard Westbound				Haven Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	7	454	**12**	473	130	30	6	166	71	384	73	528	30	47	**125**	202	1369
04:45 PM	7	427	12	446	103	32	**12**	147	84	**428**	96	608	31	44	100	175	1376
05:00 PM	10	481	7	498	**198**	**41**	7	**246**	**90**	417	102	**609**	37	**52**	120	**209**	**1562**
05:15 PM	**12**	**566**	9	**587**	124	34	10	168	61	420	**108**	589	**50**	47	75	172	1516
Total Volume	36	1928	40	2004	555	137	35	727	306	1649	379	2334	148	190	420	758	5823
% App. Total	1.8	96.2	2		76.3	18.8	4.8		13.1	70.7	16.2		19.5	25.1	55.4		
PHF	.750	.852	.833	.853	.701	.835	.729	.739	.850	.963	.877	.958	.740	.913	.840	.907	.932

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City of Ontario
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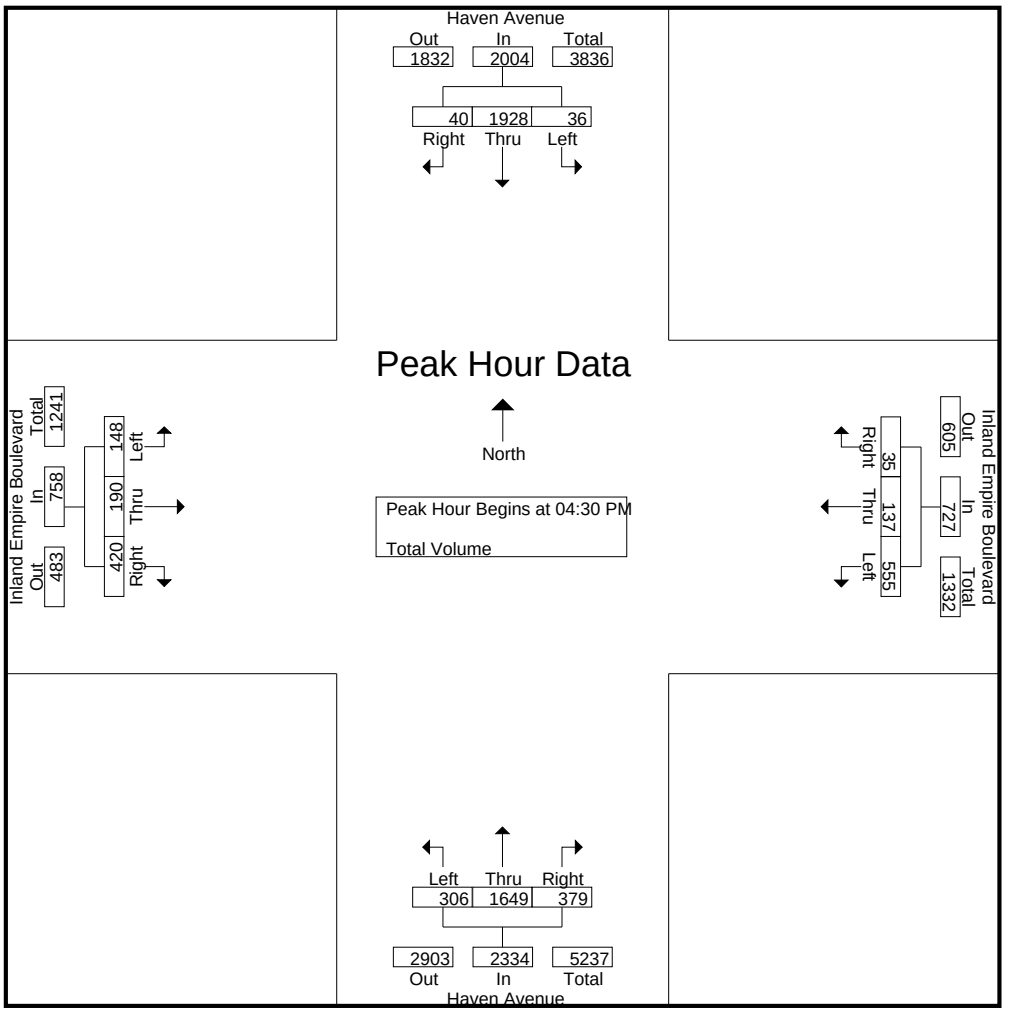

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:45 PM				04:30 PM			
+0 mins.	7	454	**12**	473	130	30	6	166	84	**428**	96	608	30	47	**125**	202
+15 mins.	7	427	12	446	103	32	**12**	147	**90**	417	102	**609**	31	44	100	175
+30 mins.	10	481	7	498	**198**	**41**	7	**246**	61	420	**108**	589	37	**52**	120	**209**
+45 mins.	**12**	**566**	9	**587**	124	34	10	168	73	418	99	590	**50**	47	75	172
Total Volume	36	1928	40	2004	555	137	35	727	308	1683	405	2396	148	190	420	758
% App. Total	1.8	96.2	2		76.3	18.8	4.8		12.9	70.2	16.9		19.5	25.1	55.4	
PHF	.750	.852	.833	.853	.701	.835	.729	.739	.856	.983	.938	.984	.740	.913	.840	.907

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E/W: Inland Empire Boulevard/Mall Drive
Weather: Clear

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Groups Printed- Total Volume

	Milliken Avenue Southbound				Mall Drive Westbound				Milliken Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	3	122	14	139	11	7	3	21	63	143	14	220	6	2	5	13	393
07:15 AM	5	196	18	219	7	10	1	18	63	170	13	246	7	2	5	14	497
07:30 AM	6	164	26	196	22	17	5	44	84	232	25	341	4	4	10	18	599
07:45 AM	5	222	37	264	18	17	8	43	103	260	26	389	15	7	12	34	730
Total	19	704	95	818	58	51	17	126	313	805	78	1196	32	15	32	79	2219
08:00 AM	10	140	25	175	19	17	0	36	88	217	20	325	20	11	5	36	572
08:15 AM	7	191	25	223	27	17	4	48	78	205	25	308	16	7	18	41	620
08:30 AM	8	204	19	231	21	21	3	45	80	178	14	272	13	10	15	38	586
08:45 AM	7	189	25	221	9	11	9	29	82	219	35	336	12	9	17	38	624
Total	32	724	94	850	76	66	16	158	328	819	94	1241	61	37	55	153	2402
Grand Total	51	1428	189	1668	134	117	33	284	641	1624	172	2437	93	52	87	232	4621
Apprch %	3.1	85.6	11.3		47.2	41.2	11.6		26.3	66.6	7.1		40.1	22.4	37.5		
Total %	1.1	30.9	4.1	36.1	2.9	2.5	0.7	6.1	13.9	35.1	3.7	52.7	2	1.1	1.9	5	

	Milliken Avenue Southbound				Mall Drive Westbound				Milliken Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	6	164	26	196	22	**17**	5	44	84	232	25	341	4	4	10	18	599
07:45 AM	5	**222**	**37**	**264**	18	17	**8**	43	**103**	**260**	**26**	**389**	15	7	12	34	**730**
08:00 AM	**10**	140	25	175	19	17	0	36	88	217	20	325	**20**	**11**	5	36	572
08:15 AM	7	191	25	223	**27**	17	4	**48**	78	205	25	308	16	7	**18**	**41**	620
Total Volume	28	717	113	858	86	68	17	171	353	914	96	1363	55	29	45	129	2521
% App. Total	3.3	83.6	13.2		50.3	39.8	9.9		25.9	67.1	7		42.6	22.5	34.9		
PHF	.700	.807	.764	.813	.796	1.00	.531	.891	.857	.879	.923	.876	.688	.659	.625	.787	.863

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City of Ontario
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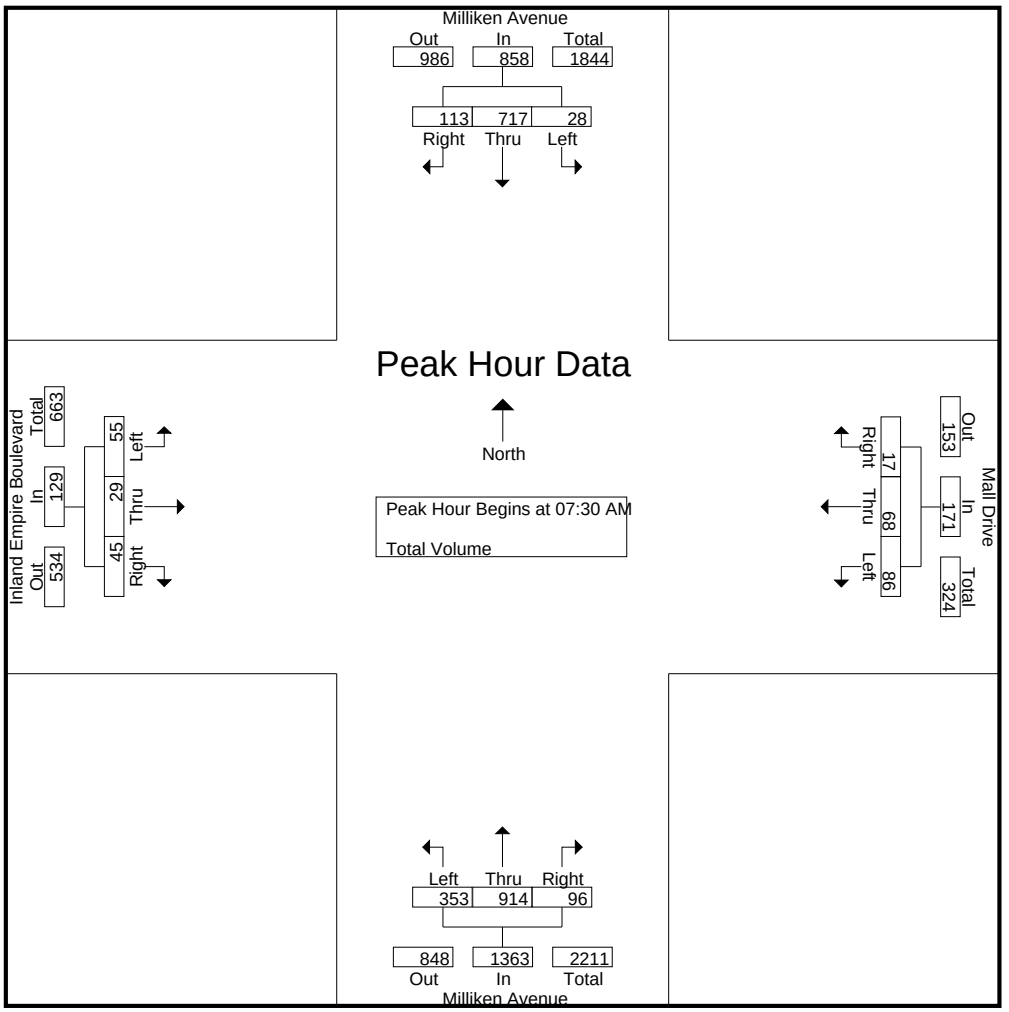

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				07:30 AM				08:00 AM			
+0 mins.	5	**222**	**37**	**264**	18	17	**8**	43	84	232	25	341	**20**	**11**	5	36
+15 mins.	**10**	140	25	175	19	17	0	36	**103**	**260**	**26**	**389**	16	7	**18**	**41**
+30 mins.	7	191	25	223	**27**	17	4	**48**	88	217	20	325	13	10	15	38
+45 mins.	8	204	19	231	21	**21**	3	45	78	205	25	308	12	9	17	38
Total Volume	30	757	106	893	85	72	15	172	353	914	96	1363	61	37	55	153
% App. Total	3.4	84.8	11.9		49.4	41.9	8.7		25.9	67.1	7		39.9	24.2	35.9	
PHF	.750	.852	.716	.846	.787	.857	.469	.896	.857	.879	.923	.876	.763	.841	.764	.933

Counts Unlimited
PO Box 1178
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(951) 268-6268

City of Ontario
N/S: Milliken Avenue
E/W: Inland Empire Boulevard/Mall Drive
Weather: Clear

File Name : ONTMIINPM
Site Code : 04216253
Start Date : 7/6/2016
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Mall Drive Westbound				Milliken Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	23	294	17	334	42	22	17	81	53	304	76	433	59	48	55	162	1010
04:15 PM	23	248	16	287	48	19	19	86	77	247	62	386	48	45	48	141	900
04:30 PM	22	295	24	341	45	20	15	80	70	286	71	427	48	49	66	163	1011
04:45 PM	24	308	29	361	58	18	15	91	79	334	82	495	62	53	49	164	1111
Total	92	1145	86	1323	193	79	66	338	279	1171	291	1741	217	195	218	630	4032
05:00 PM	21	314	24	359	43	17	29	89	74	297	86	457	66	67	83	216	1121
05:15 PM	21	304	18	343	49	16	14	79	103	380	73	556	82	57	89	228	1206
05:30 PM	18	297	32	347	35	17	17	69	85	373	77	535	46	73	60	179	1130
05:45 PM	26	216	27	269	52	15	13	80	99	296	85	480	50	61	68	179	1008
Total	86	1131	101	1318	179	65	73	317	361	1346	321	2028	244	258	300	802	4465
Grand Total	178	2276	187	2641	372	144	139	655	640	2517	612	3769	461	453	518	1432	8497
Apprch %	6.7	86.2	7.1		56.8	22	21.2		17	66.8	16.2		32.2	31.6	36.2		
Total %	2.1	26.8	2.2	31.1	4.4	1.7	1.6	7.7	7.5	29.6	7.2	44.4	5.4	5.3	6.1	16.9	

	Milliken Avenue Southbound				Mall Drive Westbound				Milliken Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**24**	308	29	**361**	**58**	**18**	15	**91**	79	334	82	495	62	53	49	164	1111
05:00 PM	21	**314**	24	359	43	17	**29**	89	74	297	**86**	457	66	67	83	216	1121
05:15 PM	21	304	18	343	49	16	14	79	**103**	**380**	73	**556**	**82**	57	**89**	**228**	**1206**
05:30 PM	18	297	**32**	347	35	17	17	69	85	373	77	535	46	**73**	60	179	1130
Total Volume	84	1223	103	1410	185	68	75	328	341	1384	318	2043	256	250	281	787	4568
% App. Total	6	86.7	7.3		56.4	20.7	22.9		16.7	67.7	15.6		32.5	31.8	35.7		
PHF	.875	.974	.805	.976	.797	.944	.647	.901	.828	.911	.924	.919	.780	.856	.789	.863	.947

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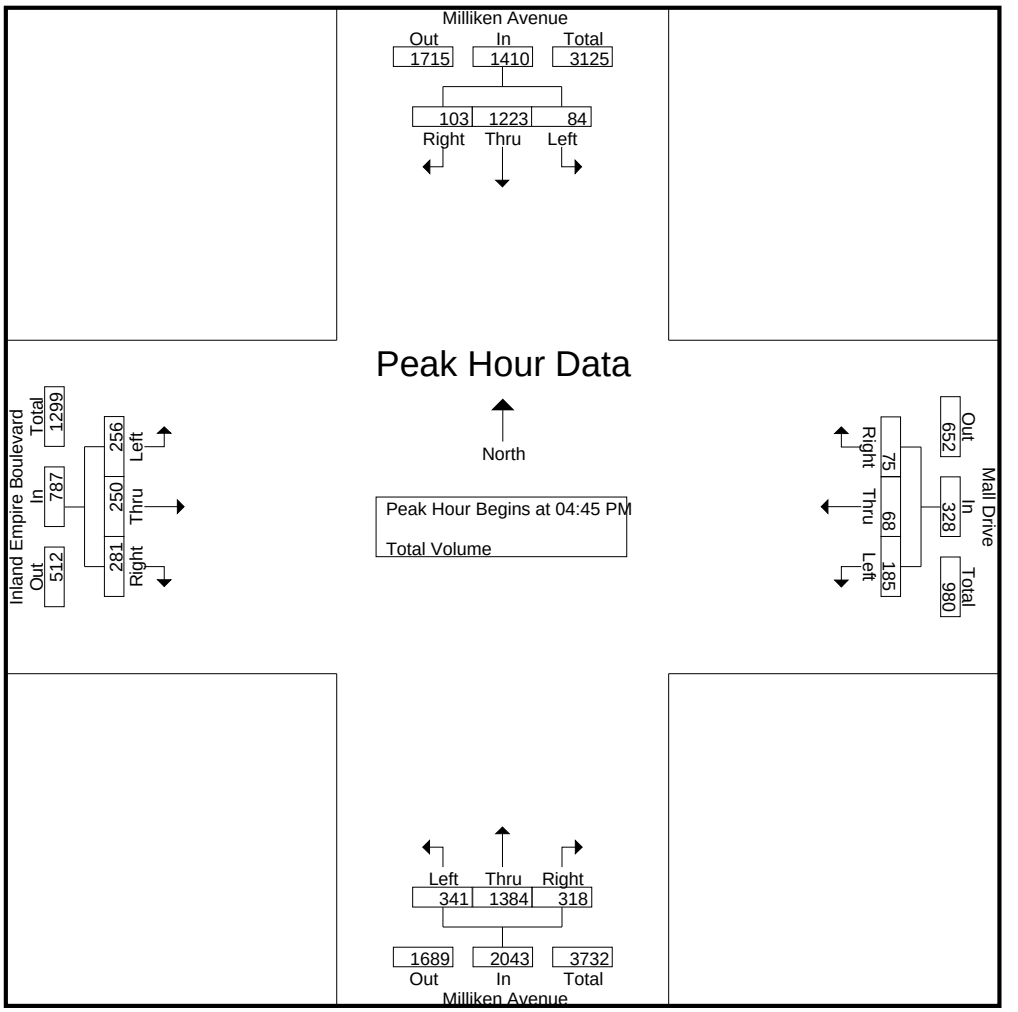
City of Ontario
N/S: Milliken Avenue
E/W: Inland Empire Boulevard/Mall Drive
Weather: Clear

File Name : ONTMIINPM
Site Code : 04216253
Start Date : 7/6/2016
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:15 PM				04:45 PM				05:00 PM			
+0 mins.	**24**	308	29	**361**	48	19	19	86	79	334	82	495	66	67	83	216
+15 mins.	21	**314**	24	359	45	**20**	15	80	74	297	**86**	457	**82**	57	**89**	**228**
+30 mins.	21	304	18	343	**58**	18	15	**91**	**103**	**380**	73	**556**	46	**73**	60	179
+45 mins.	18	297	**32**	347	43	17	**29**	89	85	373	77	535	50	61	68	179
Total Volume	84	1223	103	1410	194	74	78	346	341	1384	318	2043	244	258	300	802
% App. Total	6	86.7	7.3		56.1	21.4	22.5		16.7	67.7	15.6		30.4	32.2	37.4	
PHF	.875	.974	.805	.976	.836	.925	.672	.951	.828	.911	.924	.919	.744	.884	.843	.879

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City of Ontario
N/S: Haven Avenue
E/W: I-10 Westbound Ramps
Weather: Clear

File Name : 06_ONT_Haven_10W AM
Site Code : 99919684
Start Date : 11/6/2019

Groups Printed- Total Volume

	Haven Avenue Southbound				I-10 Westbound Ramps Westbound				Haven Avenue Northbound				I-10 Westbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	0	197	77	274	94	0	75	169	0	158	66	224	0	0	0	0	667
06:15 AM	0	241	83	324	103	0	73	176	0	224	77	301	0	0	0	0	801
06:30 AM	0	263	87	350	118	0	95	213	0	275	65	340	0	0	0	0	903
06:45 AM	0	318	115	433	94	0	96	190	0	400	81	481	0	0	0	0	1104
Total	0	1019	362	1381	409	0	339	748	0	1057	289	1346	0	0	0	0	3475
07:00 AM	0	312	120	432	86	0	81	167	0	392	83	475	0	0	0	0	1074
07:15 AM	0	331	122	453	97	0	92	189	0	484	98	582	0	0	0	0	1224
07:30 AM	0	357	110	467	94	0	102	196	0	623	72	695	0	0	0	0	1358
07:45 AM	0	403	75	478	132	0	179	311	0	680	71	751	0	0	0	0	1540
Total	0	1403	427	1830	409	0	454	863	0	2179	324	2503	0	0	0	0	5196
08:00 AM	0	330	91	421	114	0	181	295	0	550	60	610	0	0	0	0	1326
08:15 AM	0	331	95	426	118	0	166	284	0	553	89	642	0	0	0	0	1352
08:30 AM	0	301	98	399	116	0	172	288	0	515	59	574	0	0	0	0	1261
08:45 AM	0	270	101	371	107	0	168	275	0	524	69	593	0	0	0	0	1239
Total	0	1232	385	1617	455	0	687	1142	0	2142	277	2419	0	0	0	0	5178
Grand Total	0	3654	1174	4828	1273	0	1480	2753	0	5378	890	6268	0	0	0	0	13849
Apprch %	0	75.7	24.3		46.2	0	53.8		0	85.8	14.2		0	0	0		
Total %	0	26.4	8.5	34.9	9.2	0	10.7	19.9	0	38.8	6.4	45.3	0	0	0	0	

	Haven Avenue Southbound				I-10 Westbound Ramps Westbound				Haven Avenue Northbound				I-10 Westbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	357	**110**	467	94	0	102	196	0	623	72	695	0	0	0	0	1358
07:45 AM	0	**403**	75	**478**	**132**	0	179	**311**	0	**680**	71	**751**	0	0	0	0	**1540**
08:00 AM	0	330	91	421	114	0	**181**	295	0	550	60	610	0	0	0	0	1326
08:15 AM	0	331	95	426	118	0	166	284	0	553	**89**	642	0	0	0	0	1352
Total Volume	0	1421	371	1792	458	0	628	1086	0	2406	292	2698	0	0	0	0	5576
% App. Total	0	79.3	20.7		42.2	0	57.8		0	89.2	10.8		0	0	0		
PHF	.000	.882	.843	.937	.867	.000	.867	.873	.000	.885	.820	.898	.000	.000	.000	.000	.905

Counts Unlimited
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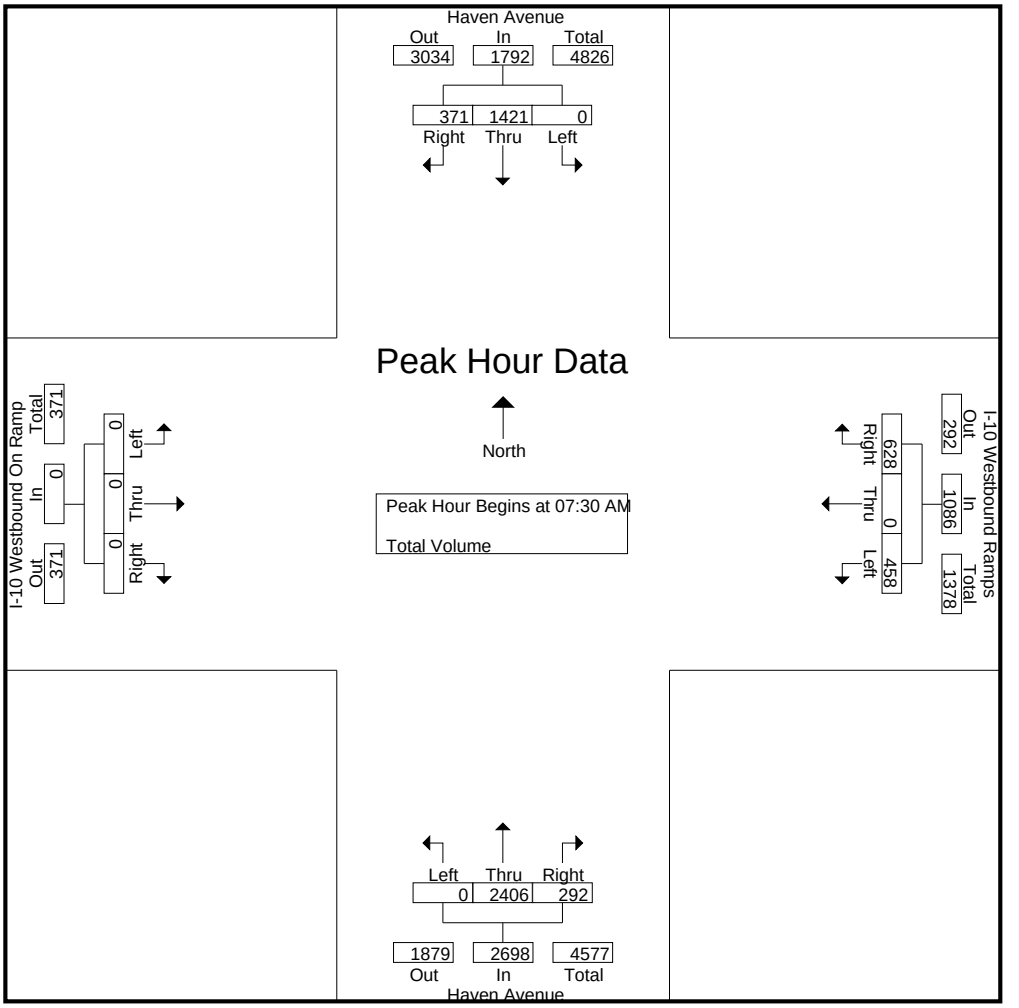
City of Ontario
N/S: Haven Avenue
E/W: I-10 Westbound Ramps
Weather: Clear

File Name : 06_ONT_Haven_10W AM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 2



Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:45 AM				07:30 AM				06:00 AM			
+0 mins.	0	312	120	432	**132**	0	179	**311**	0	623	72	695	0	0	0	0
+15 mins.	0	331	**122**	453	114	0	**181**	295	0	**680**	71	**751**	0	0	0	0
+30 mins.	0	357	110	467	118	0	166	284	0	550	60	610	0	0	0	0
+45 mins.	0	**403**	75	**478**	116	0	172	288	0	553	**89**	642	0	0	0	0
Total Volume	0	1403	427	1830	480	0	698	1178	0	2406	292	2698	0	0	0	0
% App. Total	0	76.7	23.3		40.7	0	59.3		0	89.2	10.8		0	0	0	
PHF	.000	.870	.875	.957	.909	.000	.964	.947	.000	.885	.820	.898	.000	.000	.000	.000

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City of Ontario
N/S: Haven Avenue
E/W: I-10 Westbound Ramps
Weather: Clear

File Name : 06_ONT_Haven_10W PM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				I-10 Westbound Ramps Westbound				Haven Avenue Northbound				I-10 Westbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	0	396	181	577	98	0	98	196	0	406	122	528	0	0	0	0	1301
03:15 PM	0	379	150	529	92	0	130	222	0	449	99	548	0	0	0	0	1299
03:30 PM	0	494	175	669	110	0	120	230	0	462	128	590	0	0	0	0	1489
03:45 PM	0	386	129	515	105	0	127	232	0	527	140	667	0	0	0	0	1414
Total	0	1655	635	2290	405	0	475	880	0	1844	489	2333	0	0	0	0	5503
04:00 PM	0	426	190	616	85	0	130	215	0	530	151	681	0	0	0	0	1512
04:15 PM	0	387	174	561	79	0	119	198	0	494	135	629	0	0	0	0	1388
04:30 PM	0	475	223	698	76	0	123	199	0	418	144	562	0	0	0	0	1459
04:45 PM	0	495	213	708	74	0	114	188	0	541	161	702	0	0	0	0	1598
Total	0	1783	800	2583	314	0	486	800	0	1983	591	2574	0	0	0	0	5957
05:00 PM	0	592	205	797	73	0	112	185	0	528	143	671	0	0	0	0	1653
05:15 PM	0	531	171	702	67	0	111	178	0	577	150	727	0	0	0	0	1607
05:30 PM	0	402	146	548	83	0	120	203	0	534	107	641	0	0	0	0	1392
05:45 PM	0	375	145	520	84	2	146	232	0	486	105	591	0	0	0	0	1343
Total	0	1900	667	2567	307	2	489	798	0	2125	505	2630	0	0	0	0	5995
Grand Total	0	5338	2102	7440	1026	2	1450	2478	0	5952	1585	7537	0	0	0	0	17455
Apprch %	0	71.7	28.3		41.4	0.1	58.5		0	79	21		0	0	0		
Total %	0	30.6	12	42.6	5.9	0	8.3	14.2	0	34.1	9.1	43.2	0	0	0	0	

	Haven Avenue Southbound				I-10 Westbound Ramps Westbound				Haven Avenue Northbound				I-10 Westbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	475	**223**	698	**76**	0	**123**	**199**	0	418	144	562	0	0	0	0	1459
04:45 PM	0	495	213	708	74	0	114	188	0	541	**161**	702	0	0	0	0	1598
05:00 PM	0	**592**	205	**797**	73	0	112	185	0	528	143	671	0	0	0	0	**1653**
05:15 PM	0	531	171	702	67	0	111	178	0	**577**	150	**727**	0	0	0	0	1607
Total Volume	0	2093	812	2905	290	0	460	750	0	2064	598	2662	0	0	0	0	6317
% App. Total	0	72	28		38.7	0	61.3		0	77.5	22.5		0	0	0		
PHF	.000	.884	.910	.911	.954	.000	.935	.942	.000	.894	.929	.915	.000	.000	.000	.000	.955

Counts Unlimited
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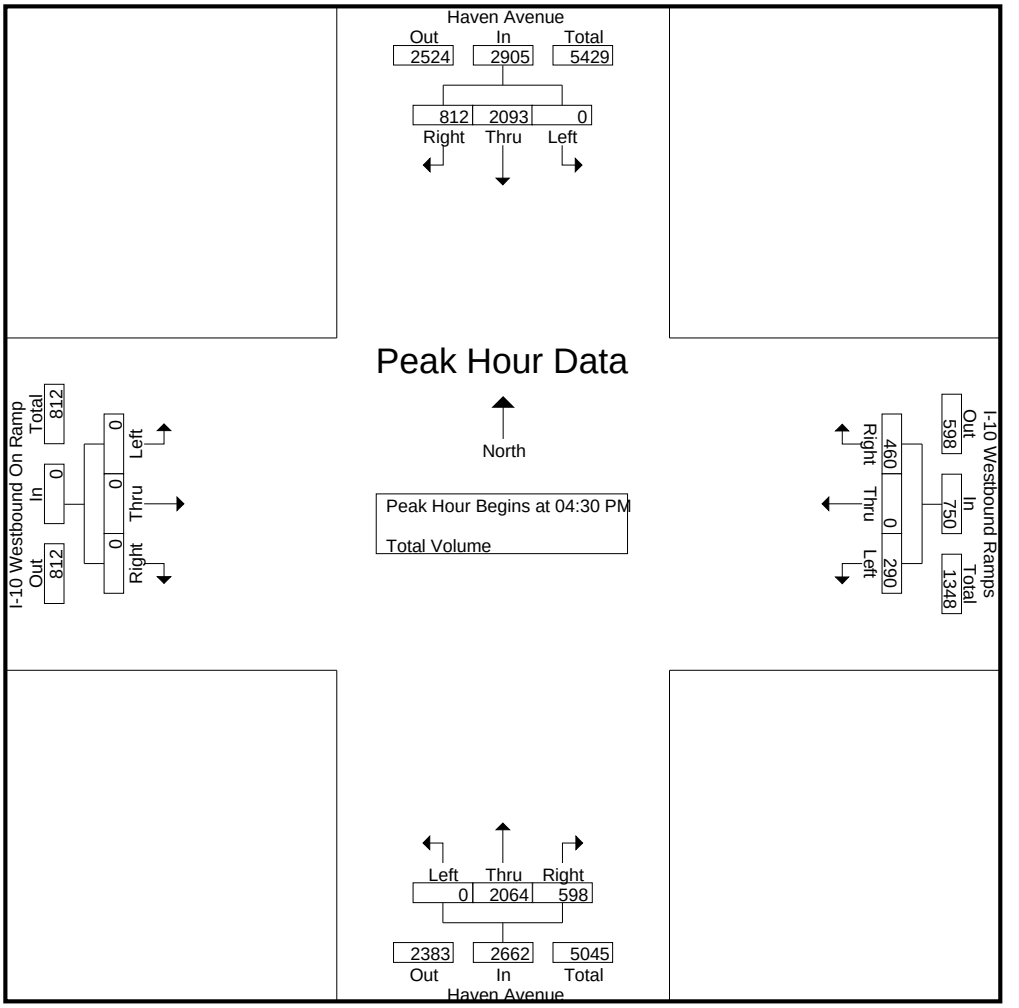
City of Ontario
N/S: Haven Avenue
E/W: I-10 Westbound Ramps
Weather: Clear

File Name : 06_ONT_Haven_10W PM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				03:15 PM				04:45 PM				03:00 PM			
+0 mins.	0	475	**223**	698	92	0	**130**	222	0	541	**161**	702	0	0	0	0
+15 mins.	0	495	213	708	**110**	0	120	230	0	528	143	671	0	0	0	0
+30 mins.	0	**592**	205	**797**	105	0	127	**232**	0	**577**	150	**727**	0	0	0	0
+45 mins.	0	531	171	702	85	0	130	215	0	534	107	641	0	0	0	0
Total Volume	0	2093	812	2905	392	0	507	899	0	2180	561	2741	0	0	0	0
% App. Total	0	72	28		43.6	0	56.4		0	79.5	20.5		0	0	0	
PHF	.000	.884	.910	.911	.891	.000	.975	.969	.000	.945	.871	.943	.000	.000	.000	.000

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File Name : 08_ONT_Milliken_10W AM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 1

City of Ontario
N/S: Milliken Avenue
E/W: I-10 WB Ramps/Ontario Mills Pkwy
Weather: Clear

Groups Printed- Total Volume

	Milliken Avenue Southbound				Ontario Mills Parkway Westbound				Milliken Avenue Northbound				I-10 Westbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	5	86	46	137	12	19	3	34	24	84	28	136	55	11	48	114	421
06:15 AM	3	107	65	175	25	33	8	66	28	96	37	161	44	10	54	108	510
06:30 AM	10	114	63	187	19	51	5	75	32	118	45	195	55	8	69	132	589
06:45 AM	13	140	56	209	43	63	5	111	26	121	59	206	89	21	51	161	687
Total	31	447	230	708	99	166	21	286	110	419	169	698	243	50	222	515	2207
07:00 AM	19	115	69	203	35	81	4	120	28	131	52	211	69	13	32	114	648
07:15 AM	15	120	62	197	29	88	5	122	28	168	57	253	101	18	37	156	728
07:30 AM	16	124	59	199	39	74	5	118	26	212	75	313	91	23	47	161	791
07:45 AM	20	146	51	217	48	51	11	110	39	224	95	358	151	24	59	234	919
Total	70	505	241	816	151	294	25	470	121	735	279	1135	412	78	175	665	3086
08:00 AM	12	102	61	175	34	30	13	77	41	215	64	320	143	23	55	221	793
08:15 AM	29	133	63	225	29	16	3	48	36	175	44	255	157	13	58	228	756
08:30 AM	20	104	54	178	36	28	6	70	32	193	49	274	92	14	45	151	673
08:45 AM	21	122	64	207	26	26	7	59	31	171	50	252	122	33	56	211	729
Total	82	461	242	785	125	100	29	254	140	754	207	1101	514	83	214	811	2951
Grand Total	183	1413	713	2309	375	560	75	1010	371	1908	655	2934	1169	211	611	1991	8244
Apprch %	7.9	61.2	30.9		37.1	55.4	7.4		12.6	65	22.3		58.7	10.6	30.7		
Total %	2.2	17.1	8.6	28	4.5	6.8	0.9	12.3	4.5	23.1	7.9	35.6	14.2	2.6	7.4	24.2	

	Milliken Avenue Southbound				Ontario Mills Parkway Westbound				Milliken Avenue Northbound				I-10 Westbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	16	124	59	199	39	**74**	5	**118**	26	212	75	313	91	23	47	161	791
07:45 AM	20	**146**	51	217	**48**	51	11	110	39	**224**	**95**	**358**	151	**24**	**59**	**234**	**919**
08:00 AM	12	102	61	175	34	30	**13**	77	**41**	215	64	320	143	23	55	221	793
08:15 AM	**29**	133	**63**	**225**	29	16	3	48	36	175	44	255	**157**	13	58	228	756
Total Volume	77	505	234	816	150	171	32	353	142	826	278	1246	542	83	219	844	3259
% App. Total	9.4	61.9	28.7		42.5	48.4	9.1		11.4	66.3	22.3		64.2	9.8	25.9		
PHF	.664	.865	.929	.907	.781	.578	.615	.748	.866	.922	.732	.870	.863	.865	.928	.902	.887

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City of Ontario
N/S: Milliken Avenue
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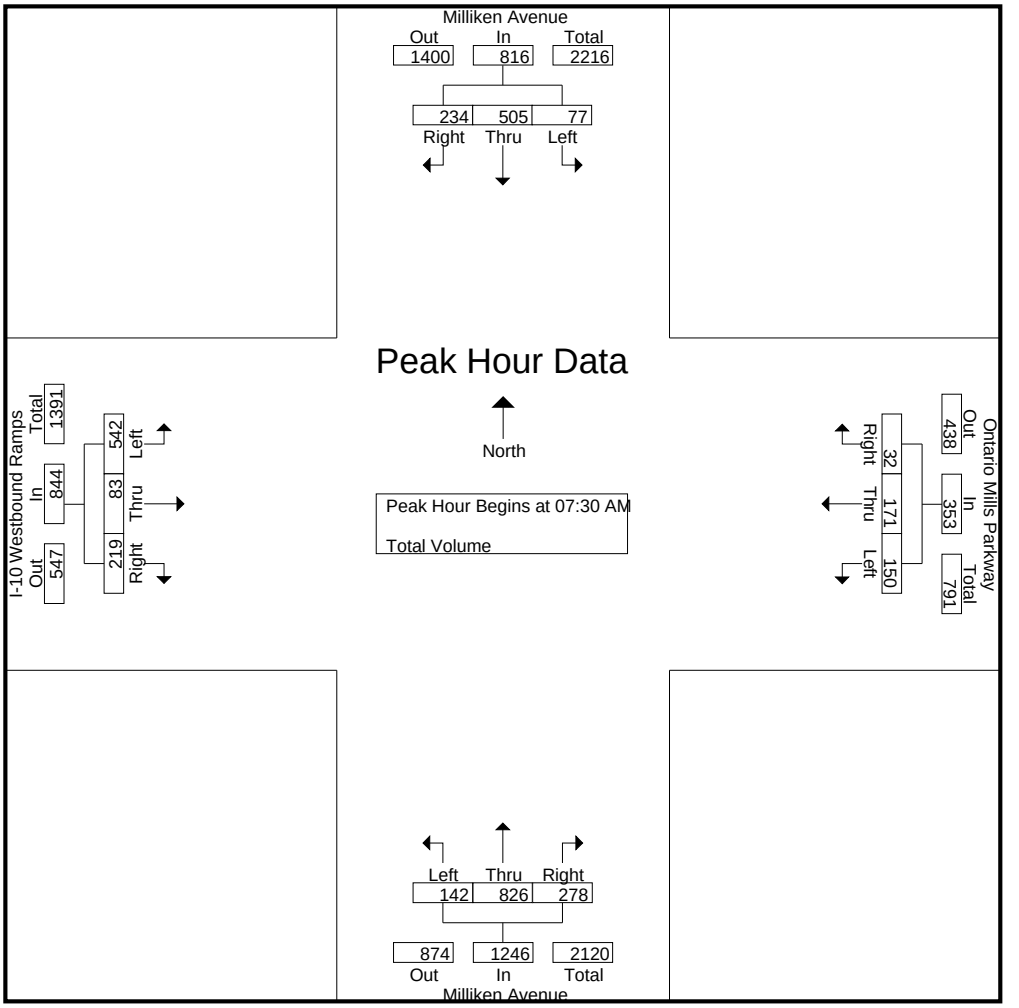
Weather: Clear

File Name : 08_ONT_Milliken_10W AM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 2



Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				06:45 AM				07:30 AM				07:30 AM			
+0 mins.	19	115	**69**	203	**43**	63	**5**	111	26	212	75	313	91	23	47	161
+15 mins.	15	120	62	197	35	81	4	120	39	**224**	**95**	**358**	151	**24**	**59**	**234**
+30 mins.	16	124	59	199	29	**88**	5	**122**	**41**	215	64	320	143	23	55	221
+45 mins.	**20**	**146**	51	**217**	39	74	5	118	36	175	44	255	**157**	13	58	228
Total Volume	70	505	241	816	146	306	19	471	142	826	278	1246	542	83	219	844
% App. Total	8.6	61.9	29.5		31	65	4		11.4	66.3	22.3		64.2	9.8	25.9	
PHF	.875	.865	.873	.940	.849	.869	.950	.965	.866	.922	.732	.870	.863	.865	.928	.902

Counts Unlimited
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File Name : 08_ONT_Milliken_10W PM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 1

City of Ontario
N/S: Milliken Avenue
E/W: I-10 WB Ramps/Ontario Mills Pkwy
Weather: Clear

Groups Printed- Total Volume

	Milliken Avenue Southbound				Ontario Mills Parkway Westbound				Milliken Avenue Northbound				I-10 Westbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	43	197	97	337	41	74	13	128	65	229	92	386	119	31	59	209	1060
03:15 PM	40	202	119	361	53	36	8	97	44	233	77	354	139	38	39	216	1028
03:30 PM	65	177	85	327	39	47	18	104	73	225	82	380	137	33	57	227	1038
03:45 PM	53	195	110	358	50	54	10	114	42	251	95	388	186	43	50	279	1139
Total	201	771	411	1383	183	211	49	443	224	938	346	1508	581	145	205	931	4265
04:00 PM	63	195	120	378	39	58	12	109	64	223	105	392	150	39	43	232	1111
04:15 PM	36	231	101	368	51	49	14	114	51	253	94	398	166	49	48	263	1143
04:30 PM	63	213	121	397	54	72	9	135	72	246	98	416	163	57	49	269	1217
04:45 PM	57	238	106	401	50	73	14	137	46	233	108	387	215	47	57	319	1244
Total	219	877	448	1544	194	252	49	495	233	955	405	1593	694	192	197	1083	4715
05:00 PM	111	252	100	463	67	76	18	161	57	242	106	405	168	37	67	272	1301
05:15 PM	76	288	115	479	63	57	18	138	47	221	106	374	170	41	46	257	1248
05:30 PM	66	225	103	394	49	57	17	123	50	241	99	390	177	42	65	284	1191
05:45 PM	75	216	103	394	53	58	17	128	30	236	89	355	188	42	50	280	1157
Total	328	981	421	1730	232	248	70	550	184	940	400	1524	703	162	228	1093	4897
Grand Total	748	2629	1280	4657	609	711	168	1488	641	2833	1151	4625	1978	499	630	3107	13877
Apprch %	16.1	56.5	27.5		40.9	47.8	11.3		13.9	61.3	24.9		63.7	16.1	20.3		
Total %	5.4	18.9	9.2	33.6	4.4	5.1	1.2	10.7	4.6	20.4	8.3	33.3	14.3	3.6	4.5	22.4	

	Milliken Avenue Southbound				Ontario Mills Parkway Westbound				Milliken Avenue Northbound				I-10 Westbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	63	213	**121**	397	54	72	9	135	**72**	**246**	98	**416**	163	**57**	49	269	1217
04:45 PM	57	238	106	401	50	73	14	137	46	233	**108**	387	**215**	47	57	**319**	1244
05:00 PM	**111**	252	100	463	**67**	**76**	**18**	**161**	57	242	106	405	168	37	**67**	272	**1301**
05:15 PM	76	**288**	115	**479**	63	57	18	138	47	221	106	374	170	41	46	257	1248
Total Volume	307	991	442	1740	234	278	59	571	222	942	418	1582	716	182	219	1117	5010
% App. Total	17.6	57	25.4		41	48.7	10.3		14	59.5	26.4		64.1	16.3	19.6		
PHF	.691	.860	.913	.908	.873	.914	.819	.887	.771	.957	.968	.951	.833	.798	.817	.875	.963

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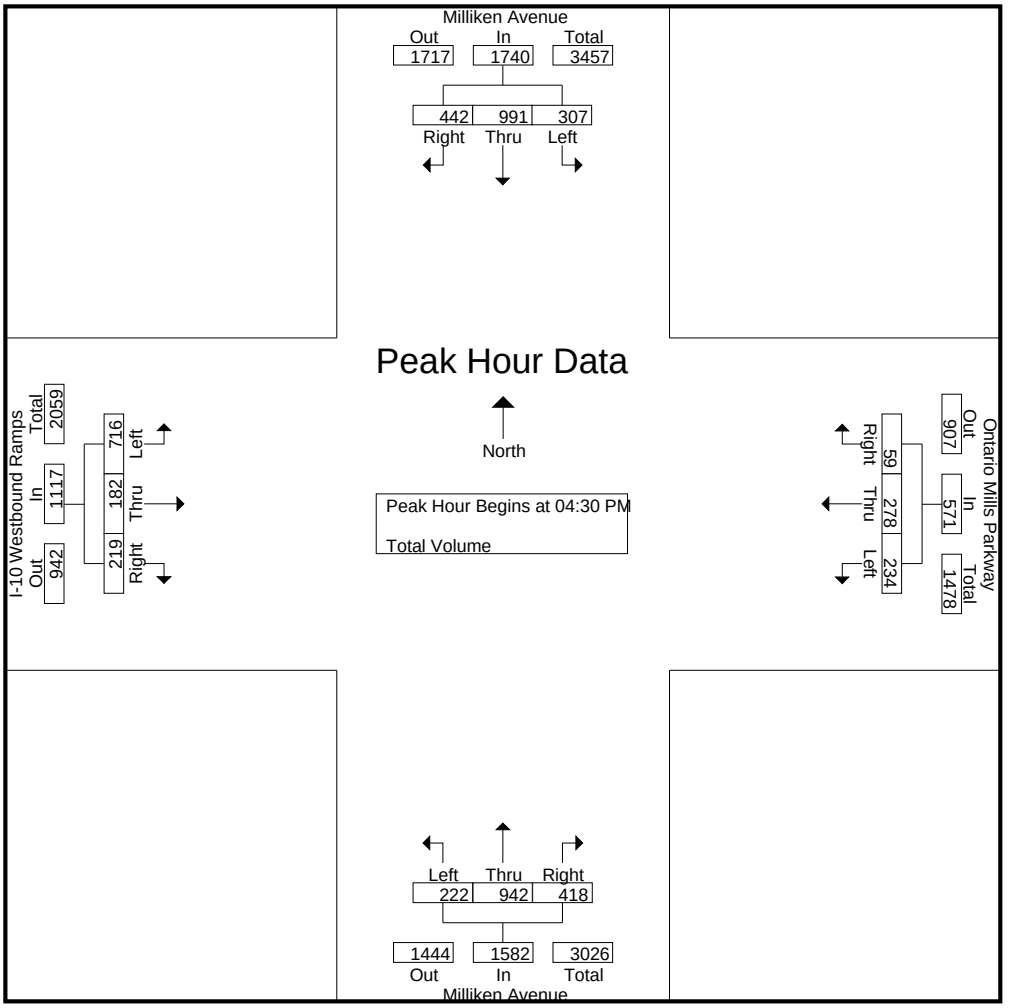
City of Ontario
N/S: Milliken Avenue
E/W: I-10 WB Ramps/Ontario Mills Pkwy
Weather: Clear

File Name : 08_ONT_Milliken_10W PM
Site Code : 99919684
Start Date : 11/6/2019



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:15 PM				04:45 PM			
+0 mins.	63	213	**121**	397	54	72	9	135	51	**253**	94	398	**215**	**47**	57	**319**
+15 mins.	57	238	106	401	50	73	14	137	**72**	246	98	**416**	168	37	**67**	272
+30 mins.	**111**	252	100	463	**67**	**76**	**18**	**161**	46	233	**108**	387	170	41	46	257
+45 mins.	76	**288**	115	**479**	63	57	18	138	57	242	106	405	177	42	65	284
Total Volume	307	991	442	1740	234	278	59	571	226	974	406	1606	730	167	235	1132
% App. Total	17.6	57	25.4		41	48.7	10.3		14.1	60.6	25.3		64.5	14.8	20.8	
PHF	.691	.860	.913	.908	.873	.914	.819	.887	.785	.962	.940	.965	.849	.888	.877	.887

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City of Upland
N/S: Haven Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 07_ONT_Haven_10E AM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				I-10 Eastbound On Ramp Westbound				Haven Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	0	217	74	291	0	0	0	0	0	152	57	209	66	0	56	122	622
06:15 AM	0	276	69	345	0	0	0	0	0	195	69	264	100	0	92	192	801
06:30 AM	0	271	113	384	0	0	0	0	0	207	70	277	131	0	108	239	900
06:45 AM	0	300	111	411	0	0	0	0	0	290	62	352	198	0	147	345	1108
Total	0	1064	367	1431	0	0	0	0	0	844	258	1102	495	0	403	898	3431
07:00 AM	0	285	116	401	0	0	0	0	0	310	83	393	165	0	141	306	1100
07:15 AM	0	309	115	424	0	0	0	0	0	372	67	439	204	0	134	338	1201
07:30 AM	0	337	109	446	0	0	0	0	0	416	57	473	282	0	144	426	1345
07:45 AM	0	406	125	531	0	0	0	0	0	402	69	471	350	0	163	513	1515
Total	0	1337	465	1802	0	0	0	0	0	1500	276	1776	1001	0	582	1583	5161
08:00 AM	0	336	110	446	0	0	0	0	0	361	78	439	252	0	125	377	1262
08:15 AM	0	331	118	449	0	0	0	0	0	387	80	467	260	0	106	366	1282
08:30 AM	0	303	106	409	0	0	0	0	0	331	104	435	243	0	119	362	1206
08:45 AM	0	278	97	375	0	0	0	0	0	344	82	426	244	0	112	356	1157
Total	0	1248	431	1679	0	0	0	0	0	1423	344	1767	999	0	462	1461	4907
Grand Total	0	3649	1263	4912	0	0	0	0	0	3767	878	4645	2495	0	1447	3942	13499
Apprch %	0	74.3	25.7		0	0	0		0	81.1	18.9		63.3	0	36.7		
Total %	0	27	9.4	36.4	0	0	0	0	0	27.9	6.5	34.4	18.5	0	10.7	29.2	

	Haven Avenue Southbound				I-10 Eastbound On Ramp Westbound				Haven Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	337	109	446	0	0	0	0	0	**416**	57	**473**	282	0	144	426	1345
07:45 AM	0	**406**	**125**	**531**	0	0	0	0	0	402	69	471	**350**	0	**163**	**513**	**1515**
08:00 AM	0	336	110	446	0	0	0	0	0	361	78	439	252	0	125	377	1262
08:15 AM	0	331	118	449	0	0	0	0	0	387	**80**	467	260	0	106	366	1282
Total Volume	0	1410	462	1872	0	0	0	0	0	1566	284	1850	1144	0	538	1682	5404
% App. Total	0	75.3	24.7		0	0	0		0	84.6	15.4		68	0	32		
PHF	.000	.868	.924	.881	.000	.000	.000	.000	.000	.941	.888	.978	.817	.000	.825	.820	.892

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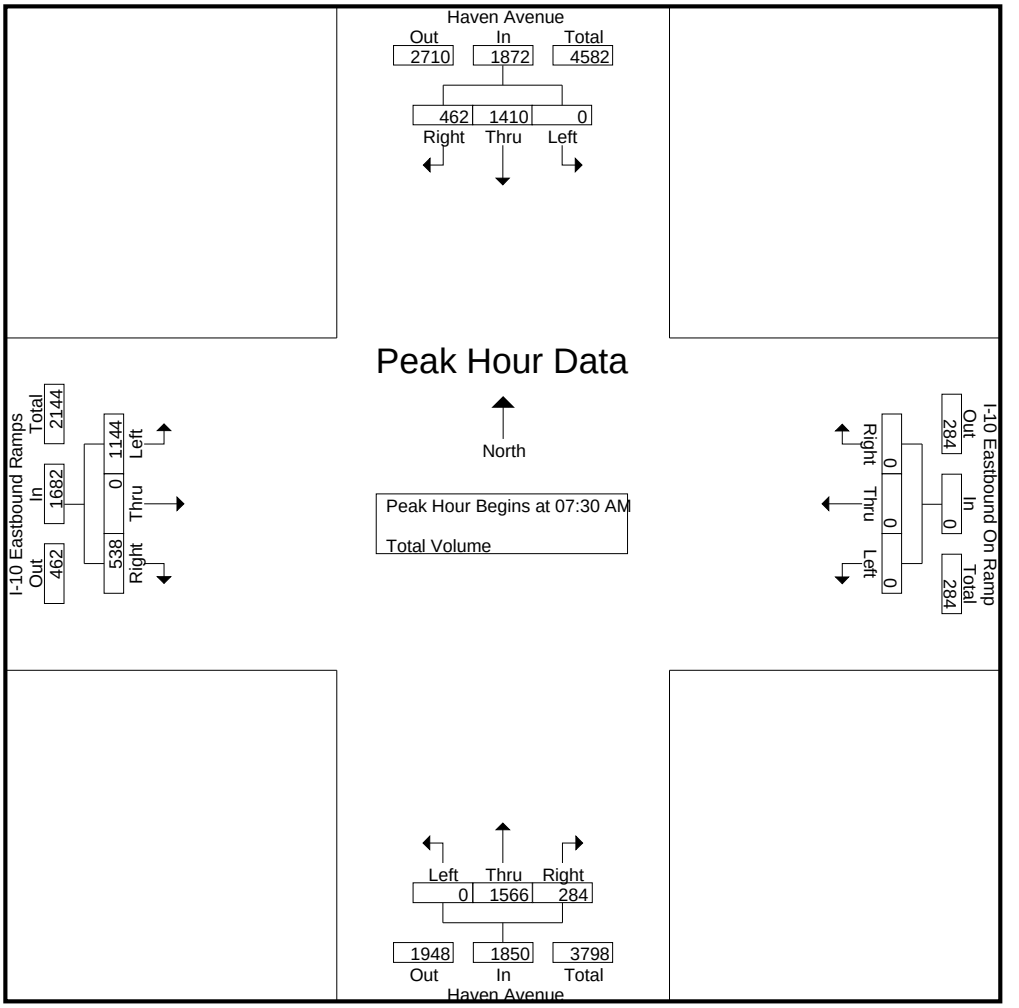
City of Upland
N/S: Haven Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 07_ONT_Haven_10E AM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 2



Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				06:00 AM				07:30 AM				07:30 AM			
+0 mins.	0	337	109	446	0	0	0	0	0	**416**	57	**473**	282	0	144	426
+15 mins.	0	**406**	**125**	**531**	0	0	0	0	0	402	69	471	**350**	0	**163**	**513**
+30 mins.	0	336	110	446	0	0	0	0	0	361	78	439	252	0	125	377
+45 mins.	0	331	118	449	0	0	0	0	0	387	**80**	467	260	0	106	366
Total Volume	0	1410	462	1872	0	0	0	0	0	1566	284	1850	1144	0	538	1682
% App. Total	0	75.3	24.7		0	0	0		0	84.6	15.4		68	0	32	
PHF	.000	.868	.924	.881	.000	.000	.000	.000	.000	.941	.888	.978	.817	.000	.825	.820

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City of Upland
N/S: Haven Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 07_ONT_Haven_10E PM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				I-10 Eastbound On Ramp Westbound				Haven Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	0	384	108	492	0	0	0	0	0	400	170	570	123	0	73	196	1258
03:15 PM	0	350	129	479	0	0	0	0	0	410	214	624	141	0	86	227	1330
03:30 PM	0	403	199	602	0	0	0	0	0	441	193	634	155	0	77	232	1468
03:45 PM	0	372	121	493	0	0	0	0	0	527	194	721	132	0	69	201	1415
Total	0	1509	557	2066	0	0	0	0	0	1778	771	2549	551	0	305	856	5471
04:00 PM	0	380	126	506	0	0	0	0	0	548	160	708	135	0	55	190	1404
04:15 PM	0	341	117	458	0	0	0	0	0	535	195	730	95	0	49	144	1332
04:30 PM	0	422	129	551	0	0	0	0	0	474	152	626	82	0	44	126	1303
04:45 PM	0	432	137	569	0	0	0	0	0	589	202	791	116	0	76	192	1552
Total	0	1575	509	2084	0	0	0	0	0	2146	709	2855	428	0	224	652	5591
05:00 PM	0	501	163	664	0	0	0	0	0	555	182	737	116	0	56	172	1573
05:15 PM	0	456	145	601	0	0	0	0	0	614	188	802	117	0	44	161	1564
05:30 PM	0	366	123	489	0	0	0	0	0	519	159	678	117	0	52	169	1336
05:45 PM	0	368	85	453	0	0	0	0	0	484	140	624	107	0	46	153	1230
Total	0	1691	516	2207	0	0	0	0	0	2172	669	2841	457	0	198	655	5703
Grand Total	0	4775	1582	6357	0	0	0	0	0	6096	2149	8245	1436	0	727	2163	16765
Apprch %	0	75.1	24.9		0	0	0		0	73.9	26.1		66.4	0	33.6		
Total %	0	28.5	9.4	37.9	0	0	0	0	0	36.4	12.8	49.2	8.6	0	4.3	12.9	

	Haven Avenue Southbound				I-10 Eastbound On Ramp Westbound				Haven Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	432	137	569	0	0	0	0	0	589	**202**	791	116	0	**76**	**192**	1552
05:00 PM	0	**501**	**163**	**664**	0	0	0	0	0	555	182	737	116	0	56	172	**1573**
05:15 PM	0	456	145	601	0	0	0	0	0	**614**	188	**802**	**117**	0	44	161	1564
05:30 PM	0	366	123	489	0	0	0	0	0	519	159	678	117	0	52	169	1336
Total Volume	0	1755	568	2323	0	0	0	0	0	2277	731	3008	466	0	228	694	6025
% App. Total	0	75.5	24.5		0	0	0		0	75.7	24.3		67.1	0	32.9		
PHF	.000	.876	.871	.875	.000	.000	.000	.000	.000	.927	.905	.938	.996	.000	.750	.904	.958

Counts Unlimited
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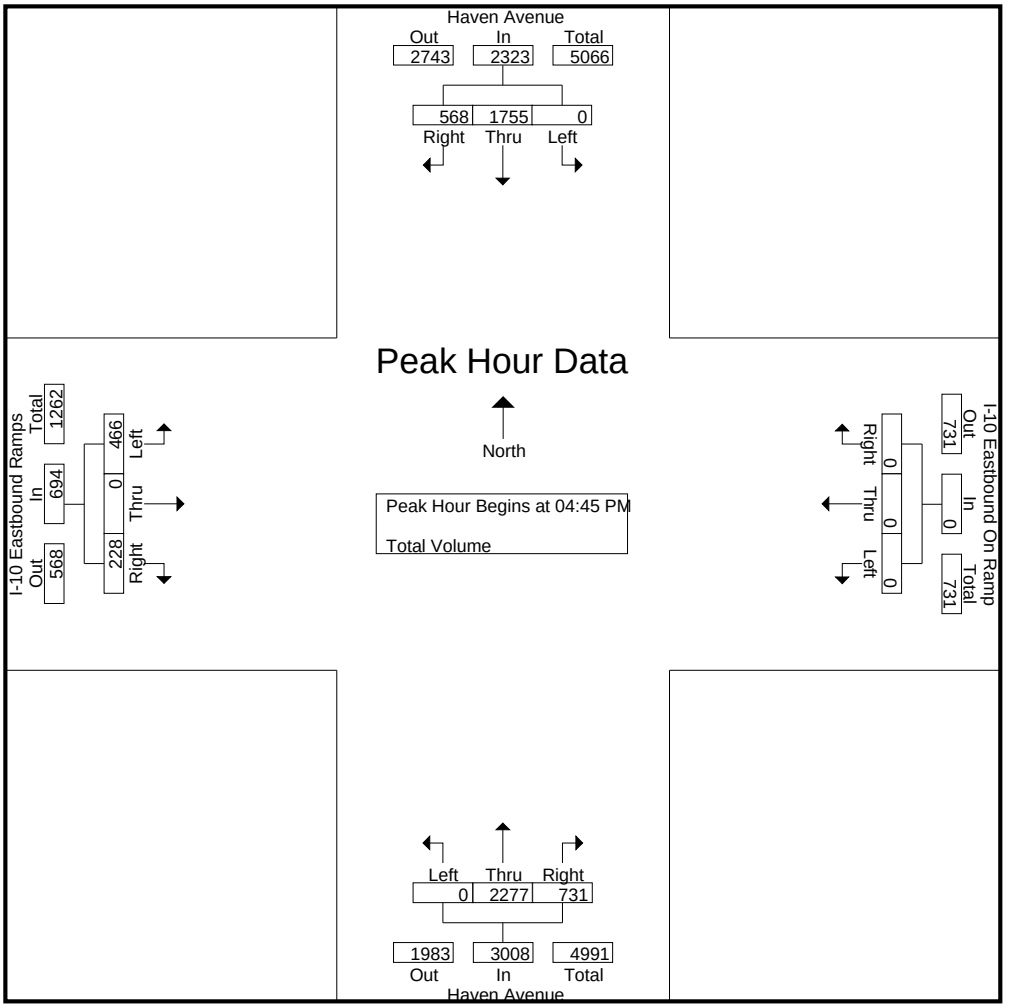
City of Upland
N/S: Haven Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 07_ONT_Haven_10E PM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				03:00 PM				04:45 PM				03:00 PM			
+0 mins.	0	422	129	551	0	0	0	0	0	589	**202**	791	123	0	73	196
+15 mins.	0	432	137	569	0	0	0	0	0	555	182	737	141	0	**86**	227
+30 mins.	0	**501**	**163**	**664**	0	0	0	0	0	**614**	188	**802**	**155**	0	77	**232**
+45 mins.	0	456	145	601	0	0	0	0	0	519	159	678	132	0	69	201
Total Volume	0	1811	574	2385	0	0	0	0	0	2277	731	3008	551	0	305	856
% App. Total	0	75.9	24.1		0	0	0		0	75.7	24.3		64.4	0	35.6	
PHF	.000	.904	.880	.898	.000	.000	.000	.000	.000	.927	.905	.938	.889	.000	.887	.922

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City of Ontario
N/S: Milliken Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 09_ONT_Milliken_10E AM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound			Milliken Avenue Northbound			I-10 Eastbound Ramps Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
06:00 AM	111	32	143	29	83	112	43	66	109	364
06:15 AM	142	40	182	25	78	103	90	70	160	445
06:30 AM	169	42	211	33	99	132	88	108	196	539
06:45 AM	172	68	240	28	97	125	116	163	279	644
Total	594	182	776	115	357	472	337	407	744	1992
07:00 AM	138	51	189	39	103	142	112	110	222	553
07:15 AM	126	53	179	41	135	176	130	122	252	607
07:30 AM	162	53	215	36	159	195	151	121	272	682
07:45 AM	189	61	250	39	168	207	198	157	355	812
Total	615	218	833	155	565	720	591	510	1101	2654
08:00 AM	149	46	195	47	173	220	136	126	262	677
08:15 AM	172	52	224	25	145	170	120	138	258	652
08:30 AM	132	61	193	52	142	194	115	109	224	611
08:45 AM	150	62	212	31	128	159	126	98	224	595
Total	603	221	824	155	588	743	497	471	968	2535
Grand Total	1812	621	2433	425	1510	1935	1425	1388	2813	7181
Apprch %	74.5	25.5		22	78		50.7	49.3		
Total %	25.2	8.6	33.9	5.9	21	26.9	19.8	19.3	39.2	

	Milliken Avenue Southbound			Milliken Avenue Northbound			I-10 Eastbound Ramps Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	162	53	215	36	159	195	151	121	272	682
07:45 AM	**189**	**61**	**250**	39	168	207	**198**	**157**	**355**	**812**
08:00 AM	149	46	195	**47**	**173**	**220**	136	126	262	677
08:15 AM	172	52	224	25	145	170	120	138	258	652
Total Volume	672	212	884	147	645	792	605	542	1147	2823
% App. Total	76	24		18.6	81.4		52.7	47.3		
PHF	.889	.869	.884	.782	.932	.900	.764	.863	.808	.869

Counts Unlimited
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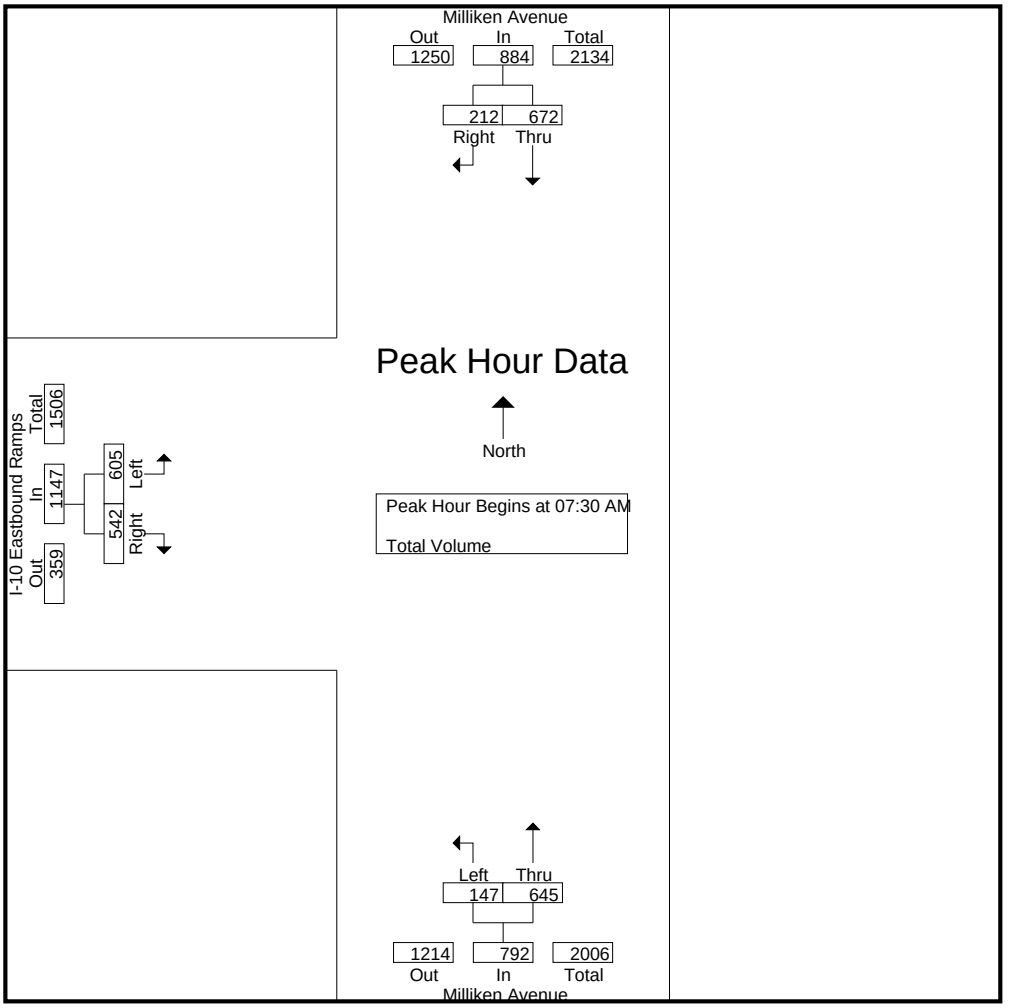
City of Ontario
N/S: Milliken Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 09_ONT_Milliken_10E AM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 2



Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:15 AM			07:30 AM		
+0 mins.	162	53	215	41	135	176	151	121	272
+15 mins.	**189**	**61**	**250**	36	159	195	**198**	**157**	**355**
+30 mins.	149	46	195	39	168	207	136	126	262
+45 mins.	172	52	224	**47**	**173**	**220**	120	138	258
Total Volume	672	212	884	163	635	798	605	542	1147
% App. Total	76	24		20.4	79.6		52.7	47.3	
PHF	.889	.869	.884	.867	.918	.907	.764	.863	.808

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Corona, CA 92878
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City of Ontario
N/S: Milliken Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 09_ONT_Milliken_10E PM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound			Milliken Avenue Northbound			I-10 Eastbound Ramps Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
03:00 PM	179	131	310	72	261	333	134	54	188	831
03:15 PM	168	121	289	65	187	252	153	52	205	746
03:30 PM	162	121	283	93	284	377	106	53	159	819
03:45 PM	174	110	284	71	270	341	121	42	163	788
Total	683	483	1166	301	1002	1303	514	201	715	3184
04:00 PM	186	101	287	80	277	357	104	34	138	782
04:15 PM	214	118	332	65	294	359	117	38	155	846
04:30 PM	217	109	326	94	310	404	120	50	170	900
04:45 PM	225	120	345	70	262	332	125	58	183	860
Total	842	448	1290	309	1143	1452	466	180	646	3388
05:00 PM	256	130	386	81	294	375	116	38	154	915
05:15 PM	242	160	402	56	248	304	113	40	153	859
05:30 PM	237	103	340	56	294	350	87	37	124	814
05:45 PM	218	108	326	42	229	271	134	42	176	773
Total	953	501	1454	235	1065	1300	450	157	607	3361
Grand Total	2478	1432	3910	845	3210	4055	1430	538	1968	9933
Apprch %	63.4	36.6		20.8	79.2		72.7	27.3		
Total %	24.9	14.4	39.4	8.5	32.3	40.8	14.4	5.4	19.8	

	Milliken Avenue Southbound			Milliken Avenue Northbound			I-10 Eastbound Ramps Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	217	109	326	**94**	**310**	**404**	120	50	170	900
04:45 PM	225	120	345	70	262	332	**125**	**58**	**183**	860
05:00 PM	**256**	130	386	81	294	375	116	38	154	**915**
05:15 PM	242	**160**	**402**	56	248	304	113	40	153	859
Total Volume	940	519	1459	301	1114	1415	474	186	660	3534
% App. Total	64.4	35.6		21.3	78.7		71.8	28.2		
PHF	.918	.811	.907	.801	.898	.876	.948	.802	.902	.966

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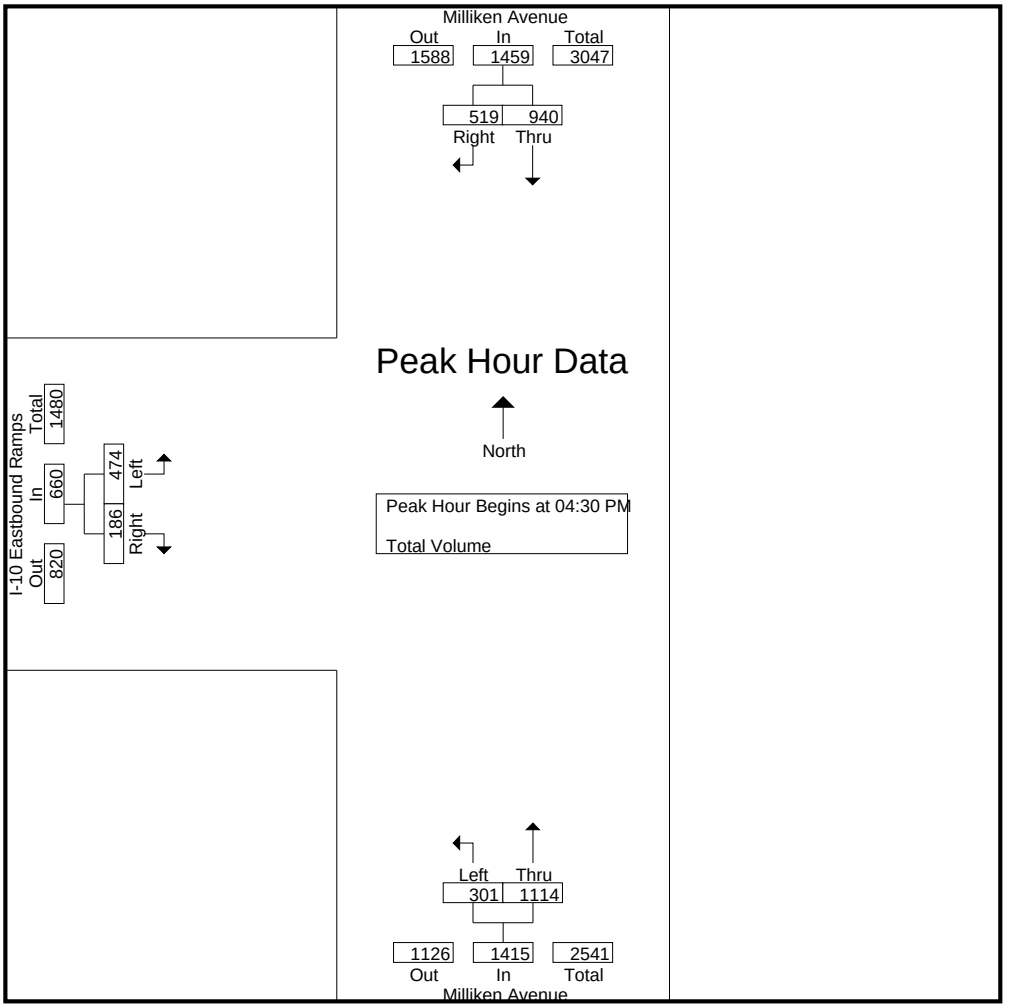
City of Ontario
N/S: Milliken Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 09_ONT_Milliken_10E PM
Site Code : 99919684
Start Date : 11/6/2019
Page No : 2



Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			04:15 PM			03:00 PM		
+0 mins.	225	120	345	65	294	359	134	**54**	188
+15 mins.	**256**	130	386	**94**	**310**	**404**	**153**	52	**205**
+30 mins.	242	**160**	**402**	70	262	332	106	53	159
+45 mins.	237	103	340	81	294	375	121	42	163
Total Volume	960	513	1473	310	1160	1470	514	201	715
% App. Total	65.2	34.8		21.1	78.9		71.9	28.1	
PHF	.938	.802	.916	.824	.935	.910	.840	.931	.872

Counts Unlimited, Inc.

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Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Ontario
4th Street
B/ haven Avenue - Milliken Avenue
24 Hour Directional Volume Count

ONT4HAMI
Site Code: 105-21235

Start Time	5/22/2021 Sat	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		25	180			64	237				
12:15		12	190			44	222				
12:30		20	185			37	192				
12:45		18	**235**	75	790	33	258	178	909	253	1699
01:00		25	**223**			30	237				
01:15		11	**216**			38	259				
01:30		15	**190**			33	235				
01:45		14	198	65	827	25	247	126	978	191	1805
02:00		8	184			22	224				
02:15		8	186			17	204				
02:30		12	212			25	234				
02:45		6	196	34	778	19	200	83	862	117	1640
03:00		5	149			24	225				
03:15		10	181			22	250				
03:30		15	193			27	273				
03:45		14	187	44	710	27	217	100	965	144	1675
04:00		2	195			24	**270**				
04:15		7	202			27	**243**				
04:30		11	159			30	**232**				
04:45		6	203	26	759	55	**281**	136	1026	162	1785
05:00		8	154			22	207				
05:15		16	167			41	267				
05:30		17	165			50	221				
05:45		29	152	70	638	63	244	176	939	246	1577
06:00		19	135			40	207				
06:15		29	151			36	229				
06:30		21	151			54	231				
06:45		34	144	103	581	79	209	209	876	312	1457
07:00		38	122			47	215				
07:15		30	106			50	193				
07:30		43	85			61	166				
07:45		43	76	154	389	76	115	234	689	388	1078
08:00		41	73			65	137				
08:15		48	80			74	140				
08:30		61	75			78	126				
08:45		78	64	228	292	127	119	344	522	572	814
09:00		76	55			115	105				
09:15		90	61			119	97				
09:30		105	35			117	73				
09:45		107	34	378	185	155	65	506	340	884	525
10:00		125	33			170	69				
10:15		130	31			133	58				
10:30		140	35			157	40				
10:45		147	9	542	108	**183**	33	643	200	1185	308
11:00		**134**	24			**176**	55				
11:15		**167**	19			**173**	31				
11:30		**168**	10			**180**	37				
11:45		**179**	17	648	70	182	48	711	171	1359	241
Total		2367	6127	2367	6127	3446	8477	3446	8477	5813	14604
Combined Total		8494		8494		11923		11923		20417	
AM Peak	-	11:00	-	-	-	10:45	-	-	-	-	-
Vol.	-	648	-	-	-	712	-	-	-	-	-
P.H.F.		0.905				0.973					
PM Peak	-	-	00:45	-	-	-	04:00	-	-	-	-
Vol.	-	-	864	-	-	-	1026	-	-	-	-
P.H.F.			0.919				0.913				
Percentage		27.9%	72.1%			28.9%	71.1%				

ADT/AADT ADT 20,417 AADT 20,417

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Corona, CA 92878
(951)268-6268

City of Ontario
N/S: Haven Avenue
E/W: Fourth Street
Weather: Clear

File Name : 01_ONT_Haven_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				Fourth Street Westbound				Haven Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	43	188	11	242	31	76	28	135	24	229	59	312	15	89	22	126	815
Total	43	188	11	242	31	76	28	135	24	229	59	312	15	89	22	126	815
01:00 PM	29	190	11	230	45	88	32	165	19	208	79	306	16	108	17	141	842
01:15 PM	43	209	13	265	35	80	29	144	25	206	51	282	8	101	19	128	819
01:30 PM	25	226	16	267	32	91	32	155	29	190	61	280	12	88	22	122	824
01:45 PM	34	197	17	248	39	90	27	156	36	231	40	307	7	92	18	117	828
Total	131	822	57	1010	151	349	120	620	109	835	231	1175	43	389	76	508	3313
02:00 PM	33	178	13	224	29	113	32	174	26	204	85	315	5	112	23	140	853
02:15 PM	30	209	10	249	39	67	27	133	29	165	62	256	13	89	20	122	760
02:30 PM	28	207	16	251	40	101	34	175	40	214	69	323	12	98	30	140	889
Grand Total	265	1604	107	1976	290	706	241	1237	228	1647	506	2381	88	777	171	1036	6630
Apprch %	13.4	81.2	5.4		23.4	57.1	19.5		9.6	69.2	21.3		8.5	75	16.5		
Total %	4	24.2	1.6	29.8	4.4	10.6	3.6	18.7	3.4	24.8	7.6	35.9	1.3	11.7	2.6	15.6	

	Haven Avenue Southbound				Fourth Street Westbound				Haven Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:45 PM																	
01:45 PM	**34**	197	**17**	248	39	90	27	156	36	**231**	40	307	7	92	18	117	828
02:00 PM	33	178	13	224	29	**113**	32	174	26	204	**85**	315	5	**112**	23	**140**	853
02:15 PM	30	**209**	10	249	39	67	27	133	29	165	62	256	**13**	89	20	122	760
02:30 PM	28	207	16	**251**	**40**	101	**34**	**175**	**40**	214	69	**323**	12	98	**30**	140	**889**
Total Volume	125	791	56	972	147	371	120	638	131	814	256	1201	37	391	91	519	3330
% App. Total	12.9	81.4	5.8		23	58.2	18.8		10.9	67.8	21.3		7.1	75.3	17.5		
PHF	.919	.946	.824	.968	.919	.821	.882	.911	.819	.881	.753	.930	.712	.873	.758	.927	.936

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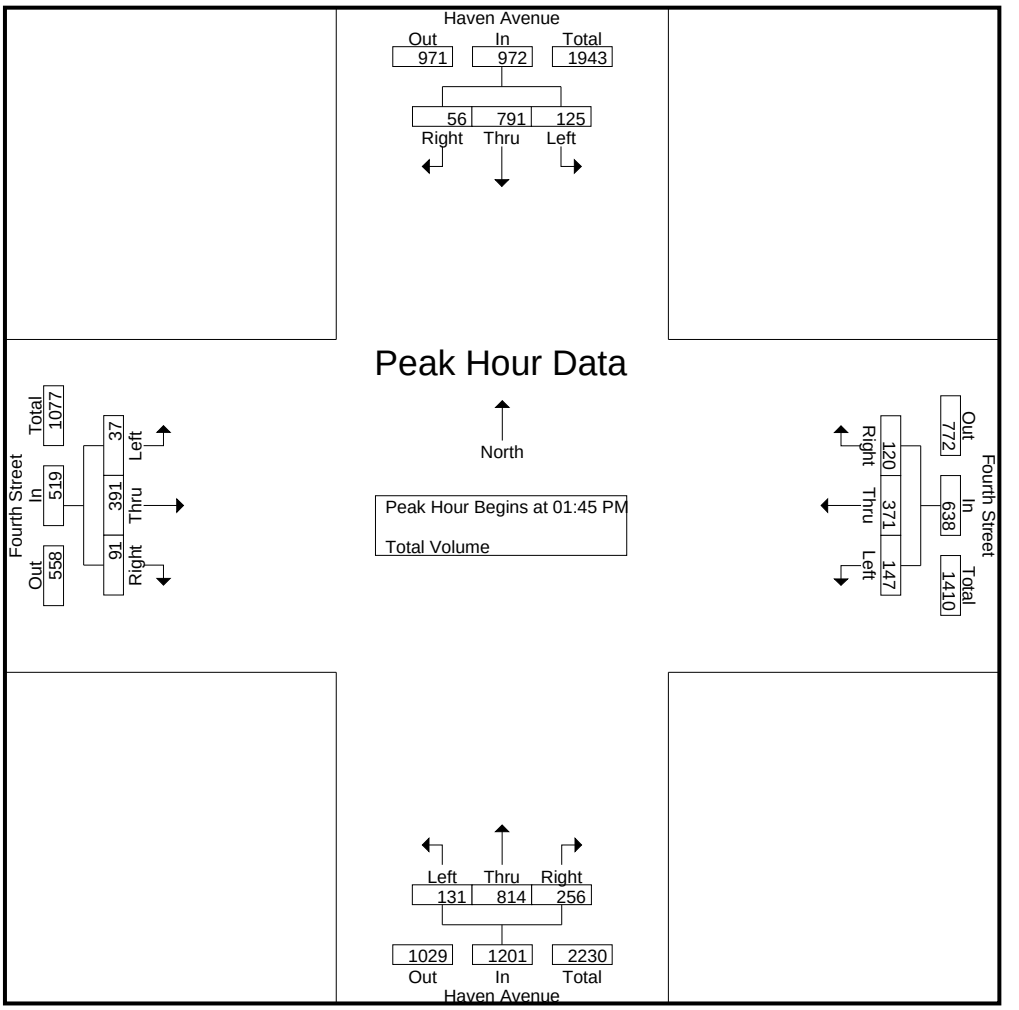
City of Ontario
N/S: Haven Avenue
E/W: Fourth Street
Weather: Clear

File Name : 01_ONT_Haven_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:00 PM				01:45 PM				01:45 PM				01:45 PM			
+0 mins.	29	190	11	230	39	90	27	156	36	**231**	40	307	7	92	18	117
+15 mins.	**43**	209	13	265	29	**113**	32	174	26	204	**85**	315	5	**112**	23	**140**
+30 mins.	25	**226**	16	**267**	39	67	27	133	29	165	62	256	**13**	89	20	122
+45 mins.	34	197	**17**	248	**40**	101	**34**	**175**	**40**	214	69	**323**	12	98	**30**	140
Total Volume	131	822	57	1010	147	371	120	638	131	814	256	1201	37	391	91	519
% App. Total	13	81.4	5.6		23	58.2	18.8		10.9	67.8	21.3		7.1	75.3	17.5	
PHF	.762	.909	.838	.946	.919	.821	.882	.911	.819	.881	.753	.930	.712	.873	.758	.927

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City of Ontario
N/S: Cleveland Avenue/Via Asti
E/W: Fourth Street
Weather: Clear

File Name : 02_ONT_Via Asti_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Cleveland Avenue Southbound				Fourth Street Westbound				Via Asti Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	1	1	2	4	0	159	2	161	3	0	2	5	0	224	1	225	395
Total	1	1	2	4	0	159	2	161	3	0	2	5	0	224	1	225	395
01:00 PM	2	0	1	3	0	146	0	146	0	1	1	2	0	198	0	198	349
01:15 PM	1	0	0	1	0	150	0	150	0	0	0	0	0	229	1	230	381
01:30 PM	1	0	1	2	1	162	2	165	0	0	0	0	0	176	0	176	343
01:45 PM	0	0	0	0	0	183	0	183	0	0	2	2	0	199	2	201	386
Total	4	0	2	6	1	641	2	644	0	1	3	4	0	802	3	805	1459
02:00 PM	0	0	0	0	1	152	1	154	0	0	1	1	0	226	0	226	381
02:15 PM	0	0	0	0	0	137	0	137	3	0	1	4	0	185	1	186	327
02:30 PM	0	0	2	2	1	174	0	175	2	0	1	3	0	213	0	213	393
Grand Total	5	1	6	12	3	1263	5	1271	8	1	8	17	0	1650	5	1655	2955
Apprch %	41.7	8.3	50		0.2	99.4	0.4		47.1	5.9	47.1		0	99.7	0.3		
Total %	0.2	0	0.2	0.4	0.1	42.7	0.2	43	0.3	0	0.3	0.6	0	55.8	0.2	56	

	Cleveland Avenue Southbound				Fourth Street Westbound				Via Asti Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:15 PM																	
01:15 PM	**1**	0	0	1	0	150	0	150	0	0	0	0	0	**229**	1	**230**	381
01:30 PM	1	0	**1**	**2**	**1**	162	**2**	165	0	0	0	0	0	176	0	176	343
01:45 PM	0	0	0	0	0	**183**	0	**183**	0	0	**2**	**2**	0	199	**2**	201	**386**
02:00 PM	0	0	0	0	1	152	1	154	0	0	1	1	0	226	0	226	381
Total Volume	2	0	1	3	2	647	3	652	0	0	3	3	0	830	3	833	1491
% App. Total	66.7	0	33.3		0.3	99.2	0.5		0	0	100		0	99.6	0.4		
PHF	.500	.000	.250	.375	.500	.884	.375	.891	.000	.000	.375	.375	.000	.906	.375	.905	.966

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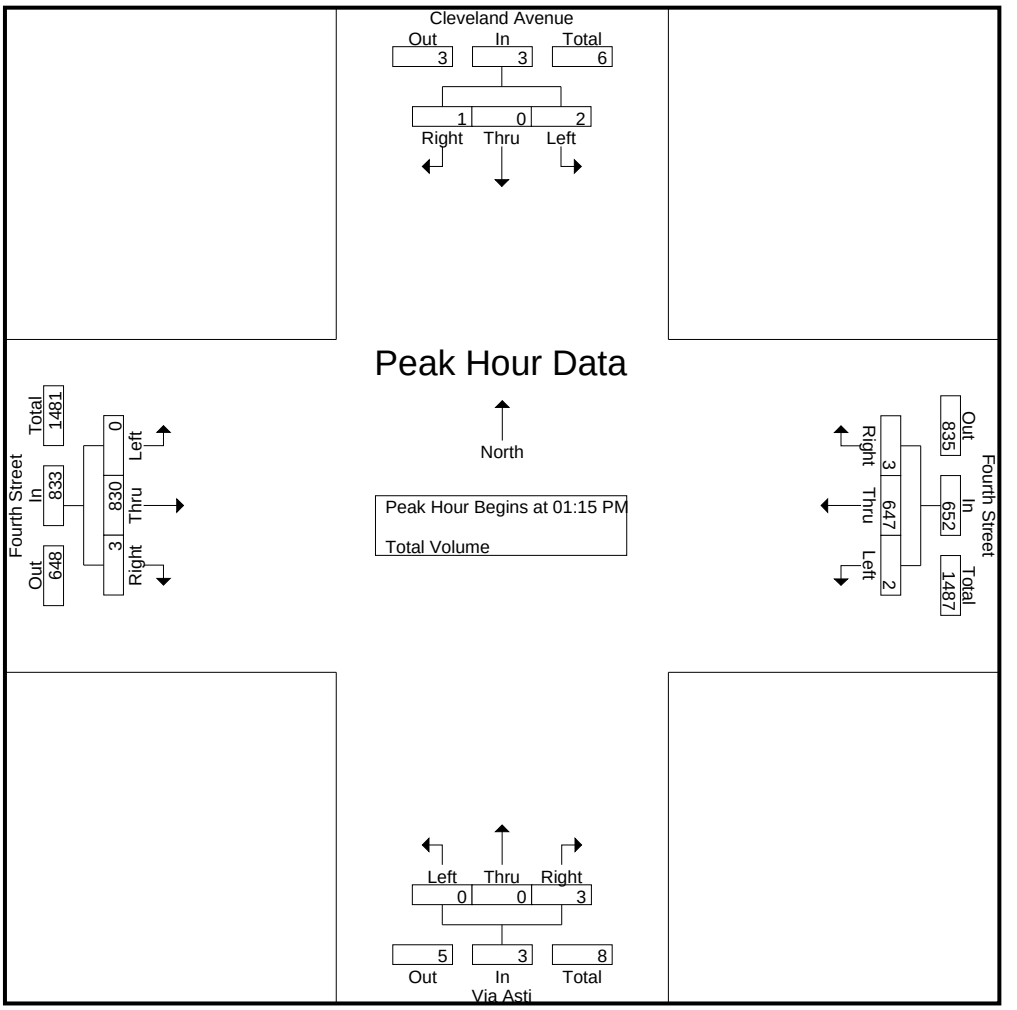
City of Ontario
N/S: Cleveland Avenue/Via Asti
E/W: Fourth Street
Weather: Clear

File Name : 02_ONT_Via Asti_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:45 PM				01:15 PM				01:45 PM				01:15 PM			
+0 mins.	1	**1**	**2**	**4**	0	150	0	150	0	0	**2**	2	0	**229**	1	**230**
+15 mins.	**2**	0	1	3	**1**	162	**2**	165	0	0	1	1	0	176	0	176
+30 mins.	1	0	0	1	0	**183**	0	**183**	**3**	0	1	**4**	0	199	**2**	201
+45 mins.	1	0	1	2	1	152	1	154	2	0	1	3	0	226	0	226
Total Volume	5	1	4	10	2	647	3	652	5	0	5	10	0	830	3	833
% App. Total	50	10	40		0.3	99.2	0.5		50	0	50		0	99.6	0.4	
PHF	.625	.250	.500	.625	.500	.884	.375	.891	.417	.000	.625	.625	.000	.906	.375	.905

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City of Ontario
N/S: The Resort Parkway/Via Piemonte
E/W: Fourth Street
Weather: Clear

File Name : 03_ONT_The Resort_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	The Resort Parkway Southbound				Fourth Street Westbound				Via Piemonte Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	12	1	5	18	0	147	6	153	2	0	2	4	1	218	5	224	399
Total	12	1	5	18	0	147	6	153	2	0	2	4	1	218	5	224	399
01:00 PM	13	1	1	15	1	143	2	146	1	0	4	5	2	201	0	203	369
01:15 PM	9	1	2	12	1	146	4	151	1	0	0	1	3	226	0	229	393
01:30 PM	4	0	4	8	0	153	6	159	1	0	1	2	3	176	1	180	349
01:45 PM	10	0	6	16	1	169	9	179	0	0	0	0	2	200	1	203	398
Total	36	2	13	51	3	611	21	635	3	0	5	8	10	803	2	815	1509
02:00 PM	7	0	3	10	1	154	4	159	0	0	0	0	3	221	0	224	393
02:15 PM	10	1	1	12	1	142	8	151	0	0	4	4	3	184	4	191	358
02:30 PM	6	0	1	7	1	162	12	175	2	0	2	4	0	211	1	212	398
Grand Total	71	4	23	98	6	1216	51	1273	7	0	13	20	17	1637	12	1666	3057
Apprch %	72.4	4.1	23.5		0.5	95.5	4		35	0	65		1	98.3	0.7		
Total %	2.3	0.1	0.8	3.2	0.2	39.8	1.7	41.6	0.2	0	0.4	0.7	0.6	53.5	0.4	54.5	

	The Resort Parkway Southbound				Fourth Street Westbound				Via Piemonte Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:45 PM																	
01:45 PM	**10**	0	**6**	**16**	**1**	**169**	9	**179**	0	0	0	0	2	200	1	203	**398**
02:00 PM	7	0	3	10	1	154	4	159	0	0	0	0	**3**	**221**	0	**224**	393
02:15 PM	10	**1**	1	12	1	142	8	151	0	0	**4**	**4**	3	184	**4**	191	358
02:30 PM	6	0	1	7	1	162	**12**	175	**2**	0	2	4	0	211	1	212	398
Total Volume	33	1	11	45	4	627	33	664	2	0	6	8	8	816	6	830	1547
% App. Total	73.3	2.2	24.4		0.6	94.4	5		25	0	75		1	98.3	0.7		
PHF	.825	.250	.458	.703	1.00	.928	.688	.927	.250	.000	.375	.500	.667	.923	.375	.926	.972

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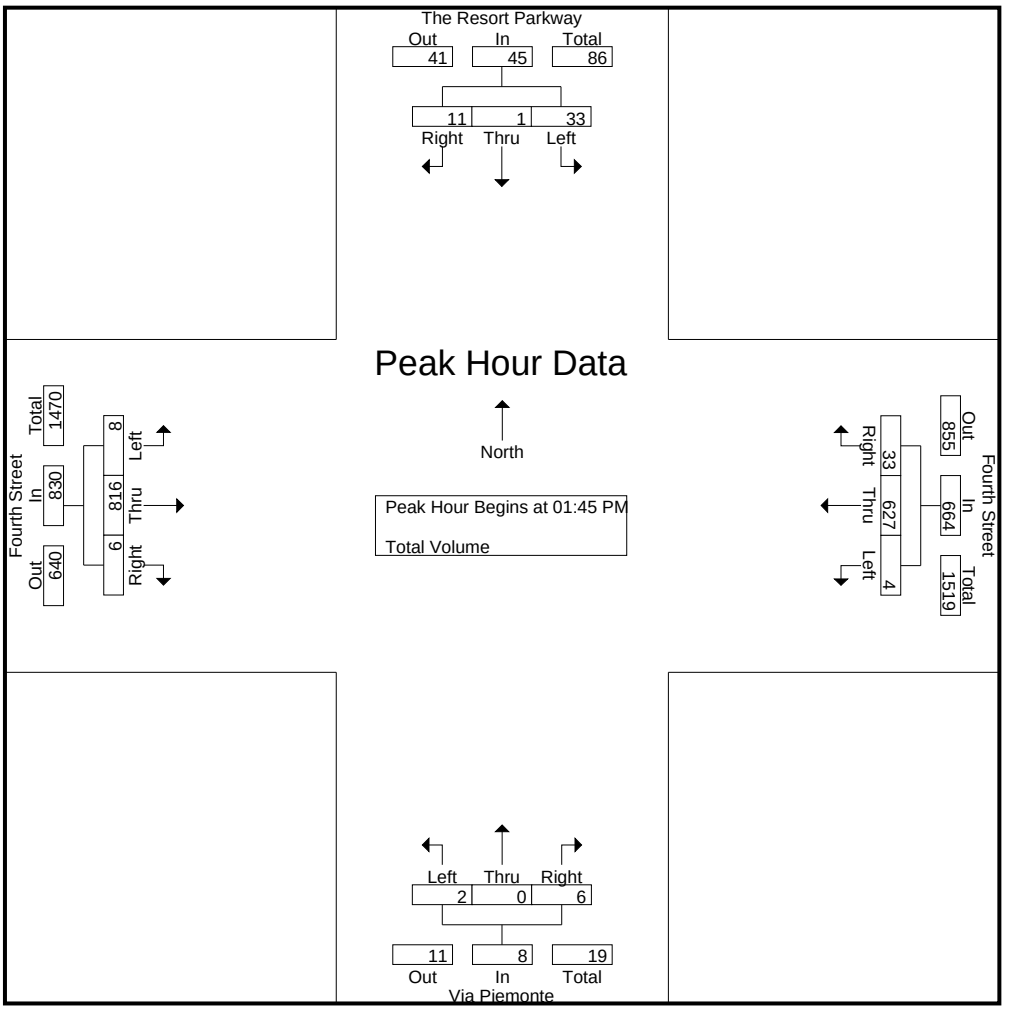
City of Ontario
N/S: The Resort Parkway/Via Piemonte
E/W: Fourth Street
Weather: Clear

File Name : 03_ONT_The Resort_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:45 PM				01:45 PM				12:45 PM				12:45 PM			
+0 mins.	12	**1**	**5**	**18**	**1**	**169**	9	**179**	**2**	0	2	4	1	218	**5**	224
+15 mins.	**13**	1	1	15	1	154	4	159	1	0	**4**	**5**	2	201	0	203
+30 mins.	9	1	2	12	1	142	8	151	1	0	0	1	**3**	**226**	0	**229**
+45 mins.	4	0	4	8	1	162	**12**	175	1	0	1	2	3	176	1	180
Total Volume	38	3	12	53	4	627	33	664	5	0	7	12	9	821	6	836
% App. Total	71.7	5.7	22.6		0.6	94.4	5		41.7	0	58.3		1.1	98.2	0.7	
PHF	.731	.750	.600	.736	1.000	.928	.688	.927	.625	.000	.438	.600	.750	.908	.300	.913

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City of Ontario
N/S: The Project Driveway 3
E/W: Fourth Street
Weather: Clear

File Name : 04_ONT_PDW3_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Fourth Street Westbound			The Project Driveway 3 Northbound			Fourth Street Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
12:45 PM	0	149	149	0	1	1	225	12	237	387
Total	0	149	149	0	1	1	225	12	237	387
01:00 PM	0	146	146	0	3	3	210	11	221	370
01:15 PM	0	158	158	0	2	2	228	7	235	395
01:30 PM	0	156	156	0	3	3	173	9	182	341
01:45 PM	0	190	190	0	3	3	204	11	215	408
Total	0	650	650	0	11	11	815	38	853	1514
02:00 PM	0	164	164	0	0	0	219	9	228	392
02:15 PM	0	151	151	0	4	4	179	15	194	349
02:30 PM	0	174	174	0	4	4	200	18	218	396
Grand Total	0	1288	1288	0	20	20	1638	92	1730	3038
Apprch %	0	100		0	100		94.7	5.3		
Total %	0	42.4	42.4	0	0.7	0.7	53.9	3	56.9	

	Fourth Street Westbound			The Project Driveway 3 Northbound			Fourth Street Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 01:45 PM										
01:45 PM	0	**190**	**190**	0	3	3	204	11	215	**408**
02:00 PM	0	164	164	0	0	0	**219**	9	**228**	392
02:15 PM	0	151	151	0	**4**	**4**	179	15	194	349
02:30 PM	0	174	174	0	4	4	200	**18**	218	396
Total Volume	0	679	679	0	11	11	802	53	855	1545
% App. Total	0	100		0	100		93.8	6.2		
PHF	.000	.893	.893	.000	.688	.688	.916	.736	.938	.947

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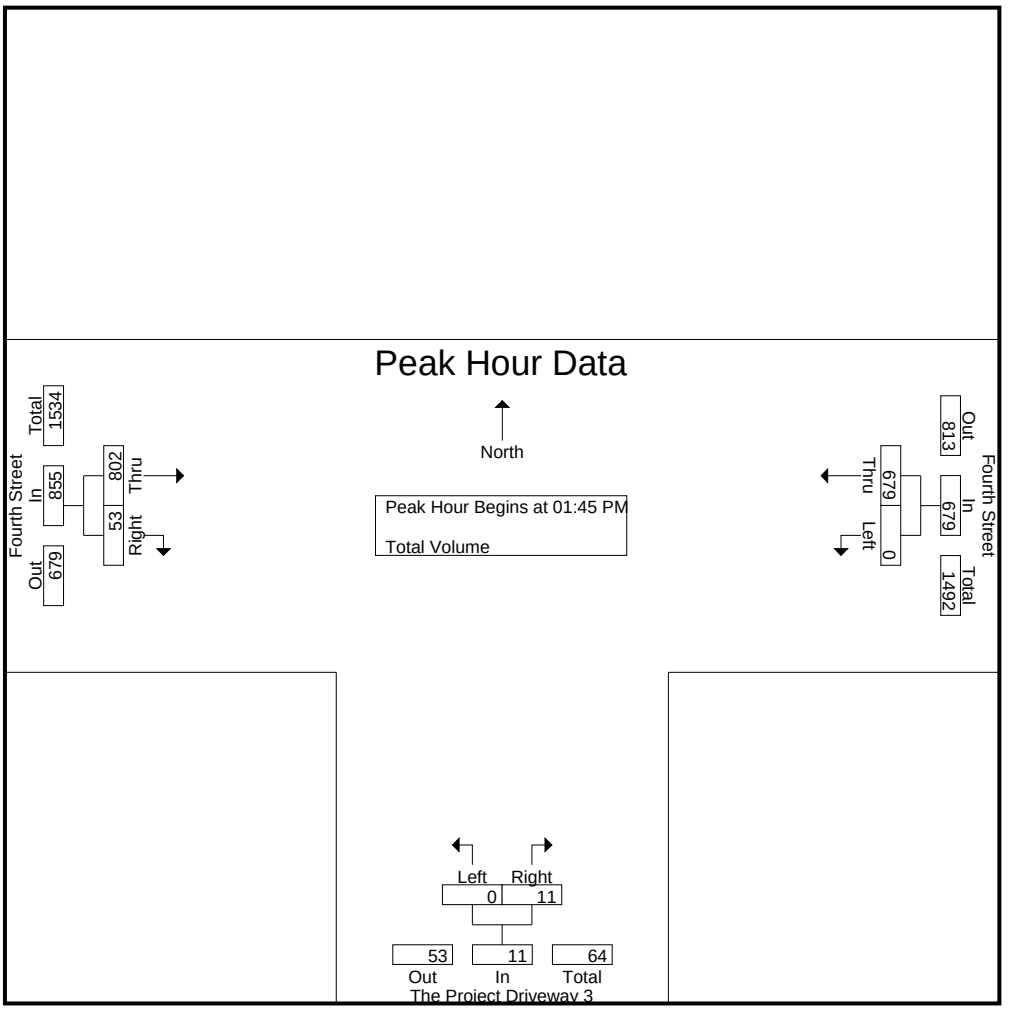
City of Ontario
N/S: The Project Driveway 3
E/W: Fourth Street
Weather: Clear

File Name : 04_ONT_PDW3_4th Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:45 PM			01:00 PM			12:45 PM		
+0 mins.	0	**190**	**190**	0	**3**	**3**	225	**12**	**237**
+15 mins.	0	164	164	0	2	2	210	11	221
+30 mins.	0	151	151	0	3	3	**228**	7	235
+45 mins.	0	174	174	0	3	3	173	9	182
Total Volume	0	679	679	0	11	11	836	39	875
% App. Total	0	100		0	100		95.5	4.5	
PHF	.000	.893	.893	.000	.917	.917	.917	.813	.923

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City of Ontario
N/S: Milliken Avenue
E/W: Fourth Street
Weather: Clear

File Name : 05_ONT_Milliken_Fourth Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Fourth Street Westbound				Milliken Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	58	146	21	225	107	103	48	258	31	128	73	232	49	227	49	325	1040
Total	58	146	21	225	107	103	48	258	31	128	73	232	49	227	49	325	1040
01:00 PM	76	129	35	240	67	126	44	237	29	150	76	255	55	146	36	237	969
01:15 PM	68	154	28	250	105	129	49	283	46	159	61	266	40	162	65	267	1066
01:30 PM	75	156	24	255	95	111	56	262	41	168	48	257	50	116	51	217	991
01:45 PM	90	151	20	261	79	104	47	230	31	142	63	236	38	141	42	221	948
Total	309	590	107	1006	346	470	196	1012	147	619	248	1014	183	565	194	942	3974
02:00 PM	68	129	26	223	79	112	50	241	38	129	69	236	60	137	48	245	945
02:15 PM	60	163	32	255	87	118	46	251	31	156	86	273	41	136	59	236	1015
02:30 PM	62	159	20	241	88	122	52	262	43	143	63	249	58	149	45	252	1004
Grand Total	557	1187	206	1950	707	925	392	2024	290	1175	539	2004	391	1214	395	2000	7978
Apprch %	28.6	60.9	10.6		34.9	45.7	19.4		14.5	58.6	26.9		19.5	60.7	19.8		
Total %	7	14.9	2.6	24.4	8.9	11.6	4.9	25.4	3.6	14.7	6.8	25.1	4.9	15.2	5	25.1	

	Milliken Avenue Southbound				Fourth Street Westbound				Milliken Avenue Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	58	146	21	225	**107**	103	48	258	31	128	73	232	49	**227**	49	**325**	1040
01:00 PM	**76**	129	**35**	240	67	126	44	237	29	150	**76**	255	**55**	146	36	237	969
01:15 PM	68	154	28	250	105	**129**	49	**283**	**46**	159	61	**266**	40	162	**65**	267	**1066**
01:30 PM	75	**156**	24	**255**	95	111	**56**	262	41	**168**	48	257	50	116	51	217	991
Total Volume	277	585	108	970	374	469	197	1040	147	605	258	1010	194	651	201	1046	4066
% App. Total	28.6	60.3	11.1		36	45.1	18.9		14.6	59.9	25.5		18.5	62.2	19.2		
PHF	.911	.938	.771	.951	.874	.909	.879	.919	.799	.900	.849	.949	.882	.717	.773	.805	.954

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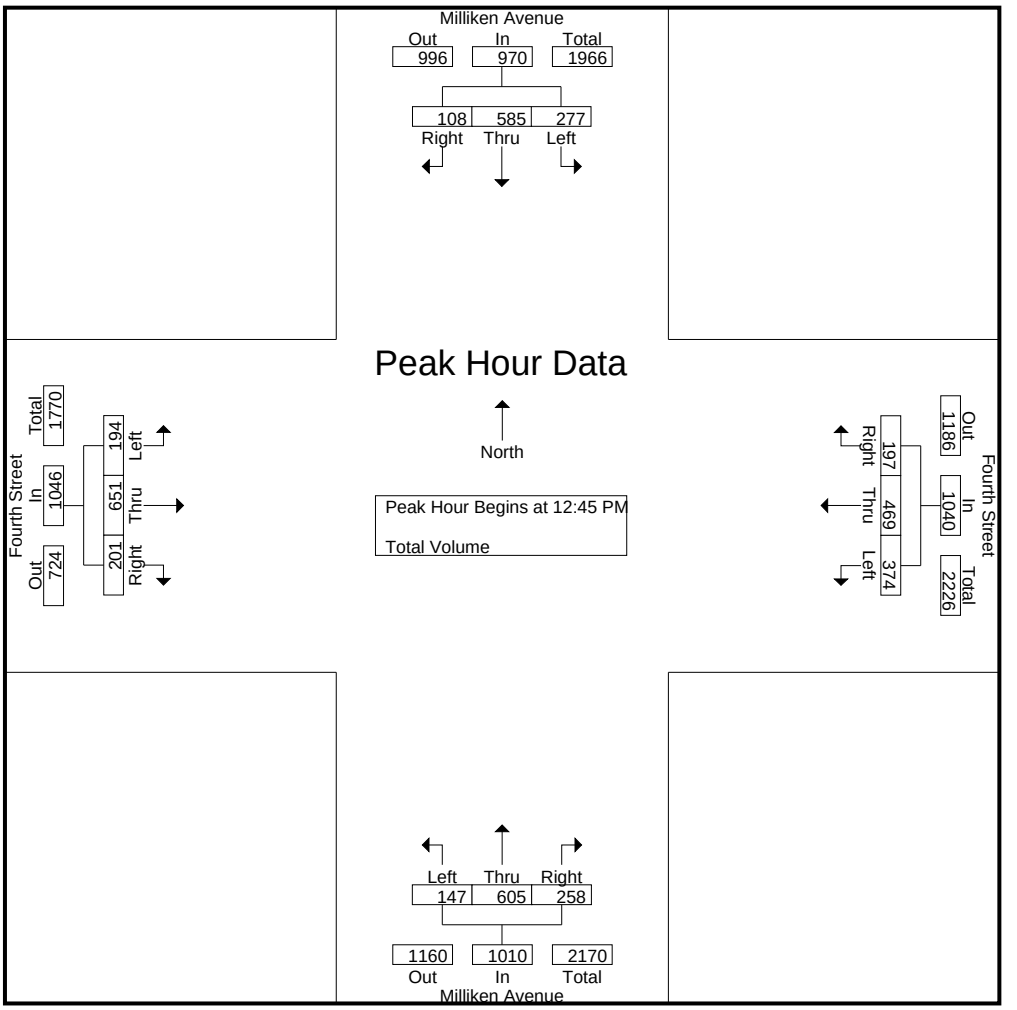
City of Ontario
N/S: Milliken Avenue
E/W: Fourth Street
Weather: Clear

File Name : 05_ONT_Milliken_Fourth Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:00 PM				12:45 PM				01:00 PM				12:45 PM			
+0 mins.	76	129	**35**	240	**107**	103	48	258	29	150	**76**	255	49	**227**	49	**325**
+15 mins.	68	154	28	250	67	126	44	237	**46**	159	61	**266**	**55**	146	36	237
+30 mins.	75	**156**	24	255	105	**129**	49	**283**	41	**168**	48	257	40	162	**65**	267
+45 mins.	**90**	151	20	**261**	95	111	**56**	262	31	142	63	236	50	116	51	217
Total Volume	309	590	107	1006	374	469	197	1040	147	619	248	1014	194	651	201	1046
% App. Total	30.7	58.6	10.6		36	45.1	18.9		14.5	61	24.5		18.5	62.2	19.2	
PHF	.858	.946	.764	.964	.874	.909	.879	.919	.799	.921	.816	.953	.882	.717	.773	.805

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City of Ontario
N/S: I-15 SB Ramps/Ontario Mills Drive
E/W: Fourth Street
Weather: Clear

File Name : 06_ONT_15S_Fourth Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	I-15 Southbound Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	15	130	141	286	93	156	67	316	22	61	87	170	141	189	34	364	1136
Total	15	130	141	286	93	156	67	316	22	61	87	170	141	189	34	364	1136
01:00 PM	9	98	158	265	63	160	63	286	32	50	82	164	119	198	22	339	1054
01:15 PM	10	109	134	253	74	163	72	309	35	59	96	190	127	219	31	377	1129
01:30 PM	14	111	117	242	61	145	96	302	40	56	81	177	131	151	24	306	1027
01:45 PM	13	116	124	253	71	143	80	294	33	76	83	192	129	181	29	339	1078
Total	46	434	533	1013	269	611	311	1191	140	241	342	723	506	749	106	1361	4288
02:00 PM	6	101	126	233	71	135	62	268	35	74	104	213	131	182	26	339	1053
02:15 PM	17	99	105	221	62	156	60	278	32	71	110	213	169	189	17	375	1087
02:30 PM	12	115	128	255	66	172	77	315	32	65	105	202	161	175	18	354	1126
Grand Total	96	879	1033	2008	561	1230	577	2368	261	512	748	1521	1108	1484	201	2793	8690
Apprch %	4.8	43.8	51.4		23.7	51.9	24.4		17.2	33.7	49.2		39.7	53.1	7.2		
Total %	1.1	10.1	11.9	23.1	6.5	14.2	6.6	27.2	3	5.9	8.6	17.5	12.8	17.1	2.3	32.1	

	I-15 Southbound Ramps Southbound				Fourth Street Westbound				Ontario Mills Drive Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	**15**	**130**	141	**286**	**93**	156	67	**316**	22	**61**	87	170	**141**	189	**34**	364	**1136**
01:00 PM	9	98	**158**	265	63	160	63	286	32	50	82	164	119	198	22	339	1054
01:15 PM	10	109	134	253	74	**163**	72	309	35	59	**96**	**190**	127	**219**	31	**377**	1129
01:30 PM	14	111	117	242	61	145	**96**	302	**40**	56	81	177	131	151	24	306	1027
Total Volume	48	448	550	1046	291	624	298	1213	129	226	346	701	518	757	111	1386	4346
% App. Total	4.6	42.8	52.6		24	51.4	24.6		18.4	32.2	49.4		37.4	54.6	8		
PHF	.800	.862	.870	.914	.782	.957	.776	.960	.806	.926	.901	.922	.918	.864	.816	.919	.956

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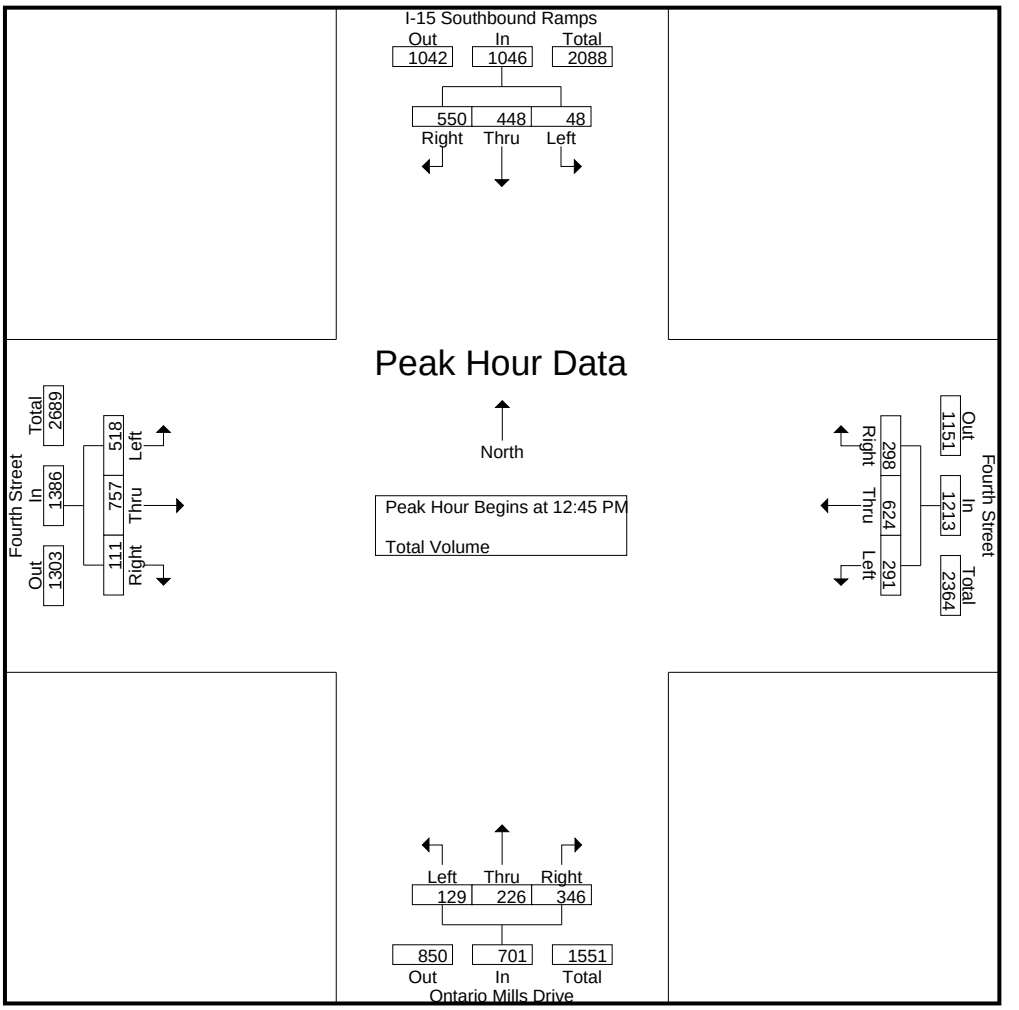
City of Ontario
N/S: I-15 SB Ramps/Ontario Mills Drive
E/W: Fourth Street
Weather: Clear

File Name : 06_ONT_15S_Fourth Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:45 PM				12:45 PM				01:45 PM				01:45 PM			
+0 mins.	**15**	**130**	141	**286**	**93**	156	67	**316**	33	**76**	83	192	129	181	**29**	339
+15 mins.	9	98	**158**	265	63	160	63	286	**35**	74	104	**213**	131	182	26	339
+30 mins.	10	109	134	253	74	**163**	72	309	32	71	**110**	213	**169**	**189**	17	**375**
+45 mins.	14	111	117	242	61	145	**96**	302	32	65	105	202	161	175	18	354
Total Volume	48	448	550	1046	291	624	298	1213	132	286	402	820	590	727	90	1407
% App. Total	4.6	42.8	52.6		24	51.4	24.6		16.1	34.9	49		41.9	51.7	6.4	
PHF	.800	.862	.870	.914	.782	.957	.776	.960	.943	.941	.914	.962	.873	.962	.776	.938

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City of Ontario
N/S: I-15 Northbound Ramps
E/W: Fourth Street
Weather: Clear

File Name : 07_ONT_15N_Fourth Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	I-15 Northbound Ramps Southbound				Fourth Street Westbound				The Exchange Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	10	10	192	212	7	107	11	125	20	13	11	44	185	75	21	281	662
Total	10	10	192	212	7	107	11	125	20	13	11	44	185	75	21	281	662
01:00 PM	12	18	197	227	3	73	9	85	11	12	9	32	180	91	12	283	627
01:15 PM	19	12	212	243	6	91	16	113	15	10	7	32	192	103	13	308	696
01:30 PM	9	14	203	226	7	89	16	112	21	13	6	40	162	70	20	252	630
01:45 PM	12	12	202	226	9	78	5	92	18	12	7	37	175	73	15	263	618
Total	52	56	814	922	25	331	46	402	65	47	29	141	709	337	60	1106	2571
02:00 PM	7	11	188	206	4	77	15	96	11	15	8	34	183	92	11	286	622
02:15 PM	13	10	183	206	5	75	7	87	20	12	3	35	194	91	26	311	639
02:30 PM	8	10	210	228	5	87	7	99	19	10	8	37	177	100	19	296	660
Grand Total	90	97	1587	1774	46	677	86	809	135	97	59	291	1448	695	137	2280	5154
Apprch %	5.1	5.5	89.5		5.7	83.7	10.6		46.4	33.3	20.3		63.5	30.5	6		
Total %	1.7	1.9	30.8	34.4	0.9	13.1	1.7	15.7	2.6	1.9	1.1	5.6	28.1	13.5	2.7	44.2	

	I-15 Northbound Ramps Southbound				Fourth Street Westbound				The Exchange Driveway Northbound				Fourth Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:45 PM																	
12:45 PM	10	10	192	212	**7**	**107**	11	**125**	20	**13**	**11**	**44**	185	75	**21**	281	662
01:00 PM	12	**18**	197	227	3	73	9	85	11	12	9	32	180	91	12	283	627
01:15 PM	**19**	12	**212**	**243**	6	91	**16**	113	15	10	7	32	**192**	**103**	13	**308**	**696**
01:30 PM	9	14	203	226	7	89	16	112	**21**	13	6	40	162	70	20	252	630
Total Volume	50	54	804	908	23	360	52	435	67	48	33	148	719	339	66	1124	2615
% App. Total	5.5	5.9	88.5		5.3	82.8	12		45.3	32.4	22.3		64	30.2	5.9		
PHF	.658	.750	.948	.934	.821	.841	.813	.870	.798	.923	.750	.841	.936	.823	.786	.912	.939

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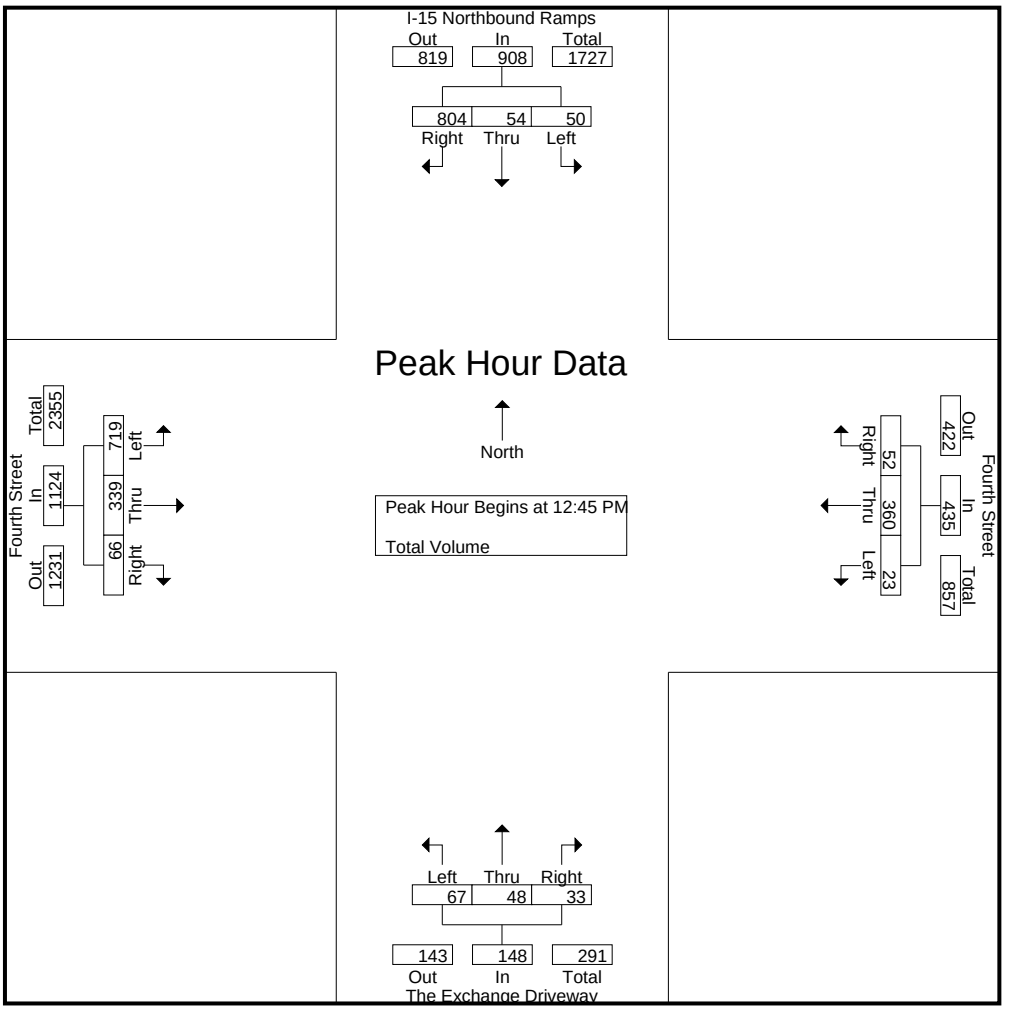
City of Ontario
N/S: I-15 Northbound Ramps
E/W: Fourth Street
Weather: Clear

File Name : 07_ONT_15N_Fourth Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:00 PM				12:45 PM				12:45 PM				01:45 PM			
+0 mins.	12	**18**	197	227	**7**	**107**	11	**125**	20	**13**	**11**	**44**	175	73	15	263
+15 mins.	**19**	12	**212**	**243**	3	73	9	85	11	12	9	32	183	92	11	286
+30 mins.	9	14	203	226	6	91	**16**	113	15	10	7	32	**194**	91	**26**	**311**
+45 mins.	12	12	202	226	7	89	16	112	**21**	13	6	40	177	**100**	19	296
Total Volume	52	56	814	922	23	360	52	435	67	48	33	148	729	356	71	1156
% App. Total	5.6	6.1	88.3		5.3	82.8	12		45.3	32.4	22.3		63.1	30.8	6.1	
PHF	.684	.778	.960	.949	.821	.841	.813	.870	.798	.923	.750	.841	.939	.890	.683	.929

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City of Ontario
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 08_ONT_Haven_Concours Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	7	218	3	228	18	14	10	42	20	313	23	356	4	3	8	15	641
Total	7	218	3	228	18	14	10	42	20	313	23	356	4	3	8	15	641
01:00 PM	7	268	5	280	20	11	17	48	6	278	29	313	2	2	9	13	654
01:15 PM	9	253	2	264	23	12	8	43	7	258	30	295	2	3	9	14	616
01:30 PM	6	278	8	292	25	10	10	45	8	283	45	336	5	9	11	25	698
01:45 PM	8	246	7	261	21	5	8	34	11	305	38	354	0	4	4	8	657
Total	30	1045	22	1097	89	38	43	170	32	1124	142	1298	9	18	33	60	2625
02:00 PM	5	222	7	234	16	11	11	38	14	280	32	326	3	2	5	10	608
02:15 PM	11	266	9	286	23	9	9	41	11	255	32	298	6	8	12	26	651
02:30 PM	7	273	7	287	18	12	10	40	3	308	18	329	0	4	9	13	669
Grand Total	60	2024	48	2132	164	84	83	331	80	2280	247	2607	22	35	67	124	5194
Apprch %	2.8	94.9	2.3		49.5	25.4	25.1		3.1	87.5	9.5		17.7	28.2	54		
Total %	1.2	39	0.9	41	3.2	1.6	1.6	6.4	1.5	43.9	4.8	50.2	0.4	0.7	1.3	2.4	

	Haven Avenue Southbound				Concours Street Westbound				Haven Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	7	268	5	280	20	11	**17**	**48**	6	278	29	313	2	2	9	13	654
01:15 PM	**9**	253	2	264	23	**12**	8	43	7	258	30	295	2	3	9	14	616
01:30 PM	6	**278**	**8**	**292**	**25**	10	10	45	8	283	**45**	336	**5**	**9**	**11**	**25**	**698**
01:45 PM	8	246	7	261	21	5	8	34	**11**	**305**	38	**354**	0	4	4	8	657
Total Volume	30	1045	22	1097	89	38	43	170	32	1124	142	1298	9	18	33	60	2625
% App. Total	2.7	95.3	2		52.4	22.4	25.3		2.5	86.6	10.9		15	30	55		
PHF	.833	.940	.688	.939	.890	.792	.632	.885	.727	.921	.789	.917	.450	.500	.750	.600	.940

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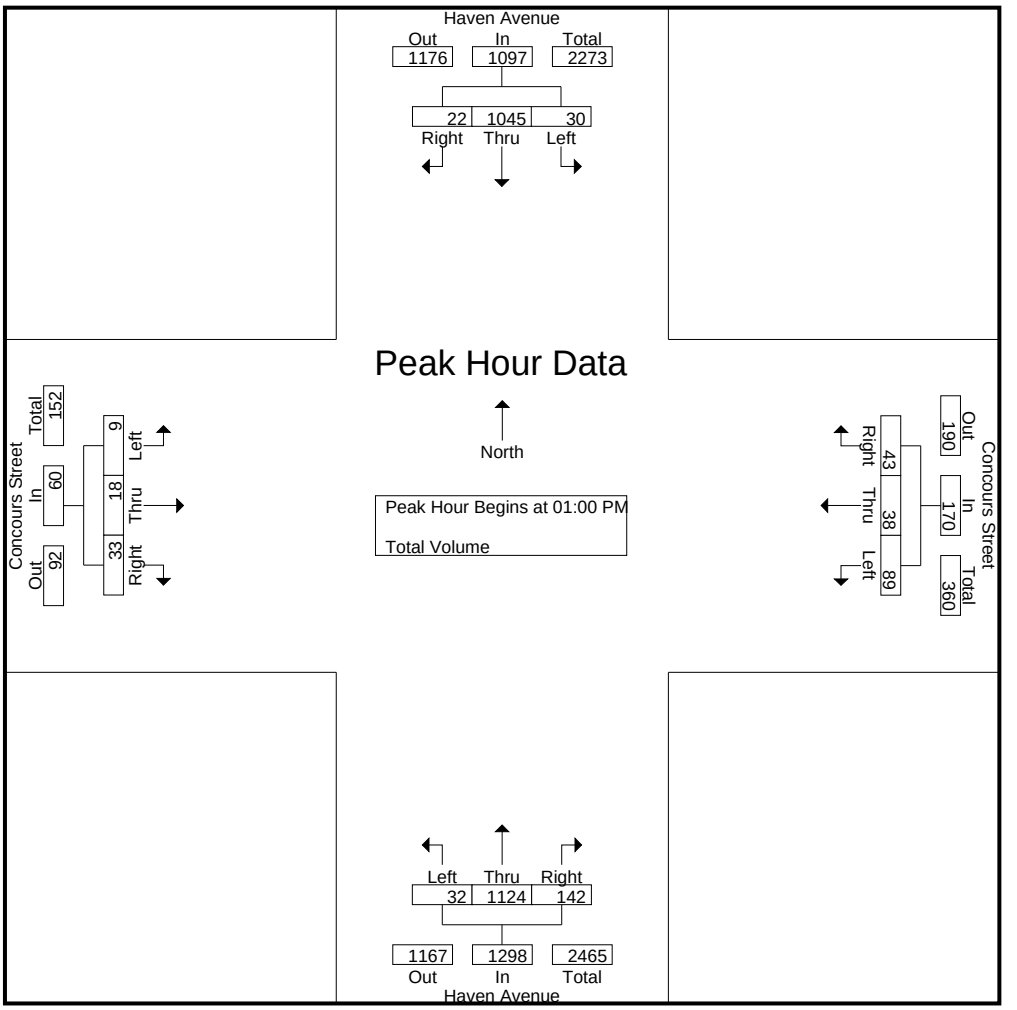
City of Ontario
N/S: Haven Avenue
E/W: Concours Street
Weather: Clear

File Name : 08_ONT_Haven_Concours Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:00 PM				12:45 PM				01:30 PM				01:30 PM			
+0 mins.	7	268	5	280	18	**14**	10	42	8	283	**45**	336	5	**9**	11	25
+15 mins.	**9**	253	2	264	20	11	**17**	**48**	11	**305**	38	**354**	0	4	4	8
+30 mins.	6	**278**	**8**	**292**	23	12	8	43	**14**	280	32	326	3	2	5	10
+45 mins.	8	246	7	261	**25**	10	10	45	11	255	32	298	**6**	8	**12**	**26**
Total Volume	30	1045	22	1097	86	47	45	178	44	1123	147	1314	14	23	32	69
% App. Total	2.7	95.3	2		48.3	26.4	25.3		3.3	85.5	11.2		20.3	33.3	46.4	
PHF	.833	.940	.688	.939	.860	.839	.662	.927	.786	.920	.817	.928	.583	.639	.667	.663

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City of Ontario
N/S: Ontario Center/Mercedes Lane
E/W: Concours Street
Weather: Clear

File Name : 09_ONT_Ont Ctr_Concours Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Concours Street Southbound				Driveway Westbound				Concours Street Northbound				Ontario Center Parkway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	0	39	4	43	0	0	0	0	2	36	0	38	4	0	0	4	85
Total	0	39	4	43	0	0	0	0	2	36	0	38	4	0	0	4	85
01:00 PM	0	44	4	48	0	0	0	0	3	34	0	37	1	0	0	1	86
01:15 PM	0	41	2	43	0	0	0	0	1	42	0	43	2	0	0	2	88
01:30 PM	0	37	0	37	0	0	0	0	0	60	0	60	0	0	1	1	98
01:45 PM	0	42	3	45	0	0	0	0	1	57	1	59	6	0	1	7	111
Total	0	164	9	173	0	0	0	0	5	193	1	199	9	0	2	11	383
02:00 PM	0	36	1	37	0	0	0	0	2	46	0	48	2	0	0	2	87
02:15 PM	0	45	7	52	0	0	0	0	1	52	0	53	0	0	0	0	105
02:30 PM	0	39	7	46	0	0	0	0	2	33	0	35	2	0	2	4	85
Grand Total	0	323	28	351	0	0	0	0	12	360	1	373	17	0	4	21	745
Apprch %	0	92	8		0	0	0		3.2	96.5	0.3		81	0	19		
Total %	0	43.4	3.8	47.1	0	0	0	0	1.6	48.3	0.1	50.1	2.3	0	0.5	2.8	

	Concours Street Southbound				Driveway Westbound				Concours Street Northbound				Ontario Center Parkway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	0	37	0	37	0	0	0	0	0	**60**	0	**60**	0	0	**1**	1	98
01:45 PM	0	42	3	45	0	0	0	0	1	57	**1**	59	**6**	0	1	**7**	**111**
02:00 PM	0	36	1	37	0	0	0	0	**2**	46	0	48	2	0	0	2	87
02:15 PM	0	**45**	**7**	**52**	0	0	0	0	1	52	0	53	0	0	0	0	105
Total Volume	0	160	11	171	0	0	0	0	4	215	1	220	8	0	2	10	401
% App. Total	0	93.6	6.4		0	0	0		1.8	97.7	0.5		80	0	20		
PHF	.000	.889	.393	.822	.000	.000	.000	.000	.500	.896	.250	.917	.333	.000	.500	.357	.903

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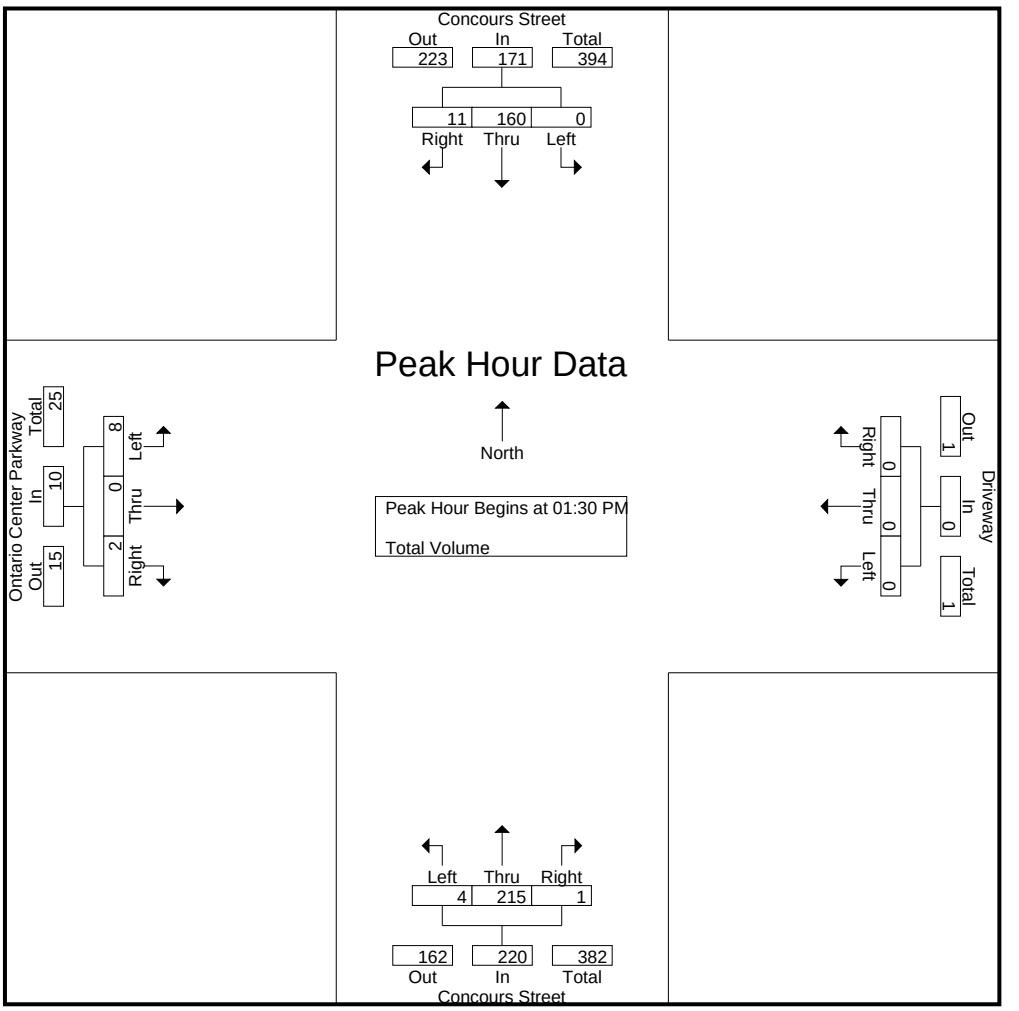
City of Ontario
N/S: Ontario Center/Mercedes Lane
E/W: Concours Street
Weather: Clear

File Name : 09_ONT_Ont Ctr_Concours Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:45 PM				12:45 PM				01:30 PM				01:45 PM			
+0 mins.	0	42	3	45	0	0	0	0	0	**60**	0	**60**	**6**	0	1	**7**
+15 mins.	0	36	1	37	0	0	0	0	1	57	**1**	59	2	0	0	2
+30 mins.	0	**45**	**7**	**52**	0	0	0	0	**2**	46	0	48	0	0	0	0
+45 mins.	0	39	7	46	0	0	0	0	1	52	0	53	2	0	**2**	4
Total Volume	0	162	18	180	0	0	0	0	4	215	1	220	10	0	3	13
% App. Total	0	90	10		0	0	0		1.8	97.7	0.5		76.9	0	23.1	
PHF	.000	.900	.643	.865	.000	.000	.000	.000	.500	.896	.250	.917	.417	.000	.375	.464

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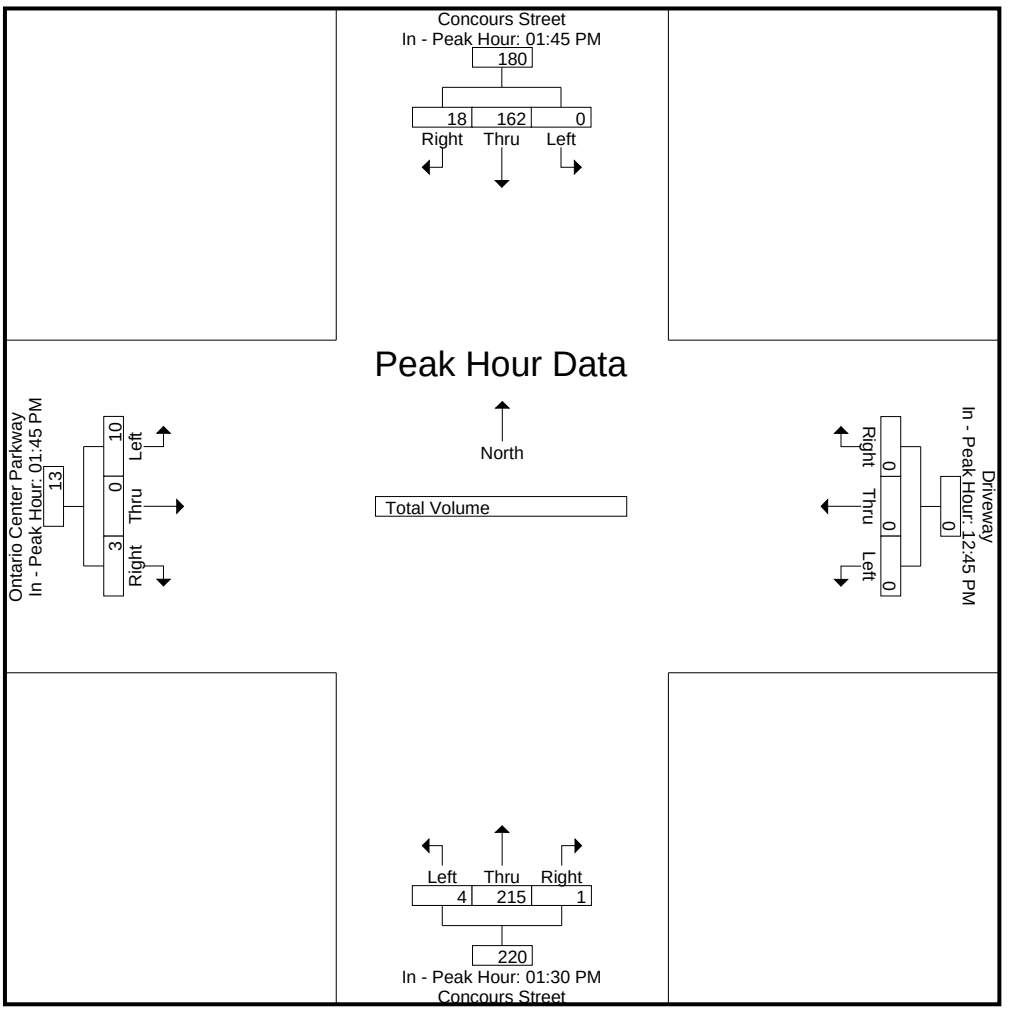
City of Ontario
N/S: Ontario Center/Mercedes Lane
E/W: Concours Street
Weather: Clear

File Name : 09_ONT_Ont Ctr_Concours Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 3



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City of Ontario
N/S: Milliken Avenue
E/W: Concours Street
Weather: Clear

File Name : 10_ONT_Milliken_Concours Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Concours Street Westbound				Milliken Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	67	190	48	305	30	18	19	67	41	197	46	284	46	20	28	94	750
Total	67	190	48	305	30	18	19	67	41	197	46	284	46	20	28	94	750
01:00 PM	48	132	36	216	37	13	28	78	46	164	47	257	49	16	33	98	649
01:15 PM	57	201	48	306	39	18	32	89	37	216	45	298	51	23	28	102	795
01:30 PM	49	175	41	265	45	18	25	88	41	157	41	239	39	31	34	104	696
01:45 PM	45	167	38	250	52	16	33	101	41	189	44	274	60	35	40	135	760
Total	199	675	163	1037	173	65	118	356	165	726	177	1068	199	105	135	439	2900
02:00 PM	48	169	40	257	49	20	24	93	39	147	43	229	64	22	26	112	691
02:15 PM	51	171	33	255	53	22	37	112	49	190	38	277	39	17	35	91	735
02:30 PM	44	203	49	296	49	20	23	92	42	193	36	271	39	22	32	93	752
Grand Total	409	1408	333	2150	354	145	221	720	336	1453	340	2129	387	186	256	829	5828
Apprch %	19	65.5	15.5		49.2	20.1	30.7		15.8	68.2	16		46.7	22.4	30.9		
Total %	7	24.2	5.7	36.9	6.1	2.5	3.8	12.4	5.8	24.9	5.8	36.5	6.6	3.2	4.4	14.2	

	Milliken Avenue Southbound				Concours Street Westbound				Milliken Avenue Northbound				Concours Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:15 PM																	
01:15 PM	**57**	**201**	**48**	**306**	39	18	32	89	37	**216**	**45**	**298**	51	23	28	102	**795**
01:30 PM	49	175	41	265	45	18	25	88	**41**	157	41	239	39	31	34	104	696
01:45 PM	45	167	38	250	**52**	16	**33**	**101**	41	189	44	274	60	**35**	**40**	**135**	760
02:00 PM	48	169	40	257	49	**20**	24	93	39	147	43	229	**64**	22	26	112	691
Total Volume	199	712	167	1078	185	72	114	371	158	709	173	1040	214	111	128	453	2942
% App. Total	18.5	66	15.5		49.9	19.4	30.7		15.2	68.2	16.6		47.2	24.5	28.3		
PHF	.873	.886	.870	.881	.889	.900	.864	.918	.963	.821	.961	.872	.836	.793	.800	.839	.925

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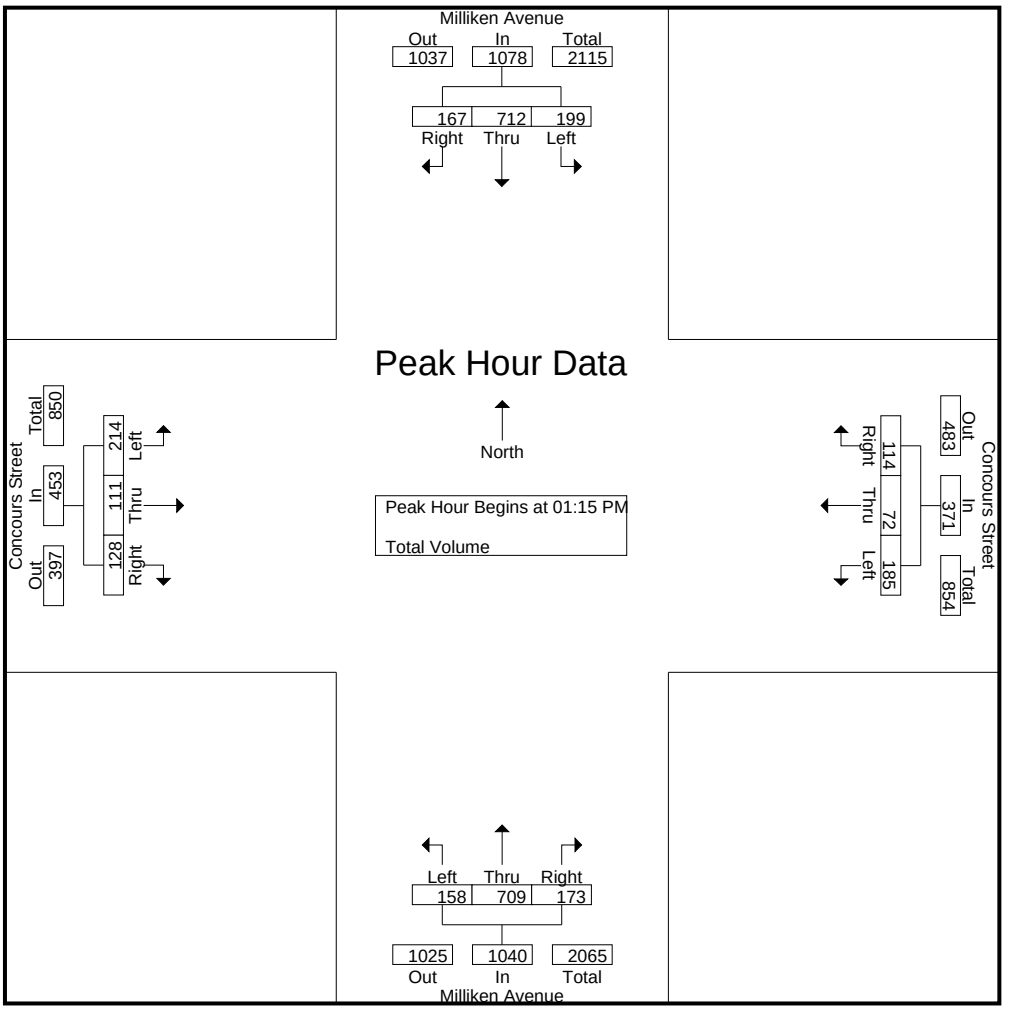
City of Ontario
N/S: Milliken Avenue
E/W: Concours Street
Weather: Clear

File Name : 10_ONT_Milliken_Concours Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:45 PM				01:45 PM				12:45 PM				01:15 PM			
+0 mins.	**67**	190	**48**	305	52	16	33	101	41	197	46	284	51	23	28	102
+15 mins.	48	132	36	216	49	20	24	93	**46**	164	**47**	257	39	31	34	104
+30 mins.	57	**201**	48	**306**	**53**	**22**	**37**	**112**	37	**216**	45	**298**	60	**35**	**40**	**135**
+45 mins.	49	175	41	265	49	20	23	92	41	157	41	239	**64**	22	26	112
Total Volume	221	698	173	1092	203	78	117	398	165	734	179	1078	214	111	128	453
% App. Total	20.2	63.9	15.8		51	19.6	29.4		15.3	68.1	16.6		47.2	24.5	28.3	
PHF	.825	.868	.901	.892	.958	.886	.791	.888	.897	.850	.952	.904	.836	.793	.800	.839

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City of Ontario
N/S: Haven Avenue
E/W: Inland Empire Boulevard
Weather: Clear

File Name : 11_ONT_Haven_Inland Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				Inland Empire Boulevard Westbound				Haven Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	10	222	9	241	29	16	4	49	23	332	99	454	11	33	43	87	831
Total	10	222	9	241	29	16	4	49	23	332	99	454	11	33	43	87	831
01:00 PM	11	252	5	268	38	23	5	66	31	306	116	453	13	21	65	99	886
01:15 PM	12	269	9	290	27	13	13	53	31	285	100	416	11	24	41	76	835
01:30 PM	11	291	9	311	30	27	12	69	33	299	96	428	15	26	41	82	890
01:45 PM	5	241	10	256	39	25	20	84	25	309	92	426	12	18	39	69	835
Total	39	1053	33	1125	134	88	50	272	120	1199	404	1723	51	89	186	326	3446
02:00 PM	9	222	9	240	34	21	10	65	37	292	102	431	18	27	47	92	828
02:15 PM	8	258	13	279	35	27	16	78	33	284	82	399	10	23	45	78	834
02:30 PM	7	264	11	282	30	22	9	61	35	290	91	416	22	22	49	93	852
Grand Total	73	2019	75	2167	262	174	89	525	248	2397	778	3423	112	194	370	676	6791
Apprch %	3.4	93.2	3.5		49.9	33.1	17		7.2	70	22.7		16.6	28.7	54.7		
Total %	1.1	29.7	1.1	31.9	3.9	2.6	1.3	7.7	3.7	35.3	11.5	50.4	1.6	2.9	5.4	10	

	Haven Avenue Southbound				Inland Empire Boulevard Westbound				Haven Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	11	252	5	268	38	23	5	66	31	306	**116**	**453**	13	21	**65**	**99**	886
01:15 PM	**12**	269	9	290	27	13	13	53	31	285	100	416	11	24	41	76	835
01:30 PM	11	**291**	9	**311**	30	**27**	12	69	**33**	299	96	428	**15**	**26**	41	82	**890**
01:45 PM	5	241	**10**	256	**39**	25	**20**	**84**	25	**309**	92	426	12	18	39	69	835
Total Volume	39	1053	33	1125	134	88	50	272	120	1199	404	1723	51	89	186	326	3446
% App. Total	3.5	93.6	2.9		49.3	32.4	18.4		7	69.6	23.4		15.6	27.3	57.1		
PHF	.813	.905	.825	.904	.859	.815	.625	.810	.909	.970	.871	.951	.850	.856	.715	.823	.968

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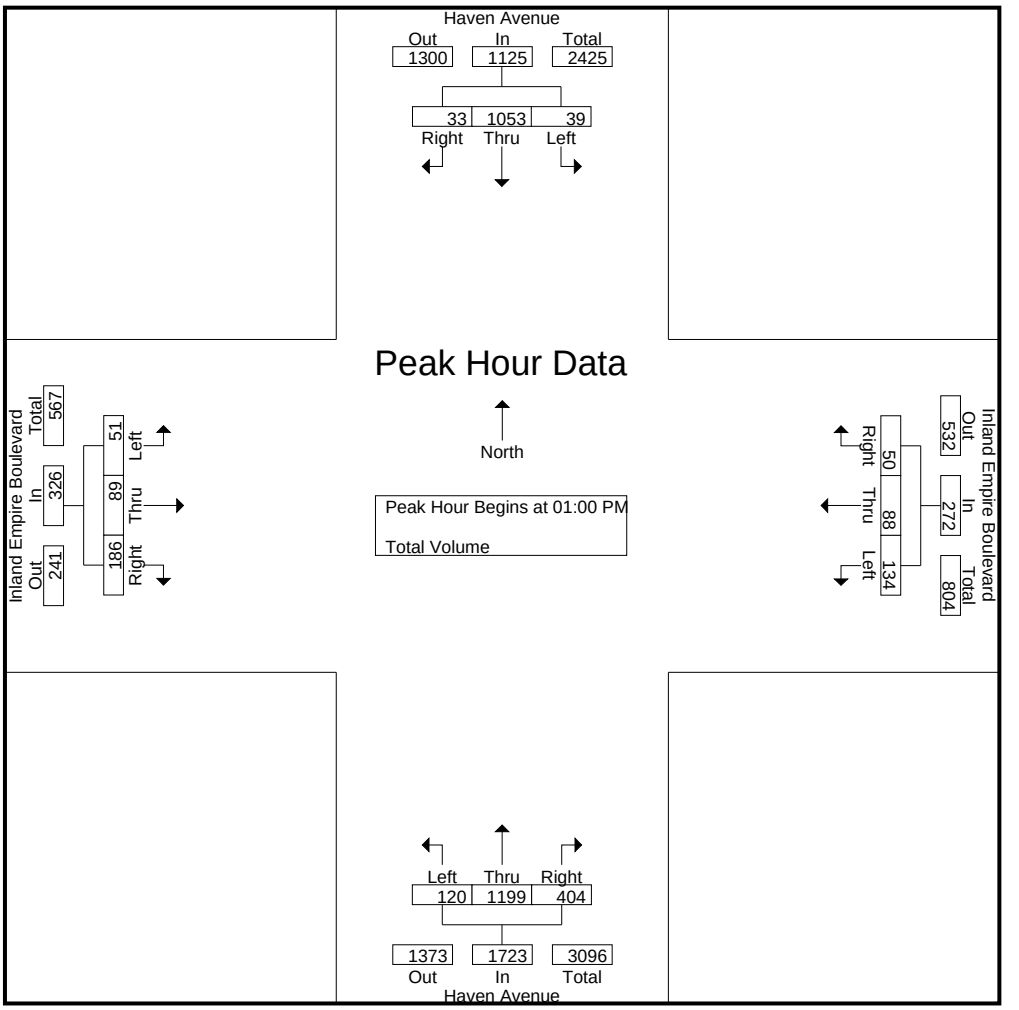
City of Ontario
N/S: Haven Avenue
E/W: Inland Empire Boulevard
Weather: Clear

File Name : 11_ONT_Haven_Inland Sat
Site Code : 10521235
Start Date : 6/5/2021



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:00 PM				01:30 PM				12:45 PM				12:45 PM			
+0 mins.	11	252	5	268	30	**27**	12	69	23	**332**	99	**454**	11	**33**	43	87
+15 mins.	**12**	269	9	290	**39**	25	**20**	**84**	31	306	**116**	453	13	21	**65**	**99**
+30 mins.	11	**291**	9	**311**	34	21	10	65	31	285	100	416	11	24	41	76
+45 mins.	5	241	**10**	256	35	27	16	78	**33**	299	96	428	**15**	26	41	82
Total Volume	39	1053	33	1125	138	100	58	296	118	1222	411	1751	50	104	190	344
% App. Total	3.5	93.6	2.9		46.6	33.8	19.6		6.7	69.8	23.5		14.5	30.2	55.2	
PHF	.813	.905	.825	.904	.885	.926	.725	.881	.894	.920	.886	.964	.833	.788	.731	.869

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City of Ontario
N/S: Milliken Avenue
E/W: Inland Empire Blvd/Mall Drive
Weather: Clear

File Name : 12_ONT_Milliken_Inland Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Mall Drive Westbound				Milliken Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	27	212	16	255	48	21	21	90	42	210	150	402	31	48	42	121	868
Total	27	212	16	255	48	21	21	90	42	210	150	402	31	48	42	121	868
01:00 PM	17	216	20	253	59	13	23	95	58	216	128	402	45	66	43	154	904
01:15 PM	26	205	19	250	62	19	31	112	73	198	133	404	38	66	47	151	917
01:30 PM	23	261	18	302	68	33	23	124	60	183	157	400	34	48	45	127	953
01:45 PM	25	246	22	293	64	24	13	101	53	209	139	401	26	47	48	121	916
Total	91	928	79	1098	253	89	90	432	244	806	557	1607	143	227	183	553	3690
02:00 PM	27	232	21	280	61	23	30	114	61	199	134	394	29	50	53	132	920
02:15 PM	18	225	16	259	69	22	20	111	64	188	130	382	34	43	36	113	865
02:30 PM	18	277	18	313	60	16	16	92	39	234	139	412	38	41	41	120	937
Grand Total	181	1874	150	2205	491	171	177	839	450	1637	1110	3197	275	409	355	1039	7280
Apprch %	8.2	85	6.8		58.5	20.4	21.1		14.1	51.2	34.7		26.5	39.4	34.2		
Total %	2.5	25.7	2.1	30.3	6.7	2.3	2.4	11.5	6.2	22.5	15.2	43.9	3.8	5.6	4.9	14.3	

	Milliken Avenue Southbound				Mall Drive Westbound				Milliken Avenue Northbound				Inland Empire Boulevard Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:15 PM																	
01:15 PM	26	205	19	250	62	19	**31**	112	**73**	198	133	**404**	**38**	**66**	47	**151**	917
01:30 PM	23	**261**	18	**302**	**68**	**33**	23	**124**	60	183	**157**	400	34	48	45	127	**953**
01:45 PM	25	246	**22**	293	64	24	13	101	53	**209**	139	401	26	47	48	121	916
02:00 PM	**27**	232	21	280	61	23	30	114	61	199	134	394	29	50	**53**	132	920
Total Volume	101	944	80	1125	255	99	97	451	247	789	563	1599	127	211	193	531	3706
% App. Total	9	83.9	7.1		56.5	22	21.5		15.4	49.3	35.2		23.9	39.7	36.3		
PHF	.935	.904	.909	.931	.938	.750	.782	.909	.846	.944	.896	.989	.836	.799	.910	.879	.972

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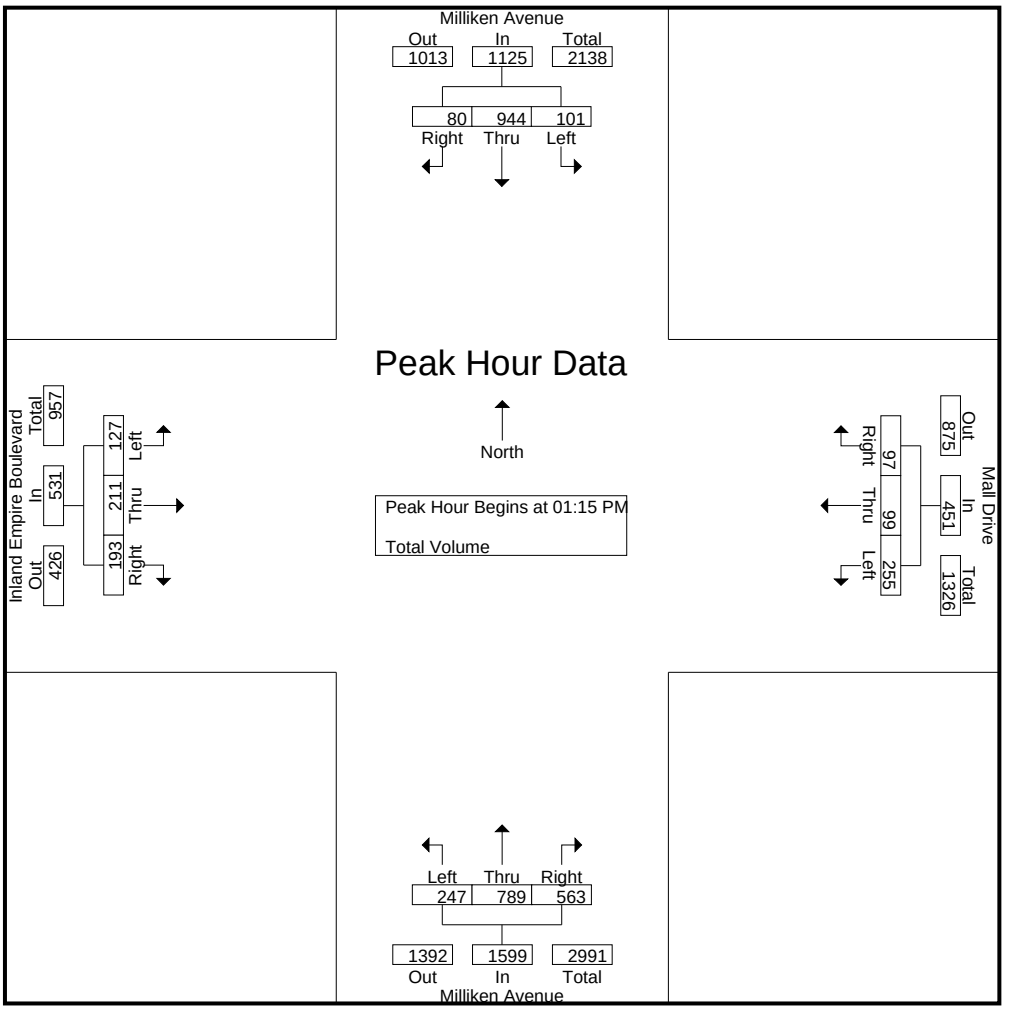
City of Ontario
N/S: Milliken Avenue
E/W: Inland Empire Blvd/Mall Drive
Weather: Clear

File Name : 12_ONT_Milliken_Inland Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:45 PM				01:15 PM				12:45 PM				12:45 PM			
+0 mins.	25	246	**22**	293	62	19	**31**	112	42	210	150	402	31	48	42	121
+15 mins.	**27**	232	21	280	**68**	**33**	23	**124**	58	**216**	128	402	**45**	**66**	43	**154**
+30 mins.	18	225	16	259	64	24	13	101	**73**	198	133	**404**	38	66	**47**	151
+45 mins.	18	**277**	18	**313**	61	23	30	114	60	183	**157**	400	34	48	45	127
Total Volume	88	980	77	1145	255	99	97	451	233	807	568	1608	148	228	177	553
% App. Total	7.7	85.6	6.7		56.5	22	21.5		14.5	50.2	35.3		26.8	41.2	32	
PHF	.815	.884	.875	.915	.938	.750	.782	.909	.798	.934	.904	.995	.822	.864	.941	.898

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City of Ontario
N/S: Haven Avenue
E/W: I-10 Westbound Ramps
Weather: Clear

File Name : 13_ONT_Haven_10W Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				I-10 Westbound Ramps Westbound				Haven Avenue Northbound				I-10 Westbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	0	235	95	330	39	0	82	121	0	360	100	460	0	0	0	0	911
Total	0	235	95	330	39	0	82	121	0	360	100	460	0	0	0	0	911
01:00 PM	0	217	145	362	42	0	94	136	0	340	113	453	0	0	0	0	951
01:15 PM	0	255	112	367	35	0	95	130	0	306	116	422	0	0	0	0	919
01:30 PM	0	260	121	381	47	0	74	121	0	336	110	446	0	0	0	0	948
01:45 PM	0	188	135	323	48	0	80	128	0	371	94	465	0	0	0	0	916
Total	0	920	513	1433	172	0	343	515	0	1353	433	1786	0	0	0	0	3734
02:00 PM	0	218	116	334	45	0	86	131	0	340	83	423	0	0	0	0	888
02:15 PM	0	237	120	357	48	0	73	121	0	304	88	392	0	0	0	0	870
02:30 PM	0	215	132	347	44	0	80	124	0	321	98	419	0	0	0	0	890
Grand Total	0	1825	976	2801	348	0	664	1012	0	2678	802	3480	0	0	0	0	7293
Apprch %	0	65.2	34.8		34.4	0	65.6		0	77	23		0	0	0		
Total %	0	25	13.4	38.4	4.8	0	9.1	13.9	0	36.7	11	47.7	0	0	0	0	

	Haven Avenue Southbound				I-10 Westbound Ramps Westbound				Haven Avenue Northbound				I-10 Westbound On Ramp Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	0	217	**145**	362	42	0	94	**136**	0	340	113	453	0	0	0	0	**951**
01:15 PM	0	255	112	367	35	0	**95**	130	0	306	**116**	422	0	0	0	0	919
01:30 PM	0	**260**	121	**381**	47	0	74	121	0	336	110	446	0	0	0	0	948
01:45 PM	0	188	135	323	**48**	0	80	128	0	**371**	94	**465**	0	0	0	0	916
Total Volume	0	920	513	1433	172	0	343	515	0	1353	433	1786	0	0	0	0	3734
% App. Total	0	64.2	35.8		33.4	0	66.6		0	75.8	24.2		0	0	0		
PHF	.000	.885	.884	.940	.896	.000	.903	.947	.000	.912	.933	.960	.000	.000	.000	.000	.982

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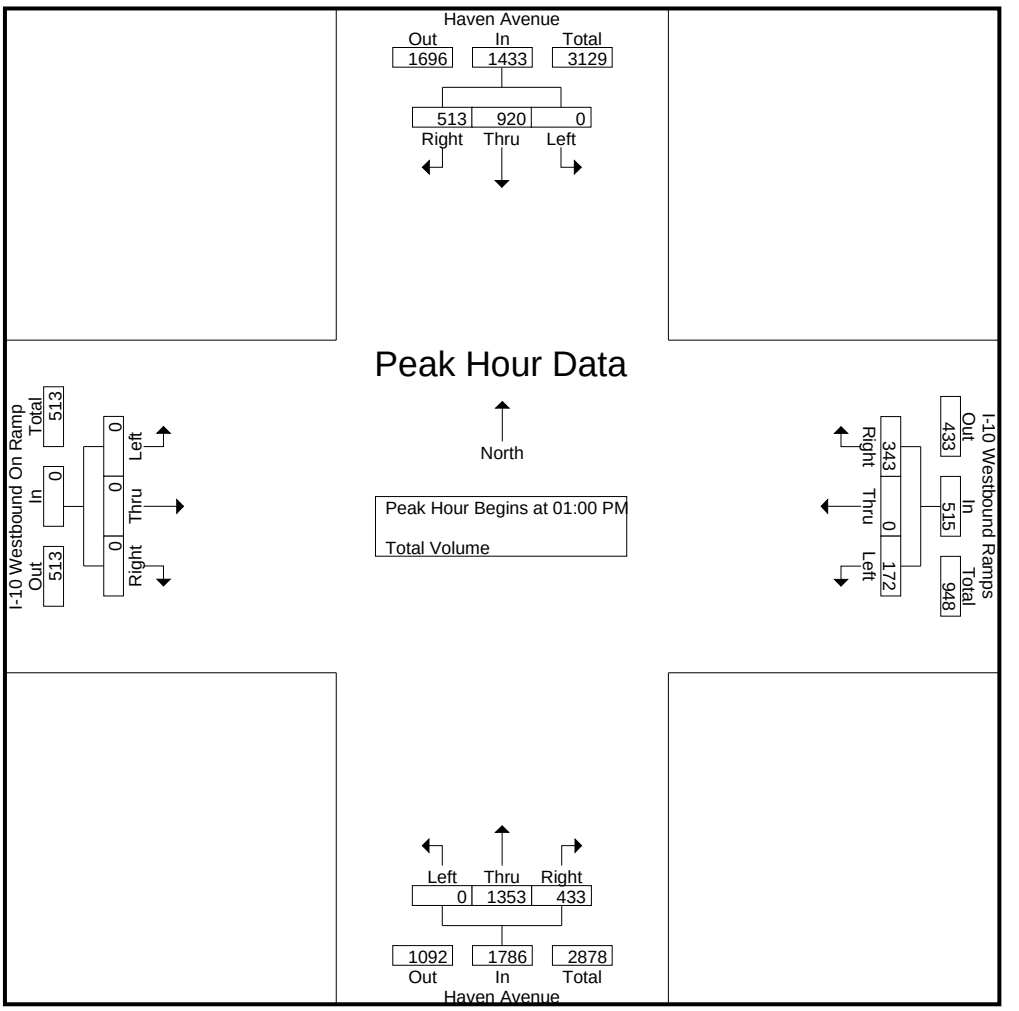
City of Ontario
N/S: Haven Avenue
E/W: I-10 Westbound Ramps
Weather: Clear

File Name : 13_ONT_Haven_10W Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:45 PM				01:00 PM				01:00 PM				12:45 PM			
+0 mins.	0	235	95	330	42	0	94	**136**	0	340	113	453	0	0	0	0
+15 mins.	0	217	**145**	362	35	0	**95**	130	0	306	**116**	422	0	0	0	0
+30 mins.	0	255	112	367	47	0	74	121	0	336	110	446	0	0	0	0
+45 mins.	0	**260**	121	**381**	**48**	0	80	128	0	**371**	94	**465**	0	0	0	0
Total Volume	0	967	473	1440	172	0	343	515	0	1353	433	1786	0	0	0	0
% App. Total	0	67.2	32.8		33.4	0	66.6		0	75.8	24.2		0	0	0	
PHF	.000	.930	.816	.945	.896	.000	.903	.947	.000	.912	.933	.960	.000	.000	.000	.000

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City of Ontario
N/S: Milliken Avenue
E/W: I-10 WB Ramps/Ontario Mills Parkway
Weather: Clear

File Name : 14_ONT_Milliken_10W Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Ontario Mills Parkway Westbound				Milliken Avenue Northbound				I-10 Westbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	54	151	112	317	45	44	13	102	23	235	90	348	118	52	25	195	962
Total	54	151	112	317	45	44	13	102	23	235	90	348	118	52	25	195	962
01:00 PM	56	186	120	362	57	43	22	122	34	244	84	362	99	47	25	171	1017
01:15 PM	51	173	96	320	56	57	17	130	29	234	77	340	110	43	23	176	966
01:30 PM	59	194	172	425	58	57	17	132	40	250	80	370	119	31	31	181	1108
01:45 PM	56	183	130	369	34	67	23	124	34	238	73	345	89	58	18	165	1003
Total	222	736	518	1476	205	224	79	508	137	966	314	1417	417	179	97	693	4094
02:00 PM	55	156	123	334	50	52	20	122	30	240	75	345	115	39	16	170	971
02:15 PM	46	178	141	365	54	69	13	136	45	232	70	347	116	34	27	177	1025
02:30 PM	58	191	146	395	58	54	18	130	35	261	69	365	117	35	20	172	1062
Grand Total	435	1412	1040	2887	412	443	143	998	270	1934	618	2822	883	339	185	1407	8114
Apprch %	15.1	48.9	36		41.3	44.4	14.3		9.6	68.5	21.9		62.8	24.1	13.1		
Total %	5.4	17.4	12.8	35.6	5.1	5.5	1.8	12.3	3.3	23.8	7.6	34.8	10.9	4.2	2.3	17.3	

	Milliken Avenue Southbound				Ontario Mills Parkway Westbound				Milliken Avenue Northbound				I-10 Westbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	**59**	**194**	**172**	**425**	**58**	57	17	132	40	**250**	**80**	**370**	**119**	31	**31**	**181**	**1108**
01:45 PM	56	183	130	369	34	67	**23**	124	34	238	73	345	89	**58**	18	165	1003
02:00 PM	55	156	123	334	50	52	20	122	30	240	75	345	115	39	16	170	971
02:15 PM	46	178	141	365	54	**69**	13	**136**	**45**	232	70	347	116	34	27	177	1025
Total Volume	216	711	566	1493	196	245	73	514	149	960	298	1407	439	162	92	693	4107
% App. Total	14.5	47.6	37.9		38.1	47.7	14.2		10.6	68.2	21.2		63.3	23.4	13.3		
PHF	.915	.916	.823	.878	.845	.888	.793	.945	.828	.960	.931	.951	.922	.698	.742	.957	.927

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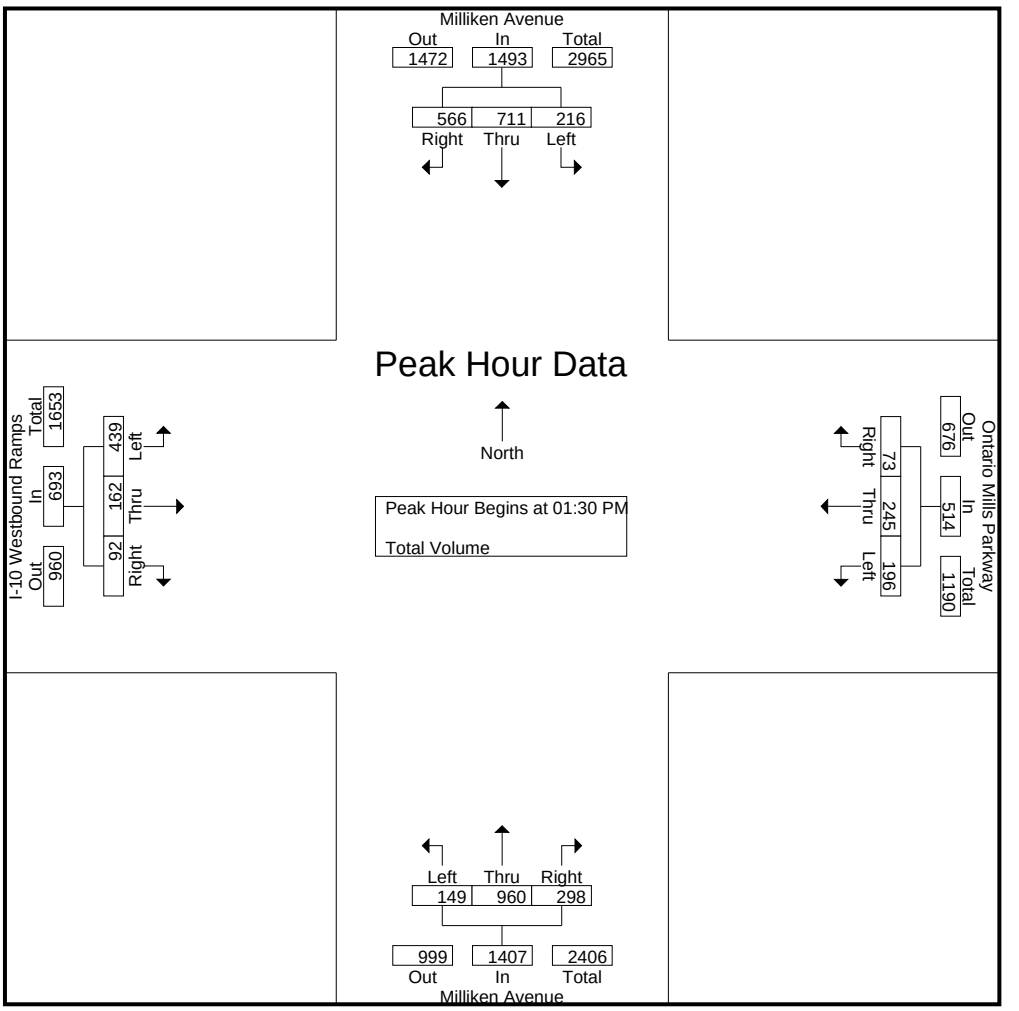
City of Ontario
N/S: Milliken Avenue
E/W: I-10 WB Ramps/Ontario Mills Parkway
Weather: Clear

File Name : 14_ONT_Milliken_10W Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:30 PM				01:30 PM				12:45 PM				12:45 PM			
+0 mins.	**59**	**194**	**172**	**425**	**58**	57	17	132	23	235	**90**	348	118	**52**	25	**195**
+15 mins.	56	183	130	369	34	67	**23**	124	34	244	84	362	99	47	25	171
+30 mins.	55	156	123	334	50	52	20	122	29	234	77	340	110	43	23	176
+45 mins.	46	178	141	365	54	**69**	13	**136**	**40**	**250**	80	**370**	**119**	31	**31**	181
Total Volume	216	711	566	1493	196	245	73	514	126	963	331	1420	446	173	104	723
% App. Total	14.5	47.6	37.9		38.1	47.7	14.2		8.9	67.8	23.3		61.7	23.9	14.4	
PHF	.915	.916	.823	.878	.845	.888	.793	.945	.788	.963	.919	.959	.937	.832	.839	.927

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City of Ontario
N/S: Haven Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 15_ONT_Haven_10E Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Haven Avenue Southbound				I-10 Eastbound On Ramp Westbound				Haven Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	0	182	58	240	0	0	0	0	0	260	55	315	189	0	83	272	827
Total	0	182	58	240	0	0	0	0	0	260	55	315	189	0	83	272	827
01:00 PM	0	220	82	302	0	0	0	0	0	252	67	319	188	0	104	292	913
01:15 PM	0	205	69	274	0	0	0	0	0	250	62	312	174	0	108	282	868
01:30 PM	0	219	70	289	0	0	0	0	0	261	56	317	178	0	85	263	869
01:45 PM	0	219	62	281	0	0	0	0	0	290	70	360	169	0	84	253	894
Total	0	863	283	1146	0	0	0	0	0	1053	255	1308	709	0	381	1090	3544
02:00 PM	0	196	67	263	0	0	0	0	0	261	63	324	151	0	73	224	811
02:15 PM	0	220	62	282	0	0	0	0	0	226	60	286	148	0	99	247	815
02:30 PM	0	205	62	267	0	0	0	0	0	256	70	326	160	0	102	262	855
Grand Total	0	1666	532	2198	0	0	0	0	0	2056	503	2559	1357	0	738	2095	6852
Apprch %	0	75.8	24.2		0	0	0		0	80.3	19.7		64.8	0	35.2		
Total %	0	24.3	7.8	32.1	0	0	0	0	0	30	7.3	37.3	19.8	0	10.8	30.6	

	Haven Avenue Southbound				I-10 Eastbound On Ramp Westbound				Haven Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	0	**220**	**82**	**302**	0	0	0	0	0	252	67	319	**188**	0	104	**292**	**913**
01:15 PM	0	205	69	274	0	0	0	0	0	250	62	312	174	0	**108**	282	868
01:30 PM	0	219	70	289	0	0	0	0	0	261	56	317	178	0	85	263	869
01:45 PM	0	219	62	281	0	0	0	0	0	**290**	**70**	**360**	169	0	84	253	894
Total Volume	0	863	283	1146	0	0	0	0	0	1053	255	1308	709	0	381	1090	3544
% App. Total	0	75.3	24.7		0	0	0		0	80.5	19.5		65	0	35		
PHF	.000	.981	.863	.949	.000	.000	.000	.000	.000	.908	.911	.908	.943	.000	.882	.933	.970

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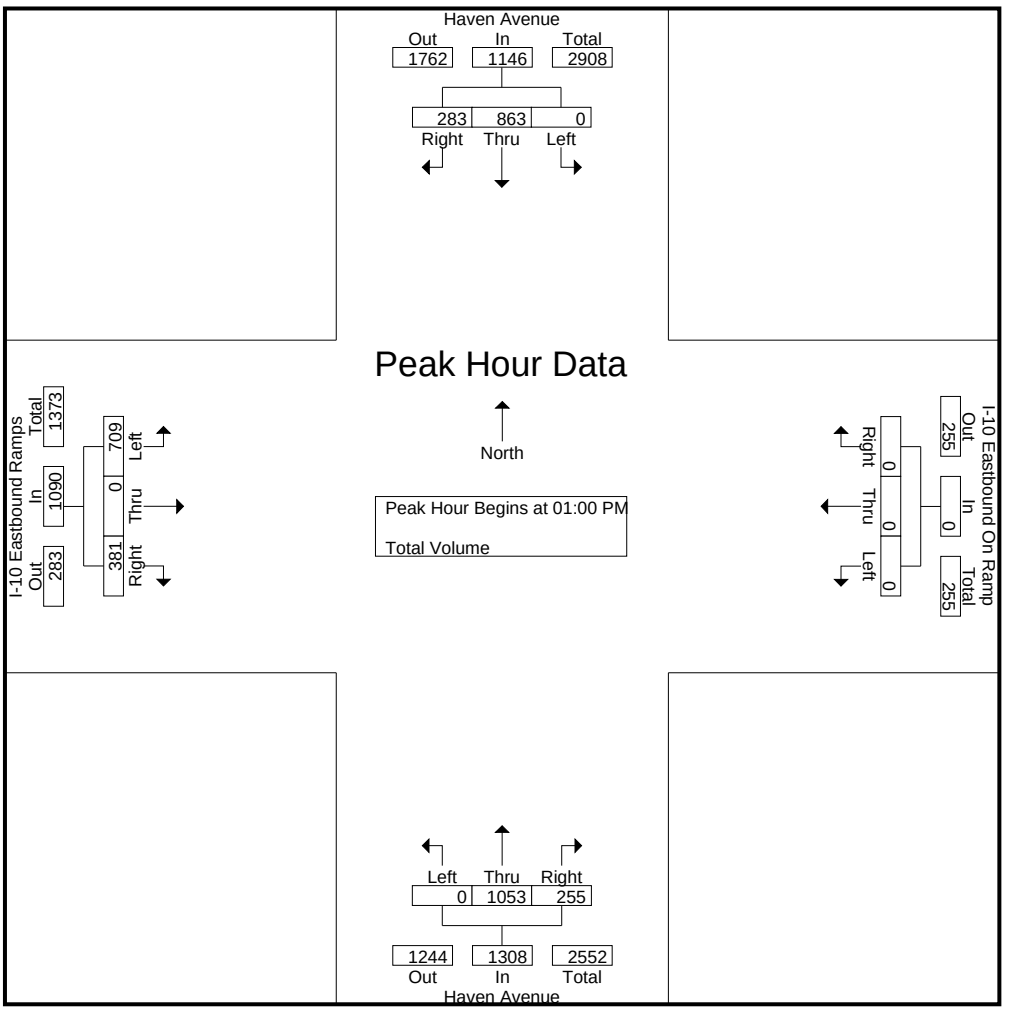
City of Ontario
N/S: Haven Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 15_ONT_Haven_10E Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2



Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:00 PM				12:45 PM				01:15 PM				12:45 PM			
+0 mins.	0	**220**	**82**	**302**	0	0	0	0	0	250	62	312	**189**	0	83	272
+15 mins.	0	205	69	274	0	0	0	0	0	261	56	317	188	0	104	**292**
+30 mins.	0	219	70	289	0	0	0	0	0	**290**	**70**	**360**	174	0	**108**	282
+45 mins.	0	219	62	281	0	0	0	0	0	261	63	324	178	0	85	263
Total Volume	0	863	283	1146	0	0	0	0	0	1062	251	1313	729	0	380	1109
% App. Total	0	75.3	24.7		0	0	0		0	80.9	19.1		65.7	0	34.3	
PHF	.000	.981	.863	.949	.000	.000	.000	.000	.000	.916	.896	.912	.964	.000	.880	.949

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City of Ontario
N/S: Milliken Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 16_ONT_Milliken_10E Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 1

Groups Printed- Total Volume

	Milliken Avenue Southbound				Dead End Westbound				Milliken Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:45 PM	0	141	100	241	0	0	0	0	26	204	0	230	153	0	41	194	665
Total	0	141	100	241	0	0	0	0	26	204	0	230	153	0	41	194	665
01:00 PM	0	124	122	246	0	0	0	0	18	228	0	246	161	0	49	210	702
01:15 PM	0	150	124	274	0	0	0	0	37	178	0	215	180	0	33	213	702
01:30 PM	0	144	87	231	0	0	0	0	22	206	0	228	158	0	36	194	653
01:45 PM	0	175	92	267	0	0	0	0	35	201	0	236	130	0	39	169	672
Total	0	593	425	1018	0	0	0	0	112	813	0	925	629	0	157	786	2729
02:00 PM	0	130	116	246	0	0	0	0	25	190	0	215	138	0	24	162	623
02:15 PM	0	143	124	267	0	0	0	0	23	201	0	224	157	0	30	187	678
02:30 PM	0	161	122	283	0	0	0	0	25	211	0	236	164	0	33	197	716
Grand Total	0	1168	887	2055	0	0	0	0	211	1619	0	1830	1241	0	285	1526	5411
Apprch %	0	56.8	43.2		0	0	0		11.5	88.5	0		81.3	0	18.7		
Total %	0	21.6	16.4	38	0	0	0	0	3.9	29.9	0	33.8	22.9	0	5.3	28.2	

	Milliken Avenue Southbound				Dead End Westbound				Milliken Avenue Northbound				I-10 Eastbound Ramps Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	0	124	122	246	0	0	0	0	18	**228**	0	**246**	161	0	**49**	210	**702**
01:15 PM	0	150	**124**	**274**	0	0	0	0	**37**	178	0	215	**180**	0	33	**213**	702
01:30 PM	0	144	87	231	0	0	0	0	22	206	0	228	158	0	36	194	653
01:45 PM	0	**175**	92	267	0	0	0	0	35	201	0	236	130	0	39	169	672
Total Volume	0	593	425	1018	0	0	0	0	112	813	0	925	629	0	157	786	2729
% App. Total	0	58.3	41.7		0	0	0		12.1	87.9	0		80	0	20		
PHF	.000	.847	.857	.929	.000	.000	.000	.000	.757	.891	.000	.940	.874	.000	.801	.923	.972

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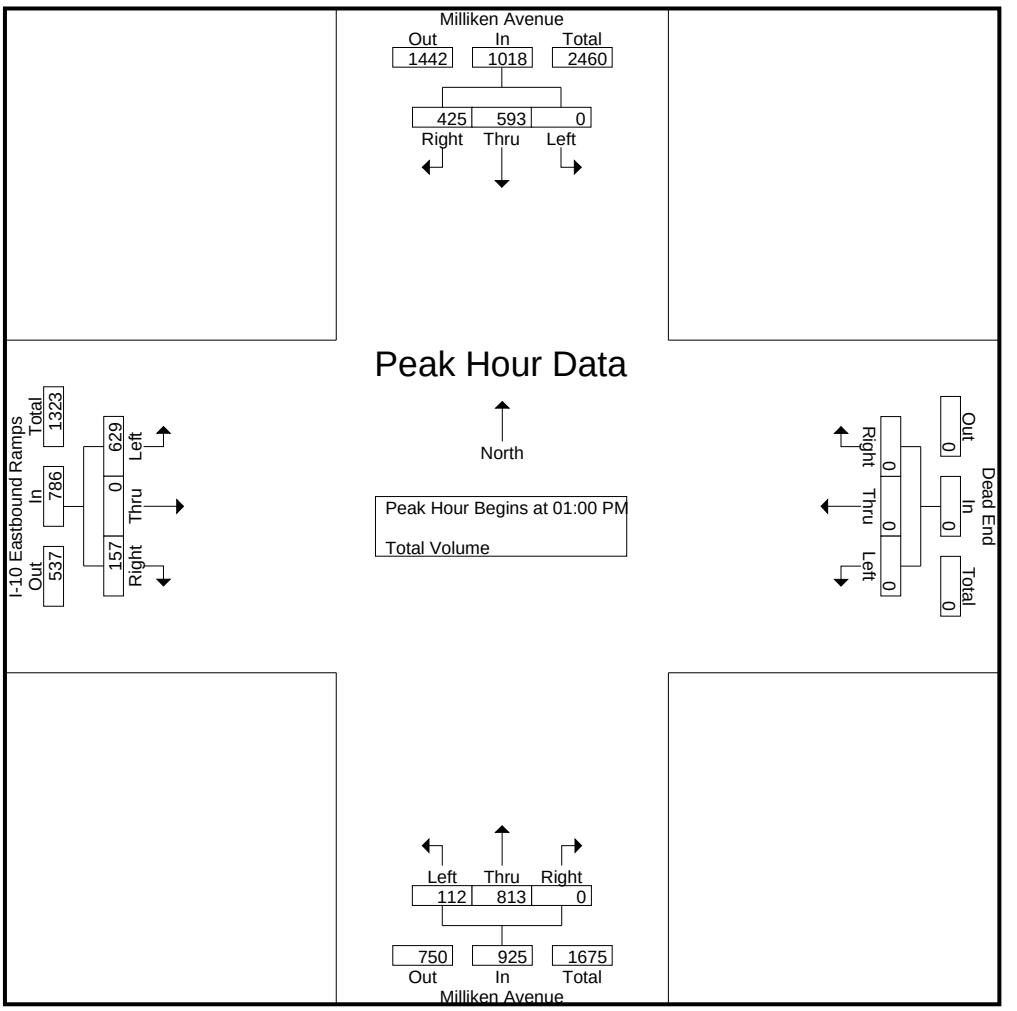
City of Ontario
N/S: Milliken Avenue
E/W: I-10 Eastbound Ramps
Weather: Clear

File Name : 16_ONT_Milliken_10E Sat
Site Code : 10521235
Start Date : 6/5/2021
Page No : 2

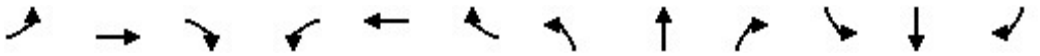


Peak Hour Analysis From 12:45 PM to 02:30 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:45 PM				12:45 PM				01:00 PM				12:45 PM			
+0 mins.	0	**175**	92	267	0	0	0	0	18	**228**	0	**246**	153	0	41	194
+15 mins.	0	130	116	246	0	0	0	0	**37**	178	0	215	161	0	**49**	210
+30 mins.	0	143	**124**	267	0	0	0	0	22	206	0	228	**180**	0	33	**213**
+45 mins.	0	161	122	**283**	0	0	0	0	35	201	0	236	158	0	36	194
Total Volume	0	609	454	1063	0	0	0	0	112	813	0	925	652	0	159	811
% App. Total	0	57.3	42.7		0	0	0		12.1	87.9	0		80.4	0	19.6	
PHF	.000	.870	.915	.939	.000	.000	.000	.000	.757	.891	.000	.940	.906	.000	.811	.952

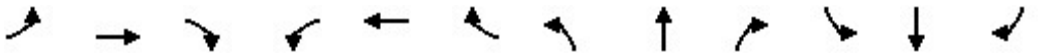
Appendix B

Intersection LOS Analysis Sheets
Existing Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.962				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67				149			238		9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



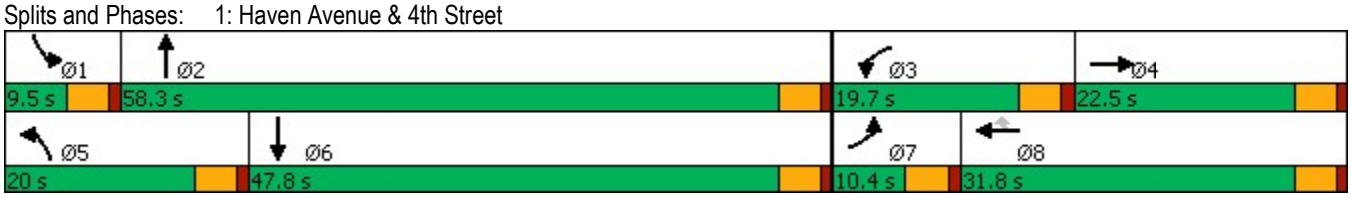
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	89	288	98	235	502	127	201	1479	464	85	1186	53
Future Volume (vph)	89	288	98	235	502	127	201	1479	464	85	1186	53
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	98	316	108	258	552	140	221	1625	510	93	1303	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	424	0	258	552	140	221	1625	510	93	1361	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	288	235	502	127	201	1479	464	85	1186
Future Volume (vph)	89	288	235	502	127	201	1479	464	85	1186
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	15.4	13.5	23.0	23.0	12.9	53.9	105.9	5.0	46.0
Actuated g/C Ratio	0.06	0.15	0.13	0.22	0.22	0.12	0.51	1.00	0.05	0.43
v/c Ratio	0.61	0.58	0.70	0.76	0.32	0.63	0.66	0.34	0.68	0.52
Control Delay	66.5	38.8	55.3	45.9	6.8	52.7	21.4	0.6	75.8	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.5	38.8	55.3	45.9	6.8	52.7	21.4	0.6	75.8	23.5
LOS	E	D	E	D	A	D	C	A	E	C
Approach Delay		44.0		42.7			19.8			26.8
Approach LOS		D		D			B			C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 105.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 28.3	Intersection LOS: C
Intersection Capacity Utilization 68.1%	ICU Level of Service C
Analysis Period (min) 15	

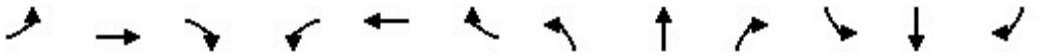
Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	98	424	258	552	140	221	1625	510	93	1361
v/c Ratio	0.61	0.58	0.70	0.76	0.32	0.63	0.66	0.34	0.68	0.52
Control Delay	66.5	38.8	55.3	45.9	6.8	52.7	21.4	0.6	75.8	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.5	38.8	55.3	45.9	6.8	52.7	21.4	0.6	75.8	23.5
Queue Length 50th (ft)	34	84	87	185	0	74	294	0	32	195
Queue Length 95th (ft)	#71	120	134	246	43	115	368	0	#76	251
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	161	845	415	866	498	424	2452	1500	136	2625
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.50	0.62	0.64	0.28	0.52	0.66	0.34	0.68	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



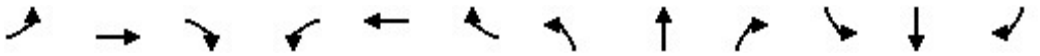
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	288	98	235	502	127	201	1479	464	85	1186	53
Future Volume (veh/h)	89	288	98	235	502	127	201	1479	464	85	1186	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	98	316	108	258	552	140	221	1625	0	93	1303	58
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	144	520	168	318	686	306	282	2536		138	2860	127
Arrive On Green	0.05	0.14	0.14	0.11	0.20	0.20	0.10	0.52	0.00	0.05	0.47	0.47
Sat Flow, veh/h	2910	3616	1170	2910	3367	1502	2910	4837	1502	2910	6027	268
Grp Volume(v), veh/h	98	280	144	258	552	140	221	1625	0	93	988	373
Grp Sat Flow(s),veh/h/ln	1455	1612	1561	1455	1683	1502	1455	1612	1502	1455	1524	1724
Q Serve(g_s), s	3.4	8.4	8.9	8.9	16.0	8.4	7.6	24.7	0.0	3.2	14.9	14.9
Cycle Q Clear(g_c), s	3.4	8.4	8.9	8.9	16.0	8.4	7.6	24.7	0.0	3.2	14.9	14.9
Prop In Lane	1.00		0.75	1.00		1.00	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	144	463	224	318	686	306	282	2536		138	2169	818
V/C Ratio(X)	0.68	0.60	0.64	0.81	0.81	0.46	0.78	0.64		0.68	0.46	0.46
Avail Cap(c_a), veh/h	167	566	274	431	895	399	439	2536		142	2169	818
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.0	41.2	41.5	44.7	38.9	35.9	45.3	17.5	0.0	48.1	18.1	18.1
Incr Delay (d2), s/veh	8.8	1.3	3.6	8.2	4.1	1.1	4.8	1.3	0.0	11.6	0.7	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.4	3.6	3.5	6.9	3.1	2.9	9.0	0.0	1.4	5.2	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.8	42.5	45.1	52.8	43.1	37.0	50.1	18.8	0.0	59.7	18.8	19.9
LnGrp LOS	E	D	D	D	D	D	D	B		E	B	B
Approach Vol, veh/h		522			950			1846	A		1454	
Approach Delay, s/veh		45.9			44.8			22.5			21.7	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.4	58.3	15.7	19.3	14.5	53.2	9.6	25.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	5.2	26.7	10.9	10.9	9.6	16.9	5.4	18.0
Green Ext Time (p_c), s	0.0	14.7	0.3	1.5	0.4	11.0	0.0	2.9

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

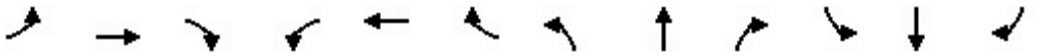
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.994				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	6034	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1583	6034	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				164			164		436	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	37	476	20	1	656	54	3	1	1	0	0	3
Future Volume (vph)	37	476	20	1	656	54	3	1	1	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	41	529	22	1	729	60	3	1	1	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	551	0	1	729	60	3	1	1	0	3	0

Intersection Summary

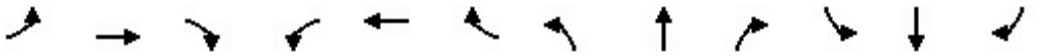
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT	Ø1
Lane Configurations										
Traffic Volume (vph)	37	476	1	656	54	3	1	1	0	
Future Volume (vph)	37	476	1	656	54	3	1	1	0	
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	NA	
Protected Phases	7	4	3	8		5	2		6	1
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	6	
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	22.5	9.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	26.7	15.0
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	38.1%	21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min	None
Act Effct Green (s)	5.5	13.2	5.5	13.2	13.2	6.1	7.3	7.3	6.0	
Actuated g/C Ratio	0.18	0.42	0.18	0.42	0.42	0.19	0.23	0.23	0.19	
v/c Ratio	0.15	0.22	0.00	0.36	0.08	0.01	0.00	0.00	0.00	
Control Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0	
LOS	B	A	B	A	A	B	B	A	A	
Approach Delay		7.7		7.3			12.2			
Approach LOS		A		A			B			

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 31.4	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 33.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	41	551	1	729	60	3	1	1	3
v/c Ratio	0.15	0.22	0.00	0.36	0.08	0.01	0.00	0.00	0.00
Control Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0
Queue Length 50th (ft)	5	10	0	18	0	0	0	0	0
Queue Length 95th (ft)	36	50	4	90	0	7	3	0	0
Internal Link Dist (ft)		2546		362			269		358
Turn Bay Length (ft)	130		130		145	165		165	
Base Capacity (vph)	274	3775	274	3010	999	373	1133	1022	2296
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.15	0.00	0.24	0.06	0.01	0.00	0.00	0.00

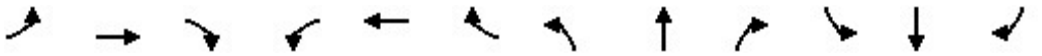
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	476	20	1	656	54	3	1	1	0	0	3
Future Volume (veh/h)	37	476	20	1	656	54	3	1	1	0	0	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	41	529	22	1	729	60	3	1	1	0	0	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	2068	85	5	1434	445	7	485	411	5	239	213
Arrive On Green	0.05	0.34	0.34	0.00	0.30	0.30	0.00	0.27	0.27	0.00	0.00	0.14
Sat Flow, veh/h	1594	6050	249	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	41	398	153	1	729	60	3	1	1	0	0	3
Grp Sat Flow(s),veh/h/ln	1594	1524	1727	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.9	2.2	2.2	0.0	4.4	1.0	0.1	0.0	0.0	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.9	2.2	2.2	0.0	4.4	1.0	0.1	0.0	0.0	0.0	0.0	0.1
Prop In Lane	1.00		0.14	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	75	1563	590	5	1434	445	7	485	411	5	239	213
V/C Ratio(X)	0.55	0.25	0.26	0.22	0.51	0.13	0.46	0.00	0.00	0.00	0.00	0.01
Avail Cap(c_a), veh/h	226	2335	882	226	2471	767	308	930	788	475	1060	946
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	16.4	8.4	8.4	17.6	10.3	9.1	17.5	9.3	9.3	0.0	0.0	13.0
Incr Delay (d2), s/veh	6.1	0.1	0.2	22.9	0.3	0.1	42.8	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.5	0.6	0.0	1.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	8.4	8.6	40.5	10.6	9.2	60.3	9.3	9.3	0.0	0.0	13.0
LnGrp LOS	C	A	A	D	B	A	E	A	A	A	A	B
Approach Vol, veh/h		592			790			5			3	
Approach Delay, s/veh		9.5			10.5			39.9			13.0	
Approach LOS		A			B			D			B	

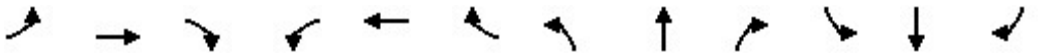
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	14.1	4.5	16.5	4.6	9.5	6.2	14.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	0.0	2.0	2.0	4.2	2.1	2.1	2.9	6.4
Green Ext Time (p_c), s	0.0	0.0	0.0	3.0	0.0	0.0	0.0	4.0

Intersection Summary	
HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	2891	6065	0	1583	4798	0	1583	1765	1500	0	1687	1500
Flt Permitted	0.950			0.950			0.732				0.741	
Satd. Flow (perm)	2891	6065	0	1583	4798	0	1220	1765	1500	0	1308	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



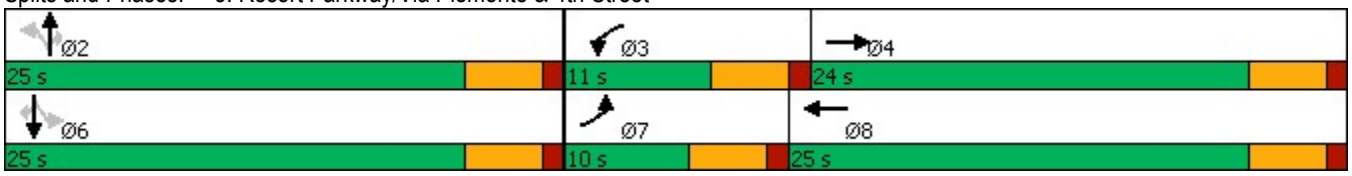
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	14	472	4	15	675	19	8	3	11	33	3	16
Future Volume (vph)	14	472	4	15	675	19	8	3	11	33	3	16
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	15	508	4	16	726	20	9	3	12	35	3	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	512	0	16	746	0	9	3	12	0	38	17

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	14	472	15	675	8	3	11	33	3	16
Future Volume (vph)	14	472	15	675	8	3	11	33	3	16
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.9	11.9	6.2	12.0	6.7	6.7	6.7		6.7	6.7
Actuated g/C Ratio	0.20	0.40	0.21	0.41	0.23	0.23	0.23		0.23	0.23
v/c Ratio	0.03	0.21	0.05	0.38	0.03	0.01	0.03		0.13	0.04
Control Delay	14.1	6.6	13.7	7.2	12.8	12.7	0.1		13.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	14.1	6.6	13.7	7.2	12.8	12.7	0.1		13.2	0.2
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		6.8		7.4		6.4			9.2	
Approach LOS		A		A		A			A	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 29.6	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 7.2	Intersection LOS: A
Intersection Capacity Utilization 33.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	15	512	16	746	9	3	12	38	17
v/c Ratio	0.03	0.21	0.05	0.38	0.03	0.01	0.03	0.13	0.04
Control Delay	14.1	6.6	13.7	7.2	12.8	12.7	0.1	13.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	6.6	13.7	7.2	12.8	12.7	0.1	13.2	0.2
Queue Length 50th (ft)	1	10	2	20	1	0	0	4	0
Queue Length 95th (ft)	8	39	16	71	11	6	0	28	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	571	4251	369	3537	898	1300	1133	963	1133
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.12	0.04	0.21	0.01	0.00	0.01	0.04	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	472	4	15	675	19	8	3	11	33	3	16
Future Volume (veh/h)	14	472	4	15	675	19	8	3	11	33	3	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	15	508	4	16	726	20	9	3	12	35	3	17
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	2108	17	33	1629	45	451	308	261	461	29	261
Arrive On Green	0.02	0.34	0.34	0.02	0.34	0.34	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	2910	6285	49	1594	4840	133	1315	1772	1502	1265	169	1502
Grp Volume(v), veh/h	15	369	143	16	483	263	9	3	12	38	0	17
Grp Sat Flow(s),veh/h/ln	1455	1524	1763	1594	1612	1748	1315	1772	1502	1434	0	1502
Q Serve(g_s), s	0.1	1.7	1.7	0.3	3.4	3.4	0.2	0.0	0.2	0.4	0.0	0.3
Cycle Q Clear(g_c), s	0.1	1.7	1.7	0.3	3.4	3.4	0.8	0.0	0.2	0.6	0.0	0.3
Prop In Lane	1.00		0.03	1.00		0.08	1.00		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	57	1534	591	33	1086	589	451	308	261	490	0	261
V/C Ratio(X)	0.26	0.24	0.24	0.48	0.45	0.45	0.02	0.01	0.05	0.08	0.00	0.07
Avail Cap(c_a), veh/h	557	3102	1196	360	2300	1247	1160	1264	1071	1257	0	1071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	6.9	6.9	13.9	7.4	7.4	10.4	9.8	9.9	10.0	0.0	9.9
Incr Delay (d2), s/veh	2.4	0.1	0.2	10.4	0.3	0.5	0.0	0.0	0.1	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	0.4	0.2	0.7	0.8	0.0	0.0	0.0	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	7.0	7.1	24.3	7.7	8.0	10.4	9.8	10.0	10.1	0.0	10.0
LnGrp LOS	B	A	A	C	A	A	B	A	A	B	A	B
Approach Vol, veh/h		527			762			24			55	
Approach Delay, s/veh		7.3			8.2			10.1			10.1	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.1	14.1		9.5	5.1	14.2				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		2.8	2.3	3.7		2.6	2.1	5.4				
Green Ext Time (p_c), s		0.0	0.0	3.0		0.2	0.0	4.3				

Intersection Summary	
HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.994					0.865
Flt Protected						
Satd. Flow (prot)	4789	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4789	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	508	20	0	668	0	3
Future Volume (vph)	508	20	0	668	0	3
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	552	22	0	726	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	574	0	0	726	0	3

Intersection Summary

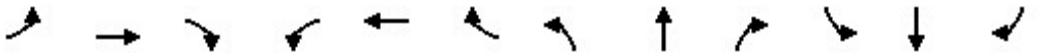
Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	508	20	0	668	0	3
Future Vol, veh/h	508	20	0	668	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	552	22	0	726	0	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	287
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	605
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	605
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

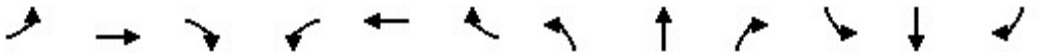
Approach	EB	WB	NB
HCM Control Delay, s	0	0	11
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	605	-	-	-
HCM Lane V/C Ratio	0.005	-	-	-
HCM Control Delay (s)	11	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5973	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5973	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			288			81		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



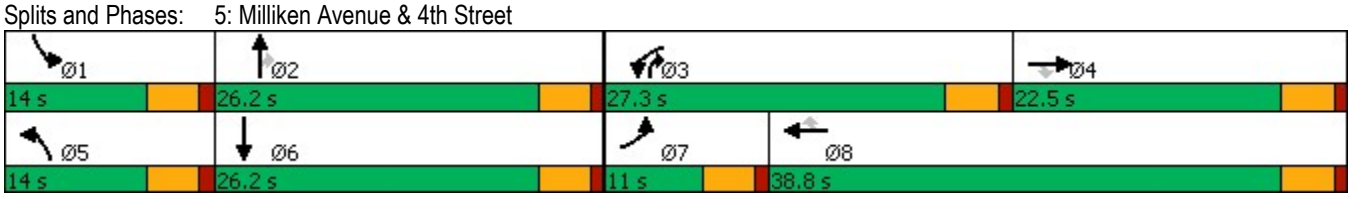
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	141	365	98	443	1132	377	191	897	140	190	785	91
Future Volume (vph)	141	365	98	443	1132	377	191	897	140	190	785	91
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	152	392	105	476	1217	405	205	965	151	204	844	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	392	105	476	1217	405	205	965	151	204	942	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	141	365	98	443	1132	377	191	897	140	190	785
Future Volume (vph)	141	365	98	443	1132	377	191	897	140	190	785
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	19.7	19.7	19.0	32.1	32.1	9.2	20.1	43.6	9.2	20.1
Actuated g/C Ratio	0.08	0.23	0.23	0.22	0.37	0.37	0.11	0.23	0.51	0.11	0.23
v/c Ratio	0.69	0.36	0.22	0.75	0.68	0.55	0.67	0.68	0.19	0.66	0.66
Control Delay	58.1	30.2	1.4	39.3	25.0	9.4	49.6	33.1	6.0	49.4	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	30.2	1.4	39.3	25.0	9.4	49.6	33.1	6.0	49.4	31.8
LOS	E	C	A	D	C	A	D	C	A	D	C
Approach Delay		32.0			25.2			32.6			34.9
Approach LOS		C			C			C			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 30.1	Intersection LOS: C
Intersection Capacity Utilization 63.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	152	392	105	476	1217	405	205	965	151	204	942
v/c Ratio	0.69	0.36	0.22	0.75	0.68	0.55	0.67	0.68	0.19	0.66	0.66
Control Delay	58.1	30.2	1.4	39.3	25.0	9.4	49.6	33.1	6.0	49.4	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	30.2	1.4	39.3	25.0	9.4	49.6	33.1	6.0	49.4	31.8
Queue Length 50th (ft)	44	68	0	130	205	44	58	144	19	58	135
Queue Length 95th (ft)	#90	101	4	177	255	126	#102	180	47	#102	171
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	219	1101	483	771	1933	774	321	1541	865	321	1538
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.36	0.22	0.62	0.63	0.52	0.64	0.63	0.17	0.64	0.61

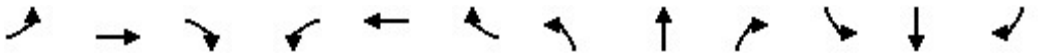
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	365	98	443	1132	377	191	897	140	190	785	91
Future Volume (veh/h)	141	365	98	443	1132	377	191	897	140	190	785	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	152	392	105	476	1217	405	205	965	151	204	844	98
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	216	1187	368	577	1787	555	277	1394	641	276	1276	146
Arrive On Green	0.07	0.25	0.25	0.20	0.37	0.37	0.10	0.23	0.23	0.09	0.23	0.23
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5589	640
Grp Volume(v), veh/h	152	392	105	476	1217	405	205	965	151	204	688	254
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1657
Q Serve(g_s), s	3.9	5.1	4.4	12.1	16.4	18.0	5.3	11.2	5.0	5.3	10.6	10.8
Cycle Q Clear(g_c), s	3.9	5.1	4.4	12.1	16.4	18.0	5.3	11.2	5.0	5.3	10.6	10.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	216	1187	368	577	1787	555	277	1394	641	276	1044	378
V/C Ratio(X)	0.70	0.33	0.28	0.82	0.68	0.73	0.74	0.69	0.24	0.74	0.66	0.67
Avail Cap(c_a), veh/h	245	1187	368	858	2146	666	358	1711	719	358	1283	465
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.0	24.0	23.7	29.7	20.5	21.0	34.1	27.3	14.1	34.1	27.1	27.2
Incr Delay (d2), s/veh	7.6	0.2	0.4	4.2	0.7	3.3	5.9	0.9	0.2	5.8	0.9	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	1.9	1.5	4.4	5.9	6.4	2.1	4.0	1.6	2.0	3.8	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.6	24.1	24.1	33.9	21.2	24.3	39.9	28.2	14.3	39.9	28.0	29.9
LnGrp LOS	D	C	C	C	C	C	D	C	B	D	C	C
Approach Vol, veh/h		649			2098			1321			1146	
Approach Delay, s/veh		28.4			24.7			28.5			30.5	
Approach LOS		C			C			C			C	

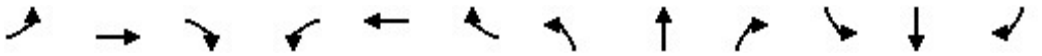
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	22.2	19.8	23.5	11.9	22.2	10.2	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	7.3	13.2	14.1	7.1	7.3	12.8	5.9	20.0
Green Ext Time (p_c), s	0.1	4.5	1.2	2.2	0.1	4.1	0.0	8.6

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.901	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2894	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2894	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		217	217
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



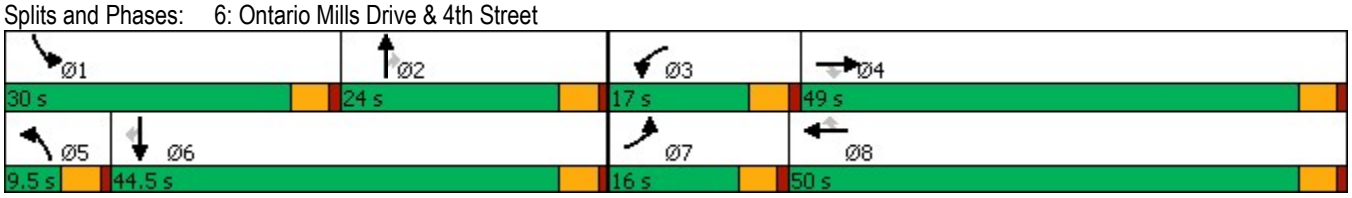
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	275	320	57	106	1243	126	69	68	75	141	214	832
Future Volume (vph)	275	320	57	106	1243	126	69	68	75	141	214	832
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	316	368	66	122	1429	145	79	78	86	162	246	956
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	316	368	66	122	1429	145	79	78	86	162	724	478

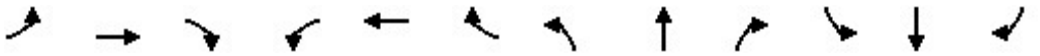
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	320	57	106	1243	126	69	68	75	141	214	832
Future Volume (vph)	275	320	57	106	1243	126	69	68	75	141	214	832
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.7	43.4	43.4	9.9	41.6	41.6	5.1	20.8	20.8	16.6	32.4	32.4
Actuated g/C Ratio	0.11	0.40	0.40	0.09	0.38	0.38	0.05	0.19	0.19	0.15	0.30	0.30
v/c Ratio	1.02	0.19	0.10	0.47	0.78	0.22	1.08	0.12	0.22	0.67	0.72	0.86
Control Delay	106.2	23.1	0.3	55.7	33.9	5.8	181.1	39.7	2.8	59.2	27.8	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	106.2	23.1	0.3	55.7	33.9	5.8	181.1	39.7	2.8	59.2	27.8	35.6
LOS	F	C	A	E	C	A	F	D	A	E	C	D
Approach Delay		56.1			33.0			72.6			34.2	
Approach LOS		E			C			E			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 109.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 40.1	Intersection LOS: D
Intersection Capacity Utilization 77.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



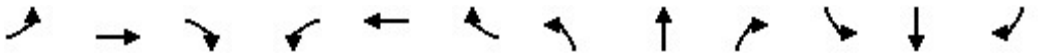


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	316	368	66	122	1429	145	79	78	86	162	724	478
v/c Ratio	1.02	0.19	0.10	0.47	0.78	0.22	1.08	0.12	0.22	0.67	0.72	0.86
Control Delay	106.2	23.1	0.3	55.7	33.9	5.8	181.1	39.7	2.8	59.2	27.8	35.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	106.2	23.1	0.3	55.7	33.9	5.8	181.1	39.7	2.8	59.2	27.8	35.6
Queue Length 50th (ft)	~142	65	0	46	342	4	~72	25	0	118	184	212
Queue Length 95th (ft)	#228	92	0	75	394	42	#169	48	8	178	241	349
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	310	2027	709	337	2048	716	73	684	414	377	1217	645
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.18	0.09	0.36	0.70	0.20	1.08	0.11	0.21	0.43	0.59	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



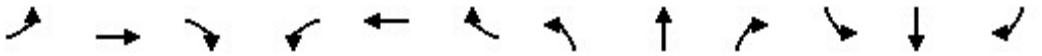
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	275	320	57	106	1243	126	69	68	75	141	214	832
Future Volume (veh/h)	275	320	57	106	1243	126	69	68	75	141	214	832
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	316	368	66	122	1429	145	79	78	86	162	246	956
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	293	1936	601	171	1734	538	70	890	397	190	602	1020
Arrive On Green	0.10	0.40	0.40	0.06	0.36	0.36	0.04	0.26	0.26	0.12	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	316	368	66	122	1429	145	79	78	86	162	246	956
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	11.5	5.6	3.2	4.7	30.8	7.8	5.0	2.0	5.1	11.4	12.2	35.2
Cycle Q Clear(g_c), s	11.5	5.6	3.2	4.7	30.8	7.8	5.0	2.0	5.1	11.4	12.2	35.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	293	1936	601	171	1734	538	70	890	397	190	602	1020
V/C Ratio(X)	1.08	0.19	0.11	0.71	0.82	0.27	1.13	0.09	0.22	0.85	0.41	0.94
Avail Cap(c_a), veh/h	293	1936	601	318	1925	598	70	890	397	355	620	1051
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.4	22.3	21.5	52.9	33.4	26.0	54.7	31.7	32.8	49.4	28.9	36.6
Incr Delay (d2), s/veh	75.4	0.0	0.1	5.4	2.8	0.3	148.7	0.0	0.3	10.2	0.4	14.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	2.2	1.1	1.8	12.3	2.8	4.9	0.8	1.9	5.1	5.2	14.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	126.8	22.3	21.6	58.3	36.2	26.3	203.3	31.7	33.1	59.6	29.4	51.3
LnGrp LOS	F	C	C	E	D	C	F	C	C	E	C	D
Approach Vol, veh/h		750			1696			243			1364	
Approach Delay, s/veh		66.3			36.9			88.0			48.4	
Approach LOS		E			D			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.1	34.7	11.2	50.3	9.5	43.3	16.0	45.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	13.4	7.1	6.7	7.6	7.0	37.2	13.5	32.8
Green Ext Time (p_c), s	0.3	0.5	0.2	2.9	0.0	1.6	0.0	8.2

Intersection Summary	
HCM 6th Ctrl Delay	49.3
HCM 6th LOS	D

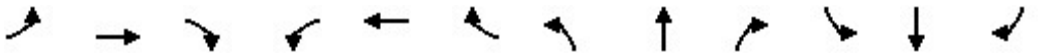
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.982			0.891				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (prot)	2891	4818	1500	1583	4731	0	1583	2987	0	1504	1619	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (perm)	2891	4818	1500	1583	4731	0	1583	2987	0	1504	1619	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		24			58				521
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



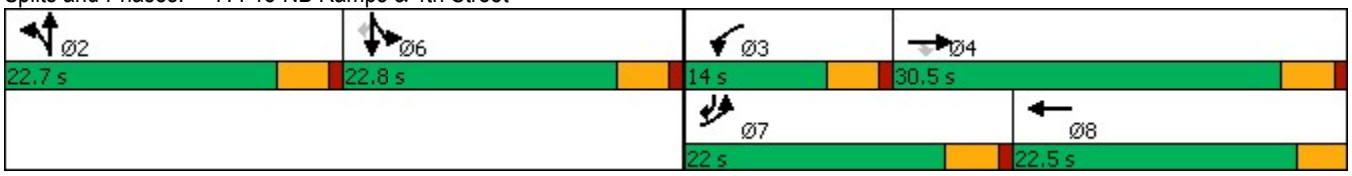
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	175	314	74	43	450	60	106	21	55	356	63	924
Future Volume (vph)	175	314	74	43	450	60	106	21	55	356	63	924
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	184	331	78	45	474	63	112	22	58	375	66	973
Shared Lane Traffic (%)										42%		
Lane Group Flow (vph)	184	331	78	45	537	0	112	80	0	217	224	973

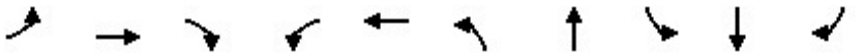
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	175	314	74	43	450	106	21	356	63	924
Future Volume (vph)	175	314	74	43	450	106	21	356	63	924
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	22.0	30.5	30.5	14.0	22.5	22.7	22.7	22.8	22.8	22.0
Total Split (%)	24.4%	33.9%	33.9%	15.6%	25.0%	25.2%	25.2%	25.3%	25.3%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	12.1	22.5	22.5	7.5	13.6	10.6	10.6	14.7	14.7	31.6
Actuated g/C Ratio	0.18	0.33	0.33	0.11	0.20	0.15	0.15	0.21	0.21	0.46
v/c Ratio	0.36	0.21	0.14	0.26	0.56	0.46	0.16	0.67	0.65	0.65
Control Delay	29.3	20.1	1.8	36.6	27.4	36.0	13.4	39.0	36.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	20.1	1.8	36.6	27.4	36.0	13.4	39.0	36.7	8.9
LOS	C	C	A	D	C	D	B	D	D	A
Approach Delay		20.5			28.2		26.6		17.9	
Approach LOS		C			C		C		B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 21.2	Intersection LOS: C
Intersection Capacity Utilization 62.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street

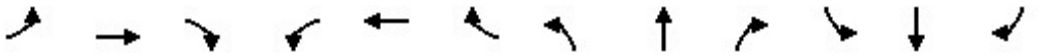




Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	184	331	78	45	537	112	80	217	224	973
v/c Ratio	0.36	0.21	0.14	0.26	0.56	0.46	0.16	0.67	0.65	0.65
Control Delay	29.3	20.1	1.8	36.6	27.4	36.0	13.4	39.0	36.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	20.1	1.8	36.6	27.4	36.0	13.4	39.0	36.7	8.9
Queue Length 50th (ft)	36	41	0	18	71	44	4	87	89	68
Queue Length 95th (ft)	75	74	11	56	127	105	24	#218	#208	169
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	767	1899	668	228	1380	436	866	417	449	1681
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.17	0.12	0.20	0.39	0.26	0.09	0.52	0.50	0.58

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	314	74	43	450	60	106	21	55	356	63	924
Future Volume (veh/h)	175	314	74	43	450	60	106	21	55	356	63	924
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	184	331	78	45	474	63	112	22	58	422	0	973
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	1126	350	70	779	102	176	186	166	984	0	1219
Arrive On Green	0.10	0.23	0.23	0.04	0.18	0.18	0.11	0.11	0.11	0.31	0.00	0.31
Sat Flow, veh/h	2910	4837	1502	1594	4329	566	1594	1683	1502	3188	0	3003
Grp Volume(v), veh/h	184	331	78	45	351	186	112	22	58	422	0	973
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1670	1594	1683	1502	1594	0	1502
Q Serve(g_s), s	3.6	3.3	2.5	1.6	5.9	6.1	4.0	0.7	2.1	6.2	0.0	16.9
Cycle Q Clear(g_c), s	3.6	3.3	2.5	1.6	5.9	6.1	4.0	0.7	2.1	6.2	0.0	16.9
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	283	1126	350	70	580	300	176	186	166	984	0	1219
V/C Ratio(X)	0.65	0.29	0.22	0.64	0.61	0.62	0.64	0.12	0.35	0.43	0.00	0.80
Avail Cap(c_a), veh/h	859	2123	659	256	1034	536	490	517	461	984	0	1219
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.8	18.7	18.4	27.9	22.4	22.4	25.2	23.8	24.4	16.3	0.0	15.5
Incr Delay (d2), s/veh	2.5	0.1	0.3	9.3	1.0	2.1	3.8	0.3	1.3	0.3	0.0	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	1.2	0.8	0.8	2.2	2.4	1.6	0.3	0.8	2.1	0.0	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.3	18.9	18.7	37.1	23.4	24.5	29.0	24.0	25.6	16.6	0.0	19.3
LnGrp LOS	C	B	B	D	C	C	C	C	C	B	A	B
Approach Vol, veh/h		593			582			192			1395	
Approach Delay, s/veh		21.8			24.8			27.4			18.5	
Approach LOS		C			C			C			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.0	7.1	18.3		22.8	10.3	15.2				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	17.5	* 19				
Max Q Clear Time (g_c+I1), s		6.0	3.6	5.3		18.9	5.6	8.1				
Green Ext Time (p_c), s		0.6	0.0	2.4		0.0	0.4	2.6				

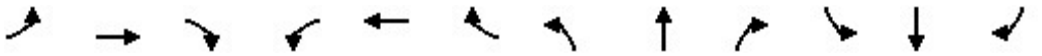
Intersection Summary	
HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

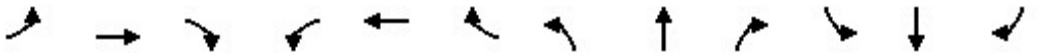
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



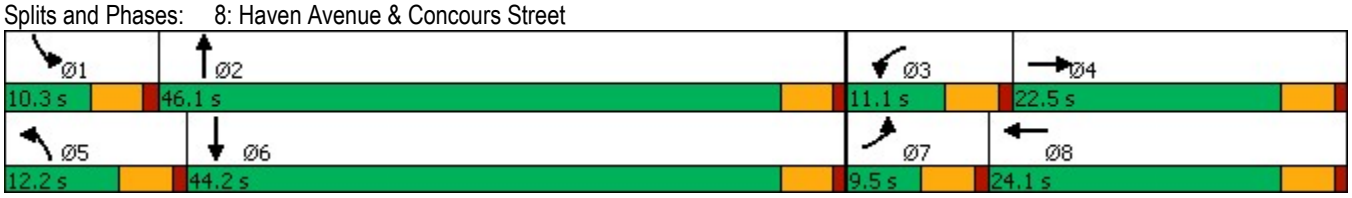
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	43	78	157	57	17	68	1737	131	93	1322	42
Future Volume (vph)	20	43	78	157	57	17	68	1737	131	93	1322	42
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	48	87	174	63	19	76	1930	146	103	1469	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	135	0	174	63	19	76	1930	146	103	1469	47

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	20	43	157	57	17	68	1737	131	93	1322	42
Future Volume (vph)	20	43	157	57	17	68	1737	131	93	1322	42
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	6.9	6.7	14.7	75.0	7.0	39.8	75.0	5.9	38.7	75.0
Actuated g/C Ratio	0.07	0.09	0.09	0.20	1.00	0.09	0.53	1.00	0.08	0.52	1.00
v/c Ratio	0.11	0.38	0.50	0.10	0.01	0.28	0.60	0.10	0.45	0.47	0.03
Control Delay	37.0	17.8	39.8	29.7	0.0	36.6	13.5	0.1	42.4	12.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	17.8	39.8	29.7	0.0	36.6	13.5	0.1	42.4	12.8	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.5		34.3			13.4			14.4	
Approach LOS		C		C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 75	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 54.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	22	135	174	63	19	76	1930	146	103	1469	47
v/c Ratio	0.11	0.38	0.50	0.10	0.01	0.28	0.60	0.10	0.45	0.47	0.03
Control Delay	37.0	17.8	39.8	29.7	0.0	36.6	13.5	0.1	42.4	12.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	17.8	39.8	29.7	0.0	36.6	13.5	0.1	42.4	12.8	0.0
Queue Length 50th (ft)	5	11	29	12	0	18	177	0	25	127	0
Queue Length 95th (ft)	17	37	52	33	0	39	229	0	51	169	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	195	803	352	889	1500	301	3419	1500	227	3267	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.17	0.49	0.07	0.01	0.25	0.56	0.10	0.45	0.45	0.03

Intersection Summary

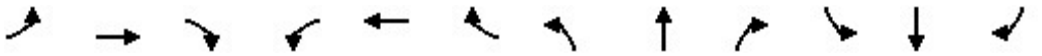
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	43	78	157	57	17	68	1737	131	93	1322	42
Future Volume (veh/h)	20	43	78	157	57	17	68	1737	131	93	1322	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	22	48	87	174	63	0	76	1930	0	103	1469	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	73	154	138	284	465		164	3078		185	3121	
Arrive On Green	0.03	0.09	0.09	0.07	0.14	0.00	0.06	0.50	0.00	0.06	0.51	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	22	48	87	174	63	0	76	1930	0	103	1469	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.5	1.8	3.7	2.9	1.1	0.0	1.7	15.4	0.0	2.3	10.4	0.0
Cycle Q Clear(g_c), s	0.5	1.8	3.7	2.9	1.1	0.0	1.7	15.4	0.0	2.3	10.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	73	154	138	284	465		164	3078		185	3121	
V/C Ratio(X)	0.30	0.31	0.63	0.61	0.14		0.46	0.63		0.56	0.47	
Avail Cap(c_a), veh/h	217	451	403	390	983		334	3778		251	3606	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.1	28.5	29.4	30.3	25.4	0.0	30.7	12.0	0.0	30.5	10.5	0.0
Incr Delay (d2), s/veh	2.3	1.1	4.7	2.1	0.1	0.0	2.0	0.2	0.0	2.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.7	1.5	0.9	0.4	0.0	0.6	4.5	0.0	0.8	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.4	29.6	34.1	32.4	25.5	0.0	32.7	12.3	0.0	33.1	10.6	0.0
LnGrp LOS	C	C	C	C	C		C	B		C	B	
Approach Vol, veh/h		157			237	A		2006	A		1572	A
Approach Delay, s/veh		32.8			30.6			13.0			12.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	38.4	9.3	10.7	8.3	38.9	6.2	13.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	4.3	17.4	4.9	5.7	3.7	12.4	2.5	3.1
Green Ext Time (p_c), s	0.0	16.5	0.1	0.5	0.1	13.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

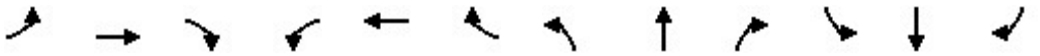
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.850			0.973			0.994			0.989	
Flt Protected					0.971		0.950			0.950		
Satd. Flow (prot)	1676	1425	0	0	1667	0	1676	4789	0	1676	4765	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	1676	1425	0	0	1717	0	1676	4789	0	1676	4765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		576			1			7			16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



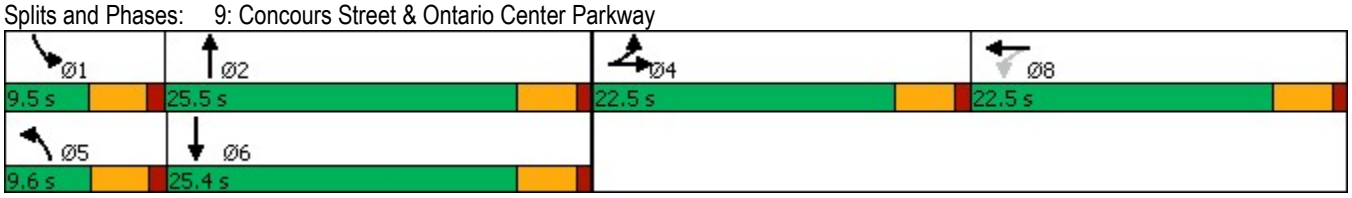
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	0	3	3	1	1	37	476	20	1	656	54
Future Volume (vph)	0	0	3	3	1	1	37	476	20	1	656	54
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	3	3	1	1	41	529	22	1	729	60
Shared Lane Traffic (%)	0%											
Lane Group Flow (vph)	0	3	0	0	5	0	41	551	0	1	789	0

Intersection Summary

Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	3	1	37	476	1	656
Future Volume (vph)	0	3	1	37	476	1	656
Turn Type	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4		8	5	2	1	6
Permitted Phases		8					
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.0		6.1	5.5	32.6	5.4	30.1
Actuated g/C Ratio	0.16		0.16	0.15	0.88	0.15	0.81
v/c Ratio	0.00		0.02	0.16	0.13	0.00	0.20
Control Delay	0.0		18.5	20.9	3.7	21.0	4.5
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	0.0		18.5	20.9	3.7	21.0	4.5
LOS	A		B	C	A	C	A
Approach Delay			18.5		4.9		4.5
Approach LOS			B		A		A

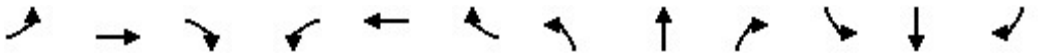
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 37.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.20	
Intersection Signal Delay: 4.7	Intersection LOS: A
Intersection Capacity Utilization 34.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	3	5	41	551	1	789
v/c Ratio	0.00	0.02	0.16	0.13	0.00	0.20
Control Delay	0.0	18.5	20.9	3.7	21.0	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	18.5	20.9	3.7	21.0	4.5
Queue Length 50th (ft)	0	1	6	0	0	0
Queue Length 95th (ft)	0	10	39	66	4	95
Internal Link Dist (ft)	319	68		111		176
Turn Bay Length (ft)			115		120	
Base Capacity (vph)	1022	903	249	4213	244	3867
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.01	0.16	0.13	0.00	0.20

Intersection Summary



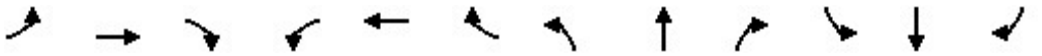
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	3	3	1	1	37	476	20	1	656	54
Future Volume (veh/h)	0	0	3	3	1	1	37	476	20	1	656	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	0	0	3	3	1	1	41	529	22	1	729	60
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	0	6	7	2	2	81	1864	77	6	1570	128
Arrive On Green	0.00	0.00	0.00	0.01	0.01	0.01	0.05	0.39	0.39	0.00	0.34	0.34
Sat Flow, veh/h	1688	0	1502	997	332	332	1688	4764	197	1688	4557	373
Grp Volume(v), veh/h	0	0	3	5	0	0	41	357	194	1	515	274
Grp Sat Flow(s),veh/h/ln	1688	0	1502	1662	0	0	1688	1612	1736	1688	1612	1705
Q Serve(g_s), s	0.0	0.0	0.1	0.1	0.0	0.0	0.7	2.3	2.3	0.0	3.8	3.8
Cycle Q Clear(g_c), s	0.0	0.0	0.1	0.1	0.0	0.0	0.7	2.3	2.3	0.0	3.8	3.8
Prop In Lane	1.00		1.00	0.60		0.20	1.00		0.11	1.00		0.22
Lane Grp Cap(c), veh/h	7	0	6	11	0	0	81	1262	679	6	1111	587
V/C Ratio(X)	0.00	0.00	0.49	0.44	0.00	0.00	0.50	0.28	0.29	0.18	0.46	0.47
Avail Cap(c_a), veh/h	1007	0	896	991	0	0	285	2244	1208	280	2233	1181
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	15.0	14.9	0.0	0.0	14.0	6.3	6.3	15.0	7.7	7.7
Incr Delay (d2), s/veh	0.0	0.0	49.0	24.8	0.0	0.0	4.8	0.1	0.2	14.6	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.5	0.5	0.0	0.8	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	64.0	39.8	0.0	0.0	18.8	6.4	6.5	29.6	8.0	8.3
LnGrp LOS	A	A	E	D	A	A	B	A	A	C	A	A
Approach Vol, veh/h		3			5			592			790	
Approach Delay, s/veh		64.0			39.8			7.3			8.1	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	16.3		4.6	6.0	14.9		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	4.3		2.1	2.7	5.8		2.1				
Green Ext Time (p_c), s	0.0	3.2		0.0	0.0	4.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		8.0
HCM 6th LOS		A

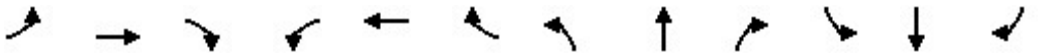
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			263
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



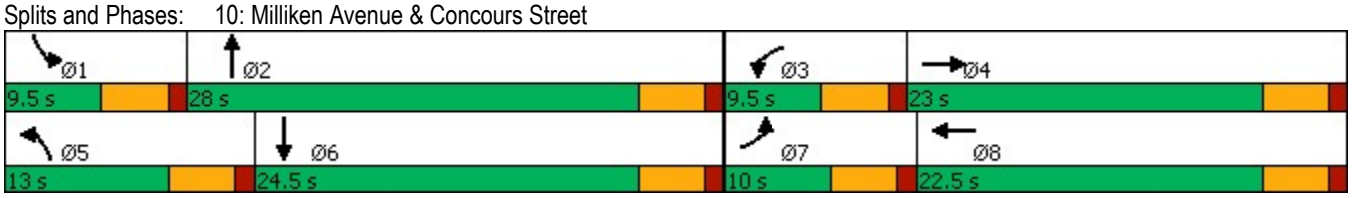
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	67	23	49	47	75	38	149	902	57	51	864	226
Future Volume (vph)	67	23	49	47	75	38	149	902	57	51	864	226
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	78	27	57	55	87	44	173	1049	66	59	1005	263
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	27	57	55	87	44	173	1049	66	59	1005	263

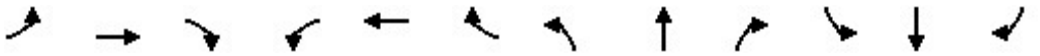
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	23	49	47	75	38	149	902	57	51	864	226
Future Volume (vph)	67	23	49	47	75	38	149	902	57	51	864	226
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.9	9.1	50.0	5.4	7.2	50.0	8.2	28.1	50.0	5.4	23.5	50.0
Actuated g/C Ratio	0.12	0.18	1.00	0.11	0.14	1.00	0.16	0.56	1.00	0.11	0.47	1.00
v/c Ratio	0.23	0.04	0.04	0.18	0.18	0.03	0.36	0.31	0.04	0.19	0.35	0.18
Control Delay	26.3	21.2	0.0	26.5	23.5	0.0	24.6	10.4	0.1	26.6	13.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	21.2	0.0	26.5	23.5	0.0	24.6	10.4	0.1	26.6	13.6	0.3
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		16.2			18.8			11.8			11.6	
Approach LOS		B			B			B			B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 50	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 38.4%	ICU Level of Service A
Analysis Period (min) 15	

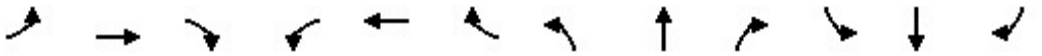
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	78	27	57	55	87	44	173	1049	66	59	1005	263
v/c Ratio	0.23	0.04	0.04	0.18	0.18	0.03	0.36	0.31	0.04	0.19	0.35	0.18
Control Delay	26.3	21.2	0.0	26.5	23.5	0.0	24.6	10.4	0.1	26.6	13.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	21.2	0.0	26.5	23.5	0.0	24.6	10.4	0.1	26.6	13.6	0.3
Queue Length 50th (ft)	13	3	0	9	14	0	28	75	0	10	79	0
Queue Length 95th (ft)	30	13	0	23	31	0	53	99	0	25	104	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	343	1340	1500	312	1304	1500	530	3442	1500	312	3012	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.02	0.04	0.18	0.07	0.03	0.33	0.30	0.04	0.19	0.33	0.18

Intersection Summary



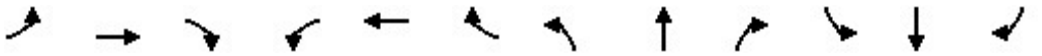
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	23	49	47	75	38	149	902	57	51	864	226
Future Volume (veh/h)	67	23	49	47	75	38	149	902	57	51	864	226
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	78	27	0	55	87	0	173	1049	0	59	1005	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	205	387		163	339		295	2151		171	1891	
Arrive On Green	0.07	0.12	0.00	0.06	0.10	0.00	0.10	0.35	0.00	0.06	0.31	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	78	27	0	55	87	0	173	1049	0	59	1005	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.1	0.3	0.0	0.8	1.0	0.0	2.4	5.8	0.0	0.8	5.9	0.0
Cycle Q Clear(g_c), s	1.1	0.3	0.0	0.8	1.0	0.0	2.4	5.8	0.0	0.8	5.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	205	387		163	339		295	2151		171	1891	
V/C Ratio(X)	0.38	0.07		0.34	0.26		0.59	0.49		0.35	0.53	
Avail Cap(c_a), veh/h	371	1444		337	1405		574	3322		337	2827	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.1	17.0	0.0	19.6	17.9	0.0	18.5	10.9	0.0	19.5	12.3	0.0
Incr Delay (d2), s/veh	1.2	0.1	0.0	1.2	0.4	0.0	1.9	0.2	0.0	1.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.1	0.0	0.3	0.4	0.0	0.8	1.6	0.0	0.3	1.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	17.1	0.0	20.8	18.3	0.0	20.4	11.1	0.0	20.7	12.5	0.0
LnGrp LOS	C	B		C	B		C	B		C	B	
Approach Vol, veh/h		105	A		142	A		1222	A		1064	A
Approach Delay, s/veh		19.5			19.3			12.4			13.0	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	19.7	6.9	9.5	8.9	17.9	7.5	8.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	2.8	7.8	2.8	2.3	4.4	7.9	3.1	3.0
Green Ext Time (p_c), s	0.0	6.7	0.0	0.1	0.2	5.5	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

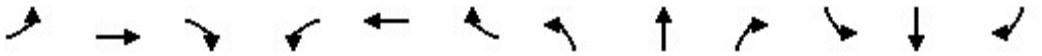
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			437			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



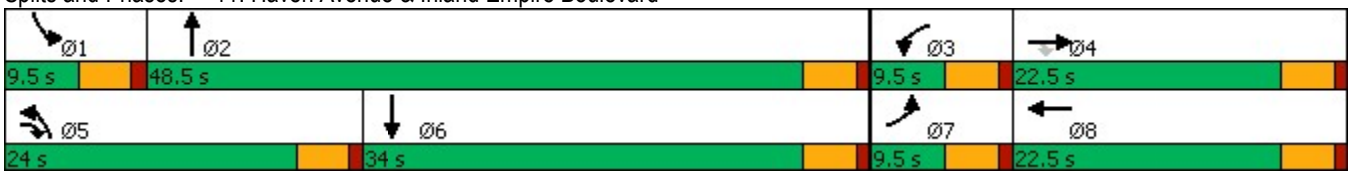
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	51	94	230	113	99	20	442	1999	622	50	1301	72
Future Volume (vph)	51	94	230	113	99	20	442	1999	622	50	1301	72
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	55	101	247	122	106	22	475	2149	669	54	1399	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	101	247	122	106	22	475	2149	669	54	1399	77

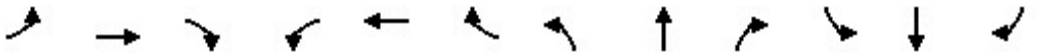
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	94	230	113	99	20	442	1999	622	50	1301	72
Future Volume (vph)	51	94	230	113	99	20	442	1999	622	50	1301	72
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.4	8.1	26.6	5.4	10.0	71.0	17.3	46.6	71.0	5.4	27.8	71.0
Actuated g/C Ratio	0.08	0.11	0.37	0.08	0.14	1.00	0.24	0.66	1.00	0.08	0.39	1.00
v/c Ratio	0.25	0.26	0.41	0.41	0.23	0.01	0.67	0.54	0.45	0.25	0.59	0.05
Control Delay	39.1	34.7	14.0	40.7	33.1	0.0	32.0	10.9	1.0	39.0	20.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	34.7	14.0	40.7	33.1	0.0	32.0	10.9	1.0	39.0	20.1	0.1
LOS	D	C	B	D	C	A	C	B	A	D	C	A
Approach Delay		22.6			33.9			11.9			19.8	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 15.9	Intersection LOS: B
Intersection Capacity Utilization 55.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	55	101	247	122	106	22	475	2149	669	54	1399	77
v/c Ratio	0.25	0.26	0.41	0.41	0.23	0.01	0.67	0.54	0.45	0.25	0.59	0.05
Control Delay	39.1	34.7	14.0	40.7	33.1	0.0	32.0	10.9	1.0	39.0	20.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	34.7	14.0	40.7	33.1	0.0	32.0	10.9	1.0	39.0	20.1	0.1
Queue Length 50th (ft)	13	25	58	21	26	0	111	200	0	13	161	0
Queue Length 95th (ft)	32	48	114	40	50	0	166	254	0	31	207	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	220	918	682	300	918	1500	858	3986	1500	220	2733	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.11	0.36	0.41	0.12	0.01	0.55	0.54	0.45	0.25	0.51	0.05

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	94	230	113	99	20	442	1999	622	50	1301	72
Future Volume (veh/h)	51	94	230	113	99	20	442	1999	622	50	1301	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	55	101	247	122	106	0	475	2149	0	54	1399	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	130	546	535	236	596		565	3071		129	2157	
Arrive On Green	0.04	0.16	0.16	0.06	0.18	0.00	0.19	0.50	0.00	0.04	0.35	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	55	101	247	122	106	0	475	2149	0	54	1399	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.4	2.0	9.9	2.3	2.1	0.0	12.3	21.1	0.0	1.4	15.0	0.0
Cycle Q Clear(g_c), s	1.4	2.0	9.9	2.3	2.1	0.0	12.3	21.1	0.0	1.4	15.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	130	546	535	236	596		565	3071		129	2157	
V/C Ratio(X)	0.42	0.18	0.46	0.52	0.18		0.84	0.70		0.42	0.65	
Avail Cap(c_a), veh/h	186	776	637	254	776		726	3433		186	2302	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.3	28.3	19.4	35.7	27.3	0.0	30.3	14.9	0.0	36.4	21.2	0.0
Incr Delay (d2), s/veh	2.2	0.2	0.6	1.8	0.1	0.0	7.0	0.6	0.0	2.2	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.8	3.4	0.8	0.8	0.0	4.7	6.7	0.0	0.5	5.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.5	28.4	20.0	37.4	27.5	0.0	37.4	15.4	0.0	38.5	21.8	0.0
LnGrp LOS	D	C	B	D	C		D	B		D	C	
Approach Vol, veh/h		403			228	A		2624	A		1453	A
Approach Delay, s/veh		24.6			32.8			19.4			22.4	
Approach LOS		C			C			B			C	

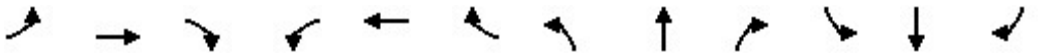
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	43.9	9.1	17.2	19.7	32.1	8.0	18.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.4	23.1	4.3	11.9	14.3	17.0	3.4	4.1
Green Ext Time (p_c), s	0.0	16.2	0.0	0.8	0.9	7.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	21.4
HCM 6th LOS	C

Notes

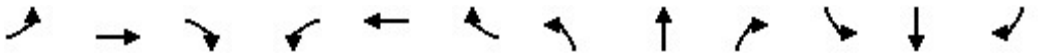
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



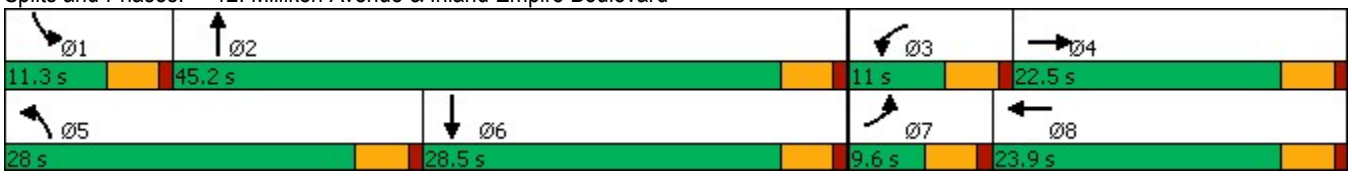
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	61	32	50	95	75	19	390	1009	106	31	792	125
Future Volume (vph)	61	32	50	95	75	19	390	1009	106	31	792	125
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	71	37	58	110	87	22	453	1173	123	36	921	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	37	58	110	87	22	453	1173	123	36	921	145

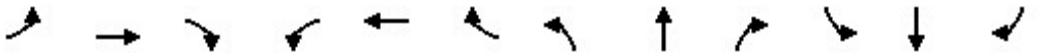
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	32	50	95	75	19	390	1009	106	31	792	125
Future Volume (vph)	61	32	50	95	75	19	390	1009	106	31	792	125
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	7.0	60.1	11.0	7.9	60.1	15.7	37.7	60.1	6.9	18.6	60.1
Actuated g/C Ratio	0.10	0.12	1.00	0.18	0.13	1.00	0.26	0.63	1.00	0.11	0.31	1.00
v/c Ratio	0.25	0.09	0.04	0.21	0.20	0.01	0.60	0.31	0.08	0.11	0.49	0.10
Control Delay	34.1	30.5	0.0	28.9	29.9	0.0	25.6	8.9	0.1	31.2	19.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	30.5	0.0	28.9	29.9	0.0	25.6	8.9	0.1	31.2	19.7	0.1
LOS	C	C	A	C	C	A	C	A	A	C	B	A
Approach Delay		21.4			26.4			12.6			17.5	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 60.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 46.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	37	58	110	87	22	453	1173	123	36	921	145
v/c Ratio	0.25	0.09	0.04	0.21	0.20	0.01	0.60	0.31	0.08	0.11	0.49	0.10
Control Delay	34.1	30.5	0.0	28.9	29.9	0.0	25.6	8.9	0.1	31.2	19.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.1	30.5	0.0	28.9	29.9	0.0	25.6	8.9	0.1	31.2	19.7	0.1
Queue Length 50th (ft)	13	7	0	17	16	0	82	58	0	6	87	0
Queue Length 95th (ft)	35	21	0	48	39	0	134	114	0	21	127	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	280	1149	1500	544	1238	1500	1293	4147	1500	374	2774	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.03	0.04	0.20	0.07	0.01	0.35	0.28	0.08	0.10	0.33	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	32	50	95	75	19	390	1009	106	31	792	125
Future Volume (veh/h)	61	32	50	95	75	19	390	1009	106	31	792	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	71	37	0	110	87	0	453	1173	0	36	921	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	179	304		222	353		614	2739		113	1691	
Arrive On Green	0.06	0.09	0.00	0.08	0.10	0.00	0.21	0.45	0.00	0.04	0.28	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	71	37	0	110	87	0	453	1173	0	36	921	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.2	0.5	0.0	1.9	1.2	0.0	7.6	6.8	0.0	0.6	6.7	0.0
Cycle Q Clear(g_c), s	1.2	0.5	0.0	1.9	1.2	0.0	7.6	6.8	0.0	0.6	6.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	179	304		222	353		614	2739		113	1691	
V/C Ratio(X)	0.40	0.12		0.49	0.25		0.74	0.43		0.32	0.54	
Avail Cap(c_a), veh/h	285	1162		363	1252		1311	4756		379	2805	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.5	21.8	0.0	23.1	21.4	0.0	19.2	9.8	0.0	24.4	16.0	0.0
Incr Delay (d2), s/veh	1.4	0.2	0.0	1.7	0.4	0.0	1.8	0.1	0.0	1.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.2	0.0	0.7	0.5	0.0	2.4	1.9	0.0	0.2	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	22.0	0.0	24.8	21.8	0.0	21.0	9.9	0.0	26.0	16.3	0.0
LnGrp LOS	C	C		C	C		C	A		C	B	
Approach Vol, veh/h		108	A		197	A		1626	A		957	A
Approach Delay, s/veh		23.9			23.5			13.0			16.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.5	27.9	8.5	9.2	15.5	19.0	7.7	10.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	2.6	8.8	3.9	2.5	9.6	8.7	3.2	3.2
Green Ext Time (p_c), s	0.0	10.4	0.1	0.1	1.4	5.8	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	15.3
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.943	0.850				
Flt Protected	0.970					
Satd. Flow (prot)	2958	1365	6071	0	0	6071
Flt Permitted	0.970					
Satd. Flow (perm)	2958	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	2	2				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

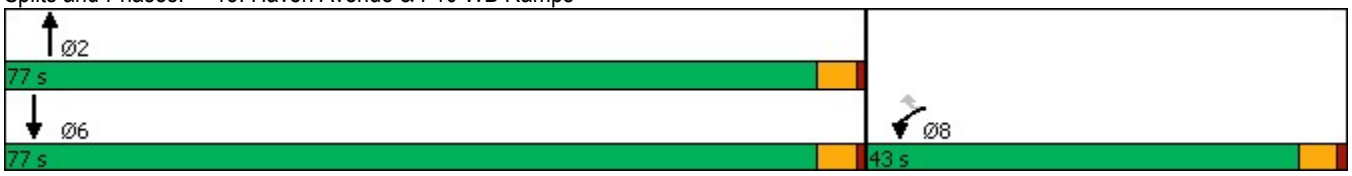
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	477	653	2503	0	0	1478
Future Volume (vph)	477	653	2503	0	0	1478
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	524	718	2751	0	0	1624
Shared Lane Traffic (%)		45%				
Lane Group Flow (vph)	847	395	2751	0	0	1624

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	477	653	2503	1478
Future Volume (vph)	477	653	2503	1478
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	37.0	37.0	72.5	72.5
Actuated g/C Ratio	0.31	0.31	0.61	0.61
v/c Ratio	0.92	0.93	0.74	0.44
Control Delay	54.8	68.3	18.1	12.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	54.8	68.3	18.1	12.8
LOS	D	E	B	B
Approach Delay	59.1		18.1	12.8
Approach LOS	E		B	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 25.6	Intersection LOS: C
Intersection Capacity Utilization 76.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	847	395	2751	1624
v/c Ratio	0.92	0.93	0.74	0.44
Control Delay	54.8	68.3	18.1	12.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	54.8	68.3	18.1	12.8
Queue Length 50th (ft)	320	318	421	185
Queue Length 95th (ft)	#434	#527	465	212
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	962	445	3715	3715
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.88	0.89	0.74	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

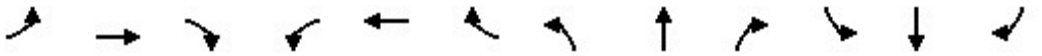
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	477	653	2503	0	0	1478
Future Volume (veh/h)	477	653	2503	0	0	1478
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	414	836	2751	0	0	1624
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	496	934	3708	0	0	3708
Arrive On Green	0.31	0.31	0.61	0.00	0.00	0.61
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	414	836	2751	0	0	1624
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	27.0	29.7	36.0	0.0	0.0	15.9
Cycle Q Clear(g_c), s	27.0	29.7	36.0	0.0	0.0	15.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	496	934	3708	0	0	3708
V/C Ratio(X)	0.83	0.89	0.74	0.00	0.00	0.44
Avail Cap(c_a), veh/h	549	1035	3957	0	0	3957
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	35.8	36.7	15.6	0.0	0.0	11.7
Incr Delay (d2), s/veh	9.9	9.5	0.7	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	11.9	11.8	0.0	0.0	5.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	45.7	46.2	16.3	0.0	0.0	11.8
LnGrp LOS	D	D	B	A	A	B
Approach Vol, veh/h	1250		2751			1624
Approach Delay, s/veh	46.1		16.3			11.8
Approach LOS	D		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		72.4			72.4	39.2
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s		38.0			17.9	31.7
Green Ext Time (p_c), s		29.9			19.7	3.1

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

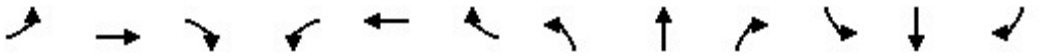
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			256			182			325			249
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



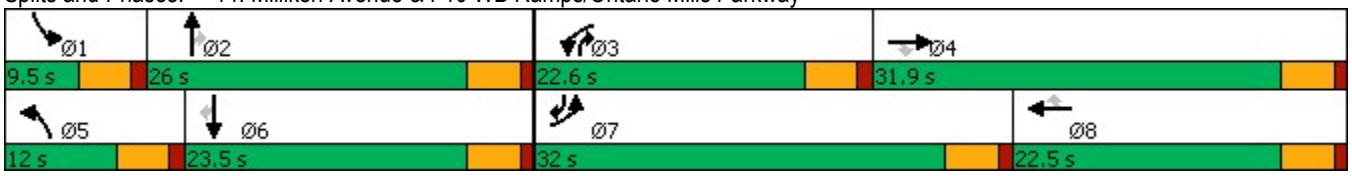
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	564	86	228	156	178	33	148	859	289	80	525	243
Future Volume (vph)	564	86	228	156	178	33	148	859	289	80	525	243
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	634	97	256	175	200	37	166	965	325	90	590	273
Shared Lane Traffic (%)												
Lane Group Flow (vph)	634	97	256	175	200	37	166	965	325	90	590	273

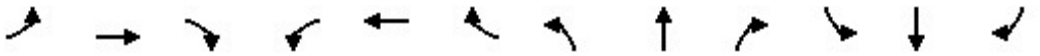
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	564	86	228	156	178	33	148	859	289	80	525	243
Future Volume (vph)	564	86	228	156	178	33	148	859	289	80	525	243
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	21.6	21.4	21.4	10.1	10.0	10.0	7.5	20.9	35.7	5.1	15.9	42.1
Actuated g/C Ratio	0.29	0.29	0.29	0.14	0.14	0.14	0.10	0.28	0.49	0.07	0.22	0.57
v/c Ratio	0.75	0.19	0.41	0.44	0.44	0.10	0.56	0.56	0.36	0.45	0.45	0.28
Control Delay	30.1	21.8	5.4	34.5	34.3	0.6	42.8	25.6	2.9	44.1	26.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	21.8	5.4	34.5	34.3	0.6	42.8	25.6	2.9	44.1	26.8	2.2
LOS	C	C	A	C	C	A	D	C	A	D	C	A
Approach Delay		22.9			31.4			22.5			21.4	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 23.3	Intersection LOS: C
Intersection Capacity Utilization 56.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

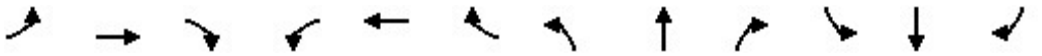




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	634	97	256	175	200	37	166	965	325	90	590	273
v/c Ratio	0.75	0.19	0.41	0.44	0.44	0.10	0.56	0.56	0.36	0.45	0.45	0.28
Control Delay	30.1	21.8	5.4	34.5	34.3	0.6	42.8	25.6	2.9	44.1	26.8	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	21.8	5.4	34.5	34.3	0.6	42.8	25.6	2.9	44.1	26.8	2.2
Queue Length 50th (ft)	139	34	0	40	46	0	39	114	0	21	68	4
Queue Length 95th (ft)	206	74	50	72	83	0	#83	165	40	#47	105	33
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1110	675	732	730	843	513	302	1823	1030	202	1611	1079
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.14	0.35	0.24	0.24	0.07	0.55	0.53	0.32	0.45	0.37	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	564	86	228	156	178	33	148	859	289	80	525	243
Future Volume (veh/h)	564	86	228	156	178	33	148	859	289	80	525	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	634	97	256	175	200	37	166	965	325	90	590	273
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	779	496	420	268	350	156	244	1715	561	183	1587	793
Arrive On Green	0.27	0.28	0.28	0.09	0.10	0.10	0.08	0.28	0.28	0.06	0.26	0.26
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	634	97	256	175	200	37	166	965	325	90	590	273
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	12.9	2.6	9.4	3.7	3.6	1.4	3.5	8.6	11.0	1.9	5.0	6.6
Cycle Q Clear(g_c), s	12.9	2.6	9.4	3.7	3.6	1.4	3.5	8.6	11.0	1.9	5.0	6.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	779	496	420	268	350	156	244	1715	561	183	1587	793
V/C Ratio(X)	0.81	0.20	0.61	0.65	0.57	0.24	0.68	0.56	0.58	0.49	0.37	0.34
Avail Cap(c_a), veh/h	1263	766	649	831	957	427	345	2069	648	230	1828	852
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.7	17.4	19.8	27.8	27.0	26.1	28.2	19.4	15.9	28.7	19.2	8.6
Incr Delay (d2), s/veh	2.2	0.2	1.4	2.7	1.5	0.8	3.3	0.3	1.0	2.1	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	1.0	3.2	1.3	1.4	0.5	1.3	2.8	3.5	0.7	1.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	17.6	21.2	30.5	28.5	26.8	31.5	19.7	16.8	30.8	19.3	8.9
LnGrp LOS	C	B	C	C	C	C	C	B	B	C	B	A
Approach Vol, veh/h		987			412			1456			953	
Approach Delay, s/veh		22.6			29.2			20.4			17.4	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	22.3	10.3	22.2	9.8	21.0	21.5	11.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	3.9	13.0	5.7	11.4	5.5	8.6	14.9	5.6
Green Ext Time (p_c), s	0.0	4.9	0.4	1.3	0.1	3.7	2.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	4	4				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

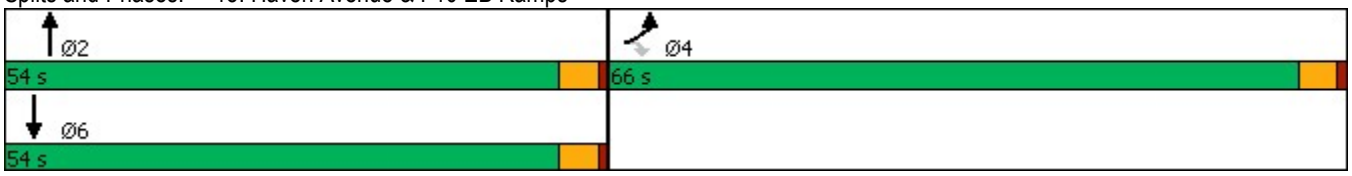
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1190	560	0	1629	1467	0
Future Volume (vph)	1190	560	0	1629	1467	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1337	629	0	1830	1648	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1400	566	0	1830	1648	0

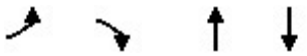
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1190	560	1629	1467
Future Volume (vph)	1190	560	1629	1467
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	56.8	56.8	47.3	47.3
Actuated g/C Ratio	0.50	0.50	0.42	0.42
v/c Ratio	0.91	0.82	0.72	0.65
Control Delay	35.9	35.9	30.0	28.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.9	35.9	30.0	28.3
LOS	D	D	C	C
Approach Delay	35.9		30.0	28.3
Approach LOS	D		C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 31.6	Intersection LOS: C
Intersection Capacity Utilization 76.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1400	566	1830	1648
v/c Ratio	0.91	0.82	0.72	0.65
Control Delay	35.9	35.9	30.0	28.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.9	35.9	30.0	28.3
Queue Length 50th (ft)	483	384	341	294
Queue Length 95th (ft)	585	561	379	331
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1687	753	2689	2689
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.83	0.75	0.68	0.61

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1190	560	0	1629	1467	0
Future Volume (veh/h)	1190	560	0	1629	1467	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1337	629	0	1830	1648	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1555	733	0	2566	2566	0
Arrive On Green	0.49	0.49	0.00	0.42	0.42	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1337	629	0	1830	1648	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	36.6	36.5	0.0	24.5	21.2	0.0
Cycle Q Clear(g_c), s	36.6	36.5	0.0	24.5	21.2	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1555	733	0	2566	2566	0
V/C Ratio(X)	0.86	0.86	0.00	0.71	0.64	0.00
Avail Cap(c_a), veh/h	1984	934	0	3053	3053	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.3	22.3	0.0	23.7	22.7	0.0
Incr Delay (d2), s/veh	3.3	6.6	0.0	0.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.6	13.4	0.0	8.6	7.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.6	28.9	0.0	24.3	23.1	0.0
LnGrp LOS	C	C	A	C	C	A
Approach Vol, veh/h	1966			1830	1648	
Approach Delay, s/veh	26.7			24.3	23.1	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		46.1		52.7		46.1
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		26.5		38.6		23.2
Green Ext Time (p_c), s		15.1		9.7		14.6

Intersection Summary		
HCM 6th Ctrl Delay		24.8
HCM 6th LOS		C

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		6				254
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	629	564	153	671	699	221
Future Volume (vph)	629	564	153	671	699	221
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	723	648	176	771	803	254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	723	648	176	771	803	254

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	629	564	153	671	699	221
Future Volume (vph)	629	564	153	671	699	221
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	28.0	28.0	52.0	24.0	38.0
Total Split (%)	42.2%	31.1%	31.1%	57.8%	26.7%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	22.2	38.2	11.3	32.1	16.1	43.0
Actuated g/C Ratio	0.35	0.60	0.18	0.50	0.25	0.67
v/c Ratio	0.72	0.72	0.34	0.25	0.53	0.23
Control Delay	23.3	14.3	27.0	9.7	23.4	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	14.3	27.0	9.7	23.4	1.3
LOS	C	B	C	A	C	A
Approach Delay	19.1			12.9	18.1	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

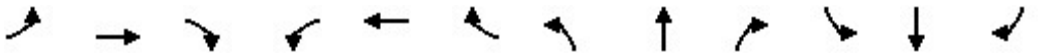
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	723	648	176	771	803	254
v/c Ratio	0.72	0.72	0.34	0.25	0.53	0.23
Control Delay	23.3	14.3	27.0	9.7	23.4	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	14.3	27.0	9.7	23.4	1.3
Queue Length 50th (ft)	118	153	30	44	74	0
Queue Length 95th (ft)	214	265	65	80	141	20
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1598	1216	1122	4691	1954	1328
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.53	0.16	0.16	0.41	0.19

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	629	564	153	671	699	221
Future Volume (veh/h)	629	564	153	671	699	221
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	723	648	176	771	803	254
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1314	820	276	2429	1394	1021
Arrive On Green	0.45	0.45	0.09	0.40	0.23	0.23
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	723	648	176	771	803	254
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	10.9	20.7	3.5	5.2	7.0	3.9
Cycle Q Clear(g_c), s	10.9	20.7	3.5	5.2	7.0	3.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1314	820	276	2429	1394	1021
V/C Ratio(X)	0.55	0.79	0.64	0.32	0.58	0.25
Avail Cap(c_a), veh/h	1626	981	1141	4829	1982	1166
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.0	10.9	26.1	12.4	20.5	3.7
Incr Delay (d2), s/veh	0.4	3.7	2.4	0.1	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	16.5	1.2	1.6	2.3	3.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.4	14.6	28.6	12.5	20.9	3.8
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	1371			947	1057	
Approach Delay, s/veh	13.4			15.5	16.8	
Approach LOS	B			B	B	

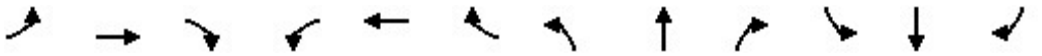
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		28.4		31.6	10.2	18.2
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	23.5	19.5
Max Q Clear Time (g_c+I1), s		7.2		22.7	5.5	9.0
Green Ext Time (p_c), s		6.4		4.4	0.5	4.7

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.964				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4644	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4644	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65				136			177		65	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	350	660	208	118	565	98	242	1468	171	140	1412	356
Future Volume (vph)	350	660	208	118	565	98	242	1468	171	140	1412	356
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	380	717	226	128	614	107	263	1596	186	152	1535	387
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	943	0	128	614	107	263	1596	186	152	1922	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	350	660	118	565	98	242	1468	171	140	1412
Future Volume (vph)	350	660	118	565	98	242	1468	171	140	1412
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.3	32.4	9.0	24.1	24.1	9.5	52.5	119.4	7.5	50.5
Actuated g/C Ratio	0.14	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	0.91	0.72	0.59	0.91	0.26	1.15	0.75	0.12	0.84	0.76
Control Delay	76.7	40.3	64.8	65.1	4.8	153.6	31.0	0.2	91.0	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.7	40.3	64.8	65.1	4.8	153.6	31.0	0.2	91.0	30.8
LOS	E	D	E	E	A	F	C	A	F	C
Approach Delay		50.8		57.5			43.9			35.2
Approach LOS		D		E			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 44.3	Intersection LOS: D
Intersection Capacity Utilization 79.4%	ICU Level of Service D
Analysis Period (min) 15	

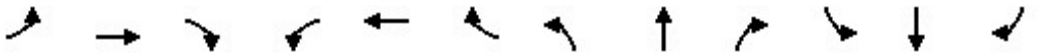
Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	380	943	128	614	107	263	1596	186	152	1922
v/c Ratio	0.91	0.72	0.59	0.91	0.26	1.15	0.75	0.12	0.84	0.76
Control Delay	76.7	40.3	64.8	65.1	4.8	153.6	31.0	0.2	91.0	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.7	40.3	64.8	65.1	4.8	153.6	31.0	0.2	91.0	30.8
Queue Length 50th (ft)	151	227	50	246	0	~123	373	0	61	352
Queue Length 95th (ft)	#240	279	83	#348	28	#210	434	0	#121	399
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	423	1312	229	687	415	229	2117	1500	181	2527
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.72	0.56	0.89	0.26	1.15	0.75	0.12	0.84	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



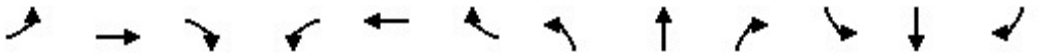
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	660	208	118	565	98	242	1468	171	140	1412	356
Future Volume (veh/h)	350	660	208	118	565	98	242	1468	171	140	1412	356
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	380	717	226	128	614	107	263	1596	0	152	1535	387
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	423	1044	325	174	674	300	232	2131		183	2072	522
Arrive On Green	0.15	0.29	0.29	0.06	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	2910	3655	1137	2910	3367	1502	2910	4837	1502	2910	4889	1233
Grp Volume(v), veh/h	380	632	311	128	614	107	263	1596	0	152	1435	487
Grp Sat Flow(s),veh/h/ln	1455	1612	1567	1455	1683	1502	1455	1612	1502	1455	1524	1550
Q Serve(g_s), s	15.3	20.7	21.1	5.2	21.3	7.3	9.5	32.8	0.0	6.2	31.4	31.4
Cycle Q Clear(g_c), s	15.3	20.7	21.1	5.2	21.3	7.3	9.5	32.8	0.0	6.2	31.4	31.4
Prop In Lane	1.00		0.73	1.00		1.00	1.00		1.00	1.00		0.80
Lane Grp Cap(c), veh/h	423	921	448	174	674	300	232	2131		183	1937	657
V/C Ratio(X)	0.90	0.69	0.70	0.74	0.91	0.36	1.13	0.75		0.83	0.74	0.74
Avail Cap(c_a), veh/h	427	921	448	232	692	309	232	2131		183	1937	657
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.1	37.8	37.9	55.1	46.6	41.1	54.8	27.8	0.0	55.2	28.8	28.8
Incr Delay (d2), s/veh	21.2	2.1	4.6	8.0	16.1	0.7	99.8	2.5	0.0	26.2	2.6	7.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	8.4	8.6	2.1	10.4	2.8	6.7	12.9	0.0	2.9	11.7	12.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.2	39.9	42.6	63.1	62.8	41.8	154.7	30.3	0.0	81.4	31.4	36.2
LnGrp LOS	E	D	D	E	E	D	F	C		F	C	D
Approach Vol, veh/h		1323			849			1859	A		2074	
Approach Delay, s/veh		49.5			60.2			47.9			36.2	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	11.6	38.5	14.0	55.0	21.8	28.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	8.2	34.8	7.2	23.1	11.5	33.4	17.3	23.3
Green Ext Time (p_c), s	0.0	11.0	0.1	4.3	0.0	12.2	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	46.0
HCM 6th LOS	D

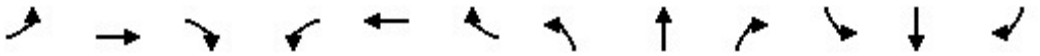
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6071	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6071	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				127			202		258	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	1731	5	1	1044	14	14	0	9	45	0	12
Future Volume (vph)	4	1731	5	1	1044	14	14	0	9	45	0	12
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	1822	5	1	1099	15	15	0	9	47	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	1827	0	1	1099	15	15	0	9	47	13	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	1731	1	1044	14	14	9	45	0
Future Volume (vph)	4	1731	1	1044	14	14	9	45	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.4	33.6	5.4	33.6	33.6	6.5	5.9	7.6	10.6
Actuated g/C Ratio	0.09	0.59	0.09	0.59	0.59	0.11	0.10	0.13	0.19
v/c Ratio	0.03	0.51	0.01	0.39	0.02	0.08	0.03	0.22	0.02
Control Delay	31.5	8.8	31.0	8.1	0.0	30.5	0.1	30.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	8.8	31.0	8.1	0.0	30.5	0.1	30.1	0.1
LOS	C	A	C	A	A	C	A	C	A
Approach Delay		8.9		8.0					23.6
Approach LOS		A		A					C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 57.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 46.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

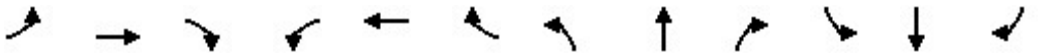
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	4	1827	1	1099	15	15	9	47	13
v/c Ratio	0.03	0.51	0.01	0.39	0.02	0.08	0.03	0.22	0.02
Control Delay	31.5	8.8	31.0	8.1	0.0	30.5	0.1	30.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	8.8	31.0	8.1	0.0	30.5	0.1	30.1	0.1
Queue Length 50th (ft)	2	106	0	73	0	5	0	17	0
Queue Length 95th (ft)	11	206	5	150	0	24	0	51	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	149	4324	149	3431	1105	217	672	295	1323
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.42	0.01	0.32	0.01	0.07	0.01	0.16	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1731	5	1	1044	14	14	0	9	45	0	12
Future Volume (veh/h)	4	1731	5	1	1044	14	14	0	9	45	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	4	1822	5	1	1099	15	15	0	9	47	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	3277	9	3	2488	772	30	167	141	75	206	184
Arrive On Green	0.01	0.52	0.52	0.00	0.51	0.51	0.02	0.00	0.09	0.05	0.00	0.12
Sat Flow, veh/h	1594	6323	17	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	4	1317	510	1	1099	15	15	0	9	47	0	13
Grp Sat Flow(s),veh/h/ln	1594	1524	1769	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.1	10.4	10.4	0.0	7.6	0.3	0.5	0.0	0.3	1.5	0.0	0.4
Cycle Q Clear(g_c), s	0.1	10.4	10.4	0.0	7.6	0.3	0.5	0.0	0.3	1.5	0.0	0.4
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	9	2369	917	3	2488	772	30	167	141	75	206	184
V/C Ratio(X)	0.47	0.56	0.56	0.33	0.44	0.02	0.50	0.00	0.06	0.63	0.00	0.07
Avail Cap(c_a), veh/h	150	3264	1263	150	3454	1072	219	641	543	297	691	617
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	8.7	8.7	26.5	8.1	6.3	25.8	0.0	21.9	24.8	0.0	20.6
Incr Delay (d2), s/veh	34.4	0.2	0.5	54.7	0.1	0.0	12.5	0.0	0.2	8.3	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.6	3.2	0.1	2.1	0.1	0.3	0.0	0.1	0.7	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.7	8.9	9.2	81.2	8.2	6.3	38.3	0.0	22.1	33.1	0.0	20.8
LnGrp LOS	E	A	A	F	A	A	D	A	C	C	A	C
Approach Vol, veh/h		1831			1115			24			60	
Approach Delay, s/veh		9.1			8.3			32.3			30.4	
Approach LOS		A			A			C			C	

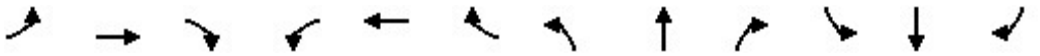
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	9.5	4.6	32.0	5.5	11.0	4.8	31.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	3.5	2.3	2.0	12.4	2.5	2.4	2.1	9.6
Green Ext Time (p_c), s	0.0	0.0	0.0	15.2	0.0	0.0	0.0	9.3

Intersection Summary	
HCM 6th Ctrl Delay	9.4
HCM 6th LOS	A



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4794	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.728				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4794	0	1213	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10				155			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



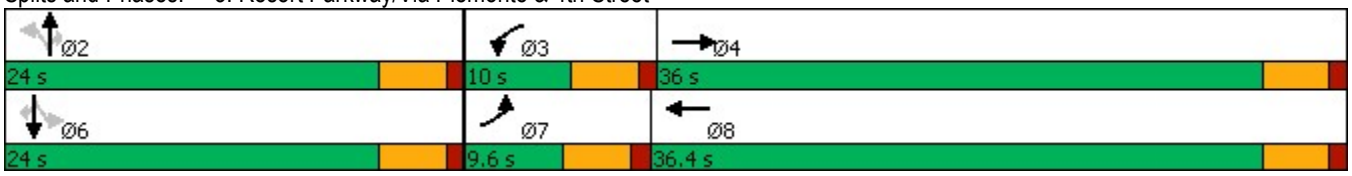
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	28	1747	8	5	1044	37	11	0	19	41	1	19
Future Volume (vph)	28	1747	8	5	1044	37	11	0	19	41	1	19
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	29	1839	8	5	1099	39	12	0	20	43	1	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1847	0	5	1138	0	12	0	20	0	44	20

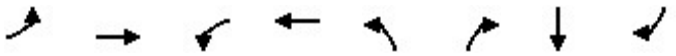
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	28	1747	5	1044	11	19	41	1	19
Future Volume (vph)	28	1747	5	1044	11	19	41	1	19
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	29.1	5.6	29.2	7.2	7.2		7.2	7.2
Actuated g/C Ratio	0.11	0.62	0.12	0.62	0.15	0.15		0.15	0.15
v/c Ratio	0.09	0.49	0.03	0.38	0.07	0.06		0.23	0.07
Control Delay	23.2	6.1	22.8	5.5	20.5	0.3		22.9	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	23.2	6.1	22.8	5.5	20.5	0.3		22.9	0.4
LOS	C	A	C	A	C	A		C	A
Approach Delay		6.4		5.6				15.9	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 47.1	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 6.3	Intersection LOS: A
Intersection Capacity Utilization 46.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	29	1847	5	1138	12	20	44	20
v/c Ratio	0.09	0.49	0.03	0.38	0.07	0.06	0.23	0.07
Control Delay	23.2	6.1	22.8	5.5	20.5	0.3	22.9	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	6.1	22.8	5.5	20.5	0.3	22.9	0.4
Queue Length 50th (ft)	3	52	1	36	3	0	11	0
Queue Length 95th (ft)	15	153	10	112	16	0	39	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	321	4165	189	3337	515	726	548	691
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.44	0.03	0.34	0.02	0.03	0.08	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	1747	8	5	1044	37	11	0	19	41	1	19
Future Volume (veh/h)	28	1747	8	5	1044	37	11	0	19	41	1	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	29	1839	8	5	1099	39	12	0	20	43	1	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	3511	15	11	2537	90	288	209	177	328	6	177
Arrive On Green	0.03	0.56	0.56	0.01	0.53	0.53	0.12	0.00	0.12	0.12	0.12	0.12
Sat Flow, veh/h	2910	6311	27	1594	4796	170	1314	1772	1502	1354	48	1502
Grp Volume(v), veh/h	29	1332	515	5	739	399	12	0	20	44	0	20
Grp Sat Flow(s),veh/h/ln	1455	1524	1767	1594	1612	1741	1314	1772	1502	1402	0	1502
Q Serve(g_s), s	0.4	7.7	7.7	0.1	5.9	5.9	0.4	0.0	0.5	1.2	0.0	0.5
Cycle Q Clear(g_c), s	0.4	7.7	7.7	0.1	5.9	5.9	1.6	0.0	0.5	1.2	0.0	0.5
Prop In Lane	1.00		0.02	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	99	2544	983	11	1706	921	288	209	177	334	0	177
V/C Ratio(X)	0.29	0.52	0.52	0.47	0.43	0.43	0.04	0.00	0.11	0.13	0.00	0.11
Avail Cap(c_a), veh/h	350	3400	1314	207	2429	1312	738	816	691	813	0	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.0	5.9	5.9	21.0	6.1	6.1	17.7	0.0	16.7	17.0	0.0	16.7
Incr Delay (d2), s/veh	1.6	0.2	0.4	28.2	0.2	0.3	0.1	0.0	0.3	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.5	1.8	0.1	1.3	1.5	0.1	0.0	0.2	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	6.0	6.3	49.1	6.3	6.4	17.8	0.0	17.0	17.2	0.0	17.0
LnGrp LOS	C	A	A	D	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1876			1143			32			64	
Approach Delay, s/veh		6.4			6.5			17.3			17.1	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	4.8	28.1		9.5	5.9	26.9				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		3.6	2.1	9.7		3.2	2.4	7.9				
Green Ext Time (p_c), s		0.0	0.0	13.8		0.2	0.0	8.5				

Intersection Summary	
HCM 6th Ctrl Delay	6.7
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	4794	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4794	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1754	61	0	1060	0	26
Future Volume (vph)	1754	61	0	1060	0	26
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1827	64	0	1104	0	27
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1891	0	0	1104	0	27

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1754	61	0	1060	0	26
Future Vol, veh/h	1754	61	0	1060	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1827	64	0	1104	0	27

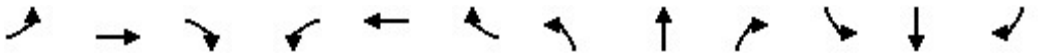
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	946
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	225
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	225
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	23.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	225	-	-	-
HCM Lane V/C Ratio	0.12	-	-	-
HCM Control Delay (s)	23.2	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			188			275			55		32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



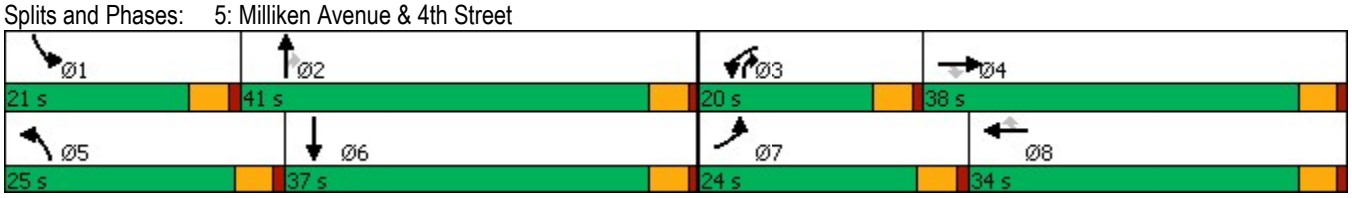
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	419	1030	198	354	813	264	290	1430	351	415	884	138
Future Volume (vph)	419	1030	198	354	813	264	290	1430	351	415	884	138
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	436	1073	206	369	847	275	302	1490	366	432	921	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	436	1073	206	369	847	275	302	1490	366	432	1065	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	419	1030	198	354	813	264	290	1430	351	415	884
Future Volume (vph)	419	1030	198	354	813	264	290	1430	351	415	884
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.3	32.3	32.3	15.5	28.5	28.5	17.1	35.7	55.7	16.5	35.1
Actuated g/C Ratio	0.16	0.27	0.27	0.13	0.24	0.24	0.14	0.30	0.47	0.14	0.30
v/c Ratio	0.92	0.81	0.38	0.97	0.73	0.48	0.72	0.81	0.50	1.07	0.59
Control Delay	75.6	45.9	8.4	91.6	45.5	7.3	58.6	42.4	20.9	113.1	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.6	45.9	8.4	91.6	45.5	7.3	58.6	42.4	20.9	113.1	36.5
LOS	E	D	A	F	D	A	E	D	C	F	D
Approach Delay		49.0			49.9			41.0			58.6
Approach LOS		D			D			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 48.8	Intersection LOS: D
Intersection Capacity Utilization 83.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

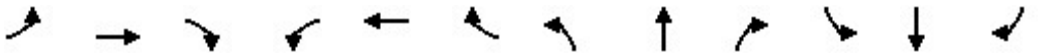


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	436	1073	206	369	847	275	302	1490	366	432	1065
v/c Ratio	0.92	0.81	0.38	0.97	0.73	0.48	0.72	0.81	0.50	1.07	0.59
Control Delay	75.6	45.9	8.4	91.6	45.5	7.3	58.6	42.4	20.9	113.1	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.6	45.9	8.4	91.6	45.5	7.3	58.6	42.4	20.9	113.1	36.5
Queue Length 50th (ft)	173	282	10	148	220	0	116	309	161	~193	199
Queue Length 95th (ft)	#271	338	70	#250	270	69	161	355	250	#297	246
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	477	1368	560	379	1204	581	502	1878	737	404	1791
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.78	0.37	0.97	0.70	0.47	0.60	0.79	0.50	1.07	0.59

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

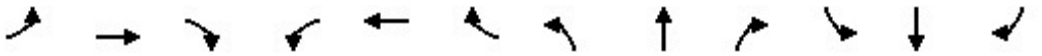
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	419	1030	198	354	813	264	290	1430	351	415	884	138
Future Volume (veh/h)	419	1030	198	354	813	264	290	1430	351	415	884	138
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	436	1073	206	369	847	275	302	1490	366	432	921	144
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	481	1285	399	392	1136	353	361	1828	653	417	1714	264
Arrive On Green	0.17	0.27	0.27	0.13	0.23	0.23	0.12	0.30	0.30	0.14	0.32	0.32
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5368	827
Grp Volume(v), veh/h	436	1073	206	369	847	275	302	1490	366	432	782	283
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1623
Q Serve(g_s), s	16.9	24.1	13.4	14.5	18.7	19.7	11.7	26.1	21.0	16.5	16.2	16.5
Cycle Q Clear(g_c), s	16.9	24.1	13.4	14.5	18.7	19.7	11.7	26.1	21.0	16.5	16.2	16.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	481	1285	399	392	1136	353	361	1828	653	417	1459	518
V/C Ratio(X)	0.91	0.83	0.52	0.94	0.75	0.78	0.84	0.82	0.56	1.04	0.54	0.55
Avail Cap(c_a), veh/h	493	1408	437	392	1240	385	518	1933	679	417	1459	518
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.1	39.9	36.0	49.3	40.8	41.2	49.3	37.3	24.3	49.3	32.2	32.3
Incr Delay (d2), s/veh	20.0	4.2	1.0	30.9	2.3	9.1	8.0	2.7	1.0	53.5	0.4	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	10.0	5.0	6.9	7.6	8.2	4.6	10.0	7.5	9.1	6.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.1	44.1	37.0	80.2	43.1	50.4	57.2	40.0	25.3	102.8	32.6	33.5
LnGrp LOS	E	D	D	F	D	D	E	D	C	F	C	C
Approach Vol, veh/h		1715			1491			2158			1497	
Approach Delay, s/veh		49.1			53.6			39.9			53.0	
Approach LOS		D			D			D			D	

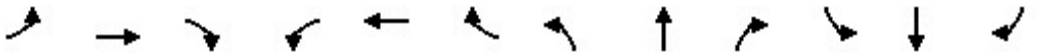
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	39.0	20.0	35.1	18.8	41.2	23.5	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	28.1	16.5	26.1	13.7	18.5	18.9	21.7
Green Ext Time (p_c), s	0.0	6.4	0.0	4.5	0.6	6.2	0.1	4.0

Intersection Summary	
HCM 6th Ctrl Delay	48.1
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.927	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2977	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2977	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			125			191			278		186	307
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



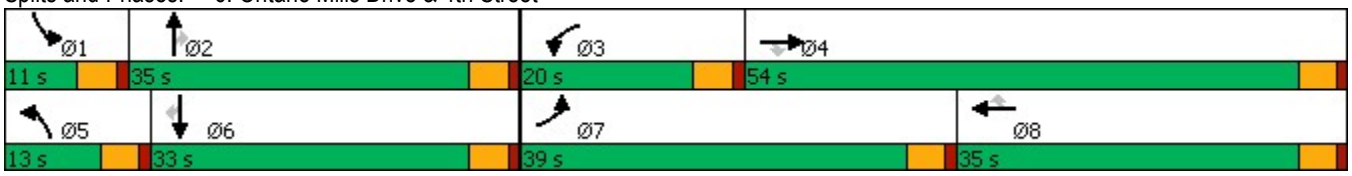
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	919	1166	115	217	928	300	136	298	338	75	300	565
Future Volume (vph)	919	1166	115	217	928	300	136	298	338	75	300	565
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	999	1267	125	236	1009	326	148	324	367	82	326	614
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	999	1267	125	236	1009	326	148	324	367	82	633	307

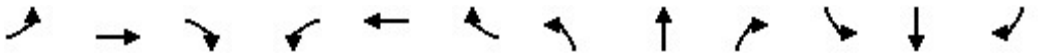
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	919	1166	115	217	928	300	136	298	338	75	300	565
Future Volume (vph)	919	1166	115	217	928	300	136	298	338	75	300	565
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.6	50.4	50.4	13.7	29.4	29.4	8.5	26.8	26.8	6.5	24.8	24.8
Actuated g/C Ratio	0.30	0.44	0.44	0.12	0.25	0.25	0.07	0.23	0.23	0.06	0.21	0.21
v/c Ratio	1.15	0.60	0.17	0.69	0.82	0.62	1.26	0.42	0.65	0.92	0.81	0.58
Control Delay	119.4	27.1	4.4	60.5	47.3	21.4	215.4	39.4	16.3	132.5	38.9	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.4	27.1	4.4	60.5	47.3	21.4	215.4	39.4	16.3	132.5	38.9	8.9
LOS	F	C	A	E	D	C	F	D	B	F	D	A
Approach Delay		64.5			43.9			60.3			37.4	
Approach LOS		E			D			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115.4	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.26	
Intersection Signal Delay: 53.6	Intersection LOS: D
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



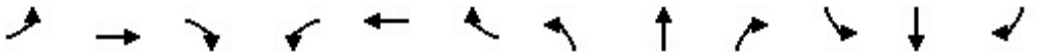


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	999	1267	125	236	1009	326	148	324	367	82	633	307
v/c Ratio	1.15	0.60	0.17	0.69	0.82	0.62	1.26	0.42	0.65	0.92	0.81	0.58
Control Delay	119.4	27.1	4.4	60.5	47.3	21.4	215.4	39.4	16.3	132.5	38.9	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.4	27.1	4.4	60.5	47.3	21.4	215.4	39.4	16.3	132.5	38.9	8.9
Queue Length 50th (ft)	~476	274	0	90	267	89	~146	109	55	64	179	0
Queue Length 95th (ft)	#614	333	37	134	326	193	#284	153	161	#169	253	85
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	867	2104	725	389	1277	537	117	889	602	89	877	569
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.60	0.17	0.61	0.79	0.61	1.26	0.36	0.61	0.92	0.72	0.54

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



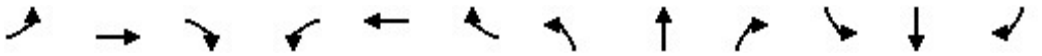
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	919	1166	115	217	928	300	136	298	338	75	300	565
Future Volume (veh/h)	919	1166	115	217	928	300	136	298	338	75	300	565
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	999	1267	125	236	1009	326	148	324	367	82	326	614
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	845	2121	658	287	1194	371	114	864	385	87	425	720
Arrive On Green	0.29	0.44	0.44	0.10	0.25	0.25	0.07	0.26	0.26	0.05	0.24	0.24
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	999	1267	125	236	1009	326	148	324	367	82	326	614
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	34.5	23.7	6.1	9.5	23.6	24.8	8.5	9.4	28.6	6.1	20.4	23.2
Cycle Q Clear(g_c), s	34.5	23.7	6.1	9.5	23.6	24.8	8.5	9.4	28.6	6.1	20.4	23.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	845	2121	658	287	1194	371	114	864	385	87	425	720
V/C Ratio(X)	1.18	0.60	0.19	0.82	0.85	0.88	1.30	0.37	0.95	0.94	0.77	0.85
Avail Cap(c_a), veh/h	845	2121	658	380	1242	385	114	864	385	87	425	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	25.4	20.4	52.5	42.6	43.1	55.2	36.3	43.4	56.0	42.1	43.2
Incr Delay (d2), s/veh	94.1	0.5	0.1	10.4	5.4	19.7	184.2	0.3	33.6	76.6	8.2	9.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.3	9.1	2.2	3.9	9.9	11.2	9.2	3.9	14.1	4.3	9.8	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	136.3	25.9	20.6	62.9	48.0	62.8	239.4	36.6	77.0	132.6	50.3	52.8
LnGrp LOS	F	C	C	E	D	E	F	D	E	F	D	D
Approach Vol, veh/h		2391			1571			839			1022	
Approach Delay, s/veh		71.7			53.3			90.1			58.4	
Approach LOS		E			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	16.2	56.6	13.0	33.0	39.0	33.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.1	30.6	11.5	25.7	10.5	25.2	36.5	26.8
Green Ext Time (p_c), s	0.0	0.0	0.3	10.7	0.0	1.5	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	67.1
HCM 6th LOS	E

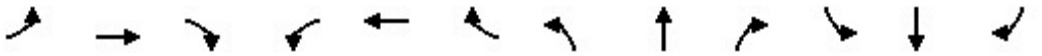
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.972			0.936				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	2891	4818	1500	1583	4683	0	1583	3138	0	1504	1646	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	2891	4818	1500	1583	4683	0	1583	3138	0	1504	1646	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97		41			58				312
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



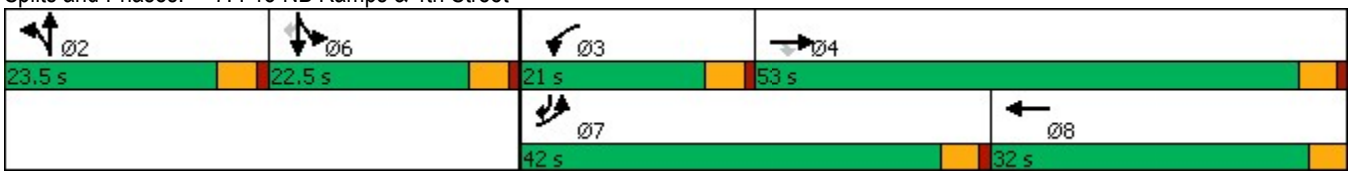
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	799	678	93	76	717	164	114	74	56	138	65	601
Future Volume (vph)	799	678	93	76	717	164	114	74	56	138	65	601
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	832	706	97	79	747	171	119	77	58	144	68	626
Shared Lane Traffic (%)										28%		
Lane Group Flow (vph)	832	706	97	79	918	0	119	135	0	104	108	626

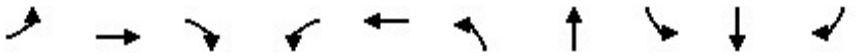
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	799	678	93	76	717	114	74	138	65	601
Future Volume (vph)	799	678	93	76	717	114	74	138	65	601
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	35.0	52.0	52.0	10.7	25.8	13.2	13.2	12.5	12.5	52.1
Actuated g/C Ratio	0.34	0.50	0.50	0.10	0.25	0.13	0.13	0.12	0.12	0.50
v/c Ratio	0.86	0.29	0.12	0.48	0.77	0.59	0.30	0.57	0.55	0.42
Control Delay	43.6	18.0	4.6	57.5	40.7	58.0	27.6	58.9	56.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	18.0	4.6	57.5	40.7	58.0	27.6	58.9	56.4	9.0
LOS	D	B	A	E	D	E	C	E	E	A
Approach Delay		30.2			42.0		41.8		21.3	
Approach LOS		C			D		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 103.9	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 32.2	Intersection LOS: C
Intersection Capacity Utilization 73.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	832	706	97	79	918	119	135	104	108	626
v/c Ratio	0.86	0.29	0.12	0.48	0.77	0.59	0.30	0.57	0.55	0.42
Control Delay	43.6	18.0	4.6	57.5	40.7	58.0	27.6	58.9	56.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	18.0	4.6	57.5	40.7	58.0	27.6	58.9	56.4	9.0
Queue Length 50th (ft)	275	103	0	53	206	80	25	73	76	69
Queue Length 95th (ft)	#441	170	33	107	290	147	57	140	143	126
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1068	2411	799	257	1345	296	634	266	292	1556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.29	0.12	0.31	0.68	0.40	0.21	0.39	0.37	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	799	678	93	76	717	164	114	74	56	138	65	601
Future Volume (veh/h)	799	678	93	76	717	164	114	74	56	138	65	601
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	832	706	97	79	747	171	119	77	58	106	121	626
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	920	2382	739	99	940	213	159	191	131	265	294	1448
Arrive On Green	0.32	0.49	0.49	0.06	0.24	0.24	0.10	0.10	0.10	0.17	0.17	0.17
Sat Flow, veh/h	2910	4837	1502	1594	3943	893	1594	1908	1312	1594	1772	3003
Grp Volume(v), veh/h	832	706	97	79	610	308	119	67	68	106	121	626
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1611	1594	1683	1536	1594	1772	1502
Q Serve(g_s), s	27.5	8.7	3.5	4.9	17.8	18.1	7.3	3.7	4.2	6.0	6.1	13.7
Cycle Q Clear(g_c), s	27.5	8.7	3.5	4.9	17.8	18.1	7.3	3.7	4.2	6.0	6.1	13.7
Prop In Lane	1.00		1.00	1.00		0.55	1.00		0.85	1.00		1.00
Lane Grp Cap(c), veh/h	920	2382	739	99	769	384	159	168	153	265	294	1448
V/C Ratio(X)	0.90	0.30	0.13	0.80	0.79	0.80	0.75	0.40	0.44	0.40	0.41	0.43
Avail Cap(c_a), veh/h	1089	2382	739	262	917	458	302	319	291	286	318	1488
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.8	15.1	13.8	46.4	35.8	35.9	43.9	42.3	42.5	37.3	37.4	17.0
Incr Delay (d2), s/veh	9.6	0.1	0.1	13.5	4.1	8.5	6.8	1.5	2.0	1.0	0.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.6	3.1	1.2	2.3	7.3	7.9	3.2	1.6	1.7	2.4	2.7	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	15.2	13.9	59.9	39.9	44.4	50.7	43.8	44.5	38.3	38.3	17.2
LnGrp LOS	D	B	B	E	D	D	D	D	D	D	D	B
Approach Vol, veh/h		1635			997			254			853	
Approach Delay, s/veh		29.0			42.9			47.2			22.8	
Approach LOS		C			D			D			C	

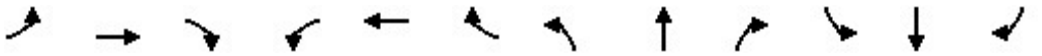
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		14.5	10.7	53.9		21.1	36.2	28.4				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		9.3	6.9	10.7		15.7	29.5	20.1				
Green Ext Time (p_c), s		0.7	0.1	6.1		1.0	2.2	3.8				

Intersection Summary	
HCM 6th Ctrl Delay	32.5
HCM 6th LOS	C

Notes

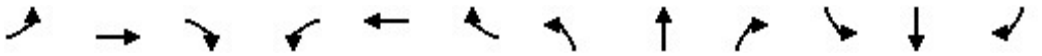
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



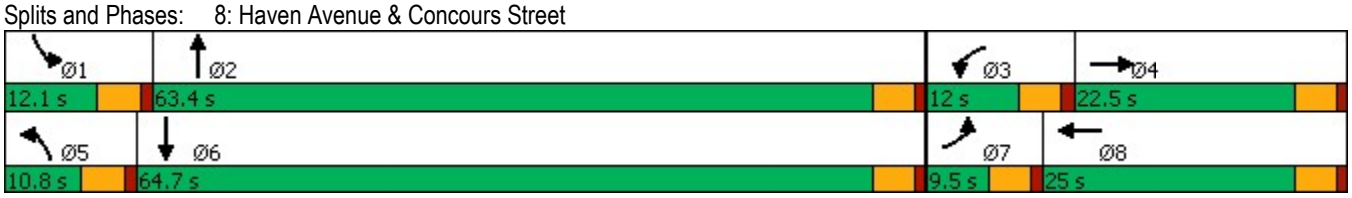
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	25	38	62	171	91	93	46	2260	176	42	1833	27
Future Volume (vph)	25	38	62	171	91	93	46	2260	176	42	1833	27
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	26	39	63	174	93	95	47	2306	180	43	1870	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	102	0	174	93	95	47	2306	180	43	1870	28

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	25	38	171	91	93	46	2260	176	42	1833	27
Future Volume (vph)	25	38	171	91	93	46	2260	176	42	1833	27
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	6.9	7.5	13.1	90.9	6.2	58.7	90.9	6.8	59.3	90.9
Actuated g/C Ratio	0.06	0.08	0.08	0.14	1.00	0.07	0.65	1.00	0.07	0.65	1.00
v/c Ratio	0.16	0.35	0.53	0.19	0.06	0.24	0.59	0.12	0.20	0.47	0.02
Control Delay	47.6	23.6	49.0	38.6	0.1	47.1	11.5	0.2	45.3	9.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	23.6	49.0	38.6	0.1	47.1	11.5	0.2	45.3	9.7	0.0
LOS	D	C	D	D	A	D	B	A	D	A	A
Approach Delay		28.5		33.5			11.4			10.3	
Approach LOS		C		C			B			B	

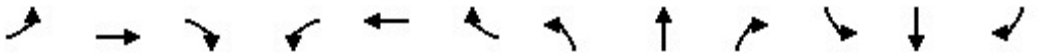
Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 90.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	26	102	174	93	95	47	2306	180	43	1870	28
v/c Ratio	0.16	0.35	0.53	0.19	0.06	0.24	0.59	0.12	0.20	0.47	0.02
Control Delay	47.6	23.6	49.0	38.6	0.1	47.1	11.5	0.2	45.3	9.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	23.6	49.0	38.6	0.1	47.1	11.5	0.2	45.3	9.7	0.0
Queue Length 50th (ft)	8	12	37	25	0	14	248	0	13	177	0
Queue Length 95th (ft)	22	38	63	54	0	34	311	0	30	221	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	161	663	331	770	1500	204	4007	1500	246	4096	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.15	0.53	0.12	0.06	0.23	0.58	0.12	0.17	0.46	0.02

Intersection Summary



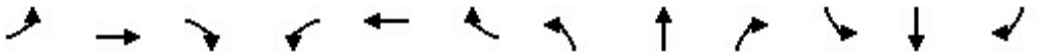
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	38	62	171	91	93	46	2260	176	42	1833	27
Future Volume (veh/h)	25	38	62	171	91	93	46	2260	176	42	1833	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	26	39	63	174	93	0	47	2306	0	43	1870	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	80	117	104	268	369		117	3672		111	3660	
Arrive On Green	0.03	0.07	0.07	0.07	0.11	0.00	0.04	0.60	0.00	0.04	0.60	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	26	39	63	174	93	0	47	2306	0	43	1870	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.7	1.8	3.3	3.5	2.0	0.0	1.3	19.6	0.0	1.2	14.3	0.0
Cycle Q Clear(g_c), s	0.7	1.8	3.3	3.5	2.0	0.0	1.3	19.6	0.0	1.2	14.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	80	117	104	268	369		117	3672		111	3660	
V/C Ratio(X)	0.33	0.33	0.60	0.65	0.25		0.40	0.63		0.39	0.51	
Avail Cap(c_a), veh/h	180	374	334	368	853		227	4437		273	4535	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.6	35.9	36.6	36.8	33.0	0.0	37.9	10.3	0.0	38.0	9.3	0.0
Incr Delay (d2), s/veh	2.4	1.7	5.5	2.7	0.4	0.0	2.2	0.2	0.0	2.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	1.3	1.2	0.8	0.0	0.5	5.7	0.0	0.4	4.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	37.5	42.1	39.4	33.3	0.0	40.1	10.5	0.0	40.2	9.4	0.0
LnGrp LOS	D	D	D	D	C		D	B		D	A	
Approach Vol, veh/h		128			267	A		2353	A		1913	A
Approach Delay, s/veh		40.5			37.3			11.1			10.1	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	53.2	10.0	10.1	7.8	53.1	6.7	13.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	3.2	21.6	5.5	5.3	3.3	16.3	2.7	4.0
Green Ext Time (p_c), s	0.0	27.2	0.1	0.4	0.0	22.8	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

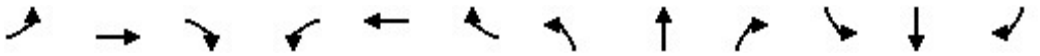
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.933			0.949						0.998	
Flt Protected	0.950	0.973			0.970		0.950			0.950		
Satd. Flow (prot)	1593	1522	0	0	1624	0	1676	4818	0	1676	4808	0
Flt Permitted	0.950	0.973					0.950			0.950		
Satd. Flow (perm)	1593	1522	0	0	1675	0	1676	4818	0	1676	4808	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



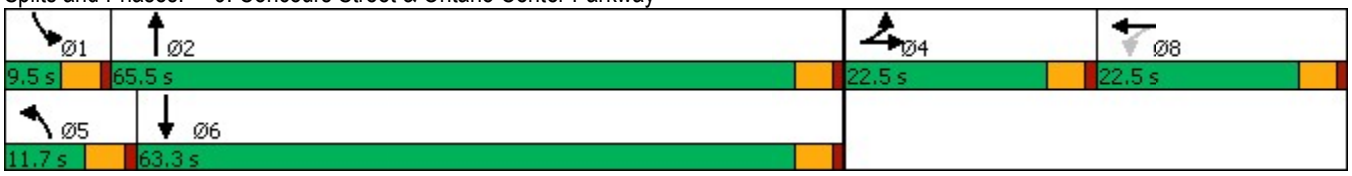
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	45	0	12	14	0	9	4	1731	5	1	1044	14
Future Volume (vph)	45	0	12	14	0	9	4	1731	5	1	1044	14
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	47	0	13	15	0	9	4	1822	5	1	1099	15
Shared Lane Traffic (%)	35%											
Lane Group Flow (vph)	31	29	0	0	24	0	4	1827	0	1	1114	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	45	0	14	0	4	1731	1	1044
Future Volume (vph)	45	0	14	0	4	1731	1	1044
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.6	7.6		6.1	6.3	56.2	5.5	56.0
Actuated g/C Ratio	0.11	0.11		0.09	0.09	0.81	0.08	0.81
v/c Ratio	0.18	0.12		0.10	0.03	0.47	0.01	0.29
Control Delay	38.4	0.9		0.9	39.5	6.0	41.0	4.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	0.9		0.9	39.5	6.0	41.0	4.9
LOS	D	A		A	D	A	D	A
Approach Delay		20.3		0.9		6.0		4.9
Approach LOS		C		A		A		A

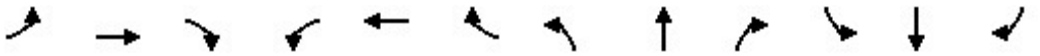
Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 69.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 5.9	Intersection LOS: A
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	31	29	24	4	1827	1	1114
v/c Ratio	0.18	0.12	0.10	0.03	0.47	0.01	0.29
Control Delay	38.4	0.9	0.9	39.5	6.0	41.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	0.9	0.9	39.5	6.0	41.0	4.9
Queue Length 50th (ft)	14	0	0	2	77	0	38
Queue Length 95th (ft)	49	0	0	13	286	6	152
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	455	502	546	191	4049	133	3976
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.06	0.04	0.02	0.45	0.01	0.28

Intersection Summary



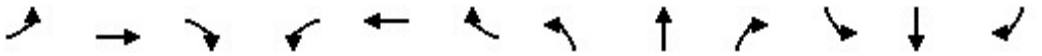
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	0	12	14	0	9	4	1731	5	1	1044	14
Future Volume (veh/h)	45	0	12	14	0	9	4	1731	5	1	1044	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	30	24	13	15	0	9	4	1822	5	1	1099	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	61	33	28	0	17	9	3046	8	3	2988	41
Arrive On Green	0.06	0.06	0.06	0.03	0.00	0.03	0.01	0.61	0.61	0.00	0.61	0.61
Sat Flow, veh/h	1688	1081	586	1008	0	605	1688	4981	14	1688	4918	67
Grp Volume(v), veh/h	30	0	37	24	0	0	4	1180	647	1	721	393
Grp Sat Flow(s),veh/h/ln	1688	0	1667	1613	0	0	1688	1612	1769	1688	1612	1760
Q Serve(g_s), s	1.0	0.0	1.3	0.9	0.0	0.0	0.1	13.3	13.3	0.0	6.7	6.7
Cycle Q Clear(g_c), s	1.0	0.0	1.3	0.9	0.0	0.0	0.1	13.3	13.3	0.0	6.7	6.7
Prop In Lane	1.00		0.35	0.62		0.37	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	95	0	94	44	0	0	9	1972	1082	3	1960	1069
V/C Ratio(X)	0.32	0.00	0.39	0.54	0.00	0.00	0.44	0.60	0.60	0.35	0.37	0.37
Avail Cap(c_a), veh/h	512	0	505	489	0	0	205	3313	1818	142	3194	1743
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	0.0	27.0	28.5	0.0	0.0	29.4	7.1	7.1	29.6	5.9	5.9
Incr Delay (d2), s/veh	1.9	0.0	2.7	9.8	0.0	0.0	30.2	0.3	0.5	61.4	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.5	0.4	0.0	0.0	0.1	3.4	3.8	0.1	1.7	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	0.0	29.7	38.3	0.0	0.0	59.6	7.4	7.6	91.0	6.0	6.1
LnGrp LOS	C	A	C	D	A	A	E	A	A	F	A	A
Approach Vol, veh/h		67			24			1831			1115	
Approach Delay, s/veh		29.3			38.3			7.6			6.1	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	40.8		7.8	4.8	40.6		6.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.0	15.3		3.3	2.1	8.7		2.9				
Green Ext Time (p_c), s	0.0	21.0		0.2	0.0	9.8		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		7.7
HCM 6th LOS		A

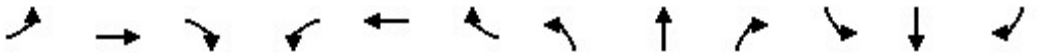
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			193			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



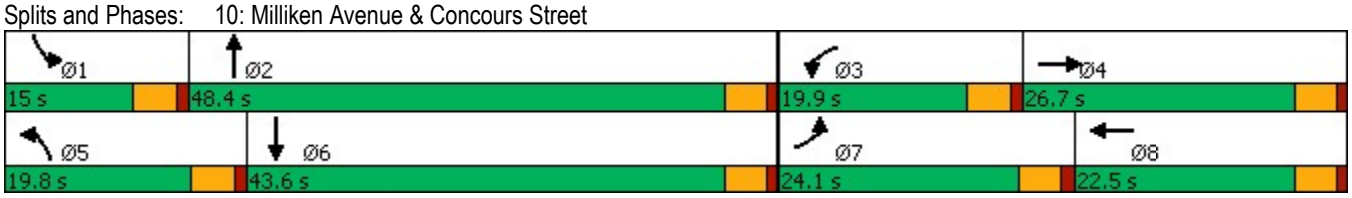
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	326	128	138	166	66	112	179	1599	125	177	1191	124
Future Volume (vph)	326	128	138	166	66	112	179	1599	125	177	1191	124
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	340	133	144	173	69	117	186	1666	130	184	1241	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	340	133	144	173	69	117	186	1666	130	184	1241	129

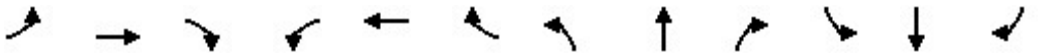
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	326	128	138	166	66	112	179	1599	125	177	1191	124
Future Volume (vph)	326	128	138	166	66	112	179	1599	125	177	1191	124
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	17.8	11.6	89.5	10.9	7.4	89.5	11.3	38.7	89.5	9.8	37.2	89.5
Actuated g/C Ratio	0.20	0.13	1.00	0.12	0.08	1.00	0.13	0.43	1.00	0.11	0.42	1.00
v/c Ratio	0.59	0.31	0.10	0.49	0.25	0.08	0.51	0.63	0.09	0.58	0.49	0.09
Control Delay	39.8	39.2	0.1	43.8	44.2	0.1	43.6	21.5	0.1	48.3	20.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.8	39.2	0.1	43.8	44.2	0.1	43.6	21.5	0.1	48.3	20.6	0.1
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		30.4			29.6			22.1			22.2	
Approach LOS		C			C			C			C	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 89.5		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.63		
Intersection Signal Delay: 23.9	Intersection LOS: C	
Intersection Capacity Utilization 60.7%	ICU Level of Service B	
Analysis Period (min) 15		

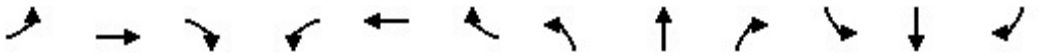
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	340	133	144	173	69	117	186	1666	130	184	1241	129
v/c Ratio	0.59	0.31	0.10	0.49	0.25	0.08	0.51	0.63	0.09	0.58	0.49	0.09
Control Delay	39.8	39.2	0.1	43.8	44.2	0.1	43.6	21.5	0.1	48.3	20.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.8	39.2	0.1	43.8	44.2	0.1	43.6	21.5	0.1	48.3	20.6	0.1
Queue Length 50th (ft)	100	38	0	51	21	0	55	214	0	55	148	0
Queue Length 95th (ft)	151	70	0	87	44	0	91	278	0	95	211	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	648	851	1500	509	690	1500	506	3049	1500	347	2778	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.16	0.10	0.34	0.10	0.08	0.37	0.55	0.09	0.53	0.45	0.09

Intersection Summary



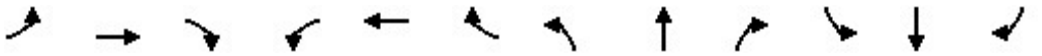
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	326	128	138	166	66	112	179	1599	125	177	1191	124
Future Volume (veh/h)	326	128	138	166	66	112	179	1599	125	177	1191	124
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	340	133	0	173	69	0	186	1666	0	184	1241	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	447		254	231		269	2699		261	2682	
Arrive On Green	0.15	0.13	0.00	0.09	0.07	0.00	0.09	0.44	0.00	0.09	0.44	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	340	133	0	173	69	0	186	1666	0	184	1241	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	8.2	2.6	0.0	4.2	1.4	0.0	4.5	15.2	0.0	4.5	10.4	0.0
Cycle Q Clear(g_c), s	8.2	2.6	0.0	4.2	1.4	0.0	4.5	15.2	0.0	4.5	10.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	440	447		254	231		269	2699		261	2682	
V/C Ratio(X)	0.77	0.30		0.68	0.30		0.69	0.62		0.71	0.46	
Avail Cap(c_a), veh/h	785	1028		617	834		613	3681		420	3279	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.6	28.5	0.0	32.2	32.2	0.0	32.0	15.5	0.0	32.2	14.3	0.0
Incr Delay (d2), s/veh	2.9	0.4	0.0	3.2	0.7	0.0	3.2	0.2	0.0	3.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	1.0	0.0	1.5	0.6	0.0	1.7	4.8	0.0	1.6	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.6	28.8	0.0	35.4	32.9	0.0	35.2	15.8	0.0	35.7	14.4	0.0
LnGrp LOS	C	C		D	C		D	B		D	B	
Approach Vol, veh/h		473	A		242	A		1852	A		1425	A
Approach Delay, s/veh		31.5			34.7			17.7			17.2	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	36.7	10.8	14.2	11.2	36.5	15.5	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	6.5	17.2	6.2	4.6	6.5	12.4	10.2	3.4
Green Ext Time (p_c), s	0.2	15.0	0.3	0.6	0.4	10.5	0.8	0.2

Intersection Summary	
HCM 6th Ctrl Delay	20.2
HCM 6th LOS	C

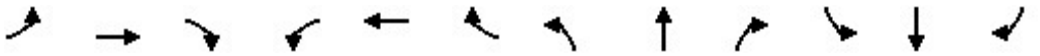
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			241			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



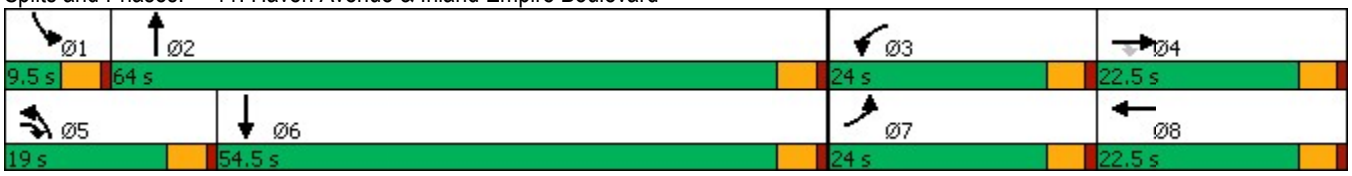
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	163	210	464	613	151	39	338	1821	418	40	2129	44
Future Volume (vph)	163	210	464	613	151	39	338	1821	418	40	2129	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	175	226	499	659	162	42	363	1958	449	43	2289	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	175	226	499	659	162	42	363	1958	449	43	2289	47

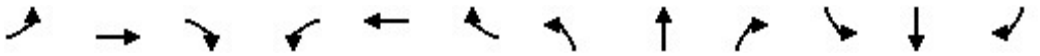
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	210	464	613	151	39	338	1821	418	40	2129	44
Future Volume (vph)	163	210	464	613	151	39	338	1821	418	40	2129	44
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	12.2	13.0	32.0	19.5	20.3	115.1	14.5	61.5	115.1	5.0	50.0	115.1
Actuated g/C Ratio	0.11	0.11	0.28	0.17	0.18	1.00	0.13	0.53	1.00	0.04	0.43	1.00
v/c Ratio	0.57	0.60	1.09	0.99	0.27	0.03	1.00	0.60	0.30	0.34	0.87	0.03
Control Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.1	0.5	62.1	34.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.1	0.5	62.1	34.2	0.0
LOS	E	E	F	F	D	A	F	C	A	E	C	A
Approach Delay		83.0			69.2			27.1			34.1	
Approach LOS		F			E			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115.1	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 42.0	Intersection LOS: D
Intersection Capacity Utilization 88.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard



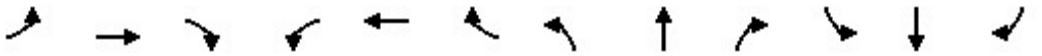


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	175	226	499	659	162	42	363	1958	449	43	2289	47
v/c Ratio	0.57	0.60	1.09	0.99	0.27	0.03	1.00	0.60	0.30	0.34	0.87	0.03
Control Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.1	0.5	62.1	34.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.1	0.5	62.1	34.2	0.0
Queue Length 50th (ft)	64	85	~387	174	55	0	140	289	0	16	437	0
Queue Length 95th (ft)	101	126	#587	#271	91	0	#251	352	0	36	522	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	490	524	457	668	591	1500	364	3244	1500	125	2639	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.43	1.09	0.99	0.27	0.03	1.00	0.60	0.30	0.34	0.87	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



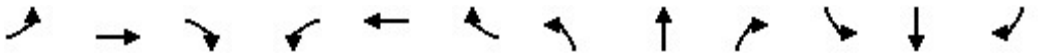
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	163	210	464	613	151	39	338	1821	418	40	2129	44
Future Volume (veh/h)	163	210	464	613	151	39	338	1821	418	40	2129	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	175	226	499	659	162	0	363	1958	0	43	2289	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	507	408	647	792		353	3071		93	2525	
Arrive On Green	0.08	0.15	0.15	0.16	0.24	0.00	0.12	0.50	0.00	0.03	0.41	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	175	226	499	659	162	0	363	1958	0	43	2289	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	7.0	7.3	18.0	19.5	4.6	0.0	14.5	28.1	0.0	1.7	42.1	0.0
Cycle Q Clear(g_c), s	7.0	7.3	18.0	19.5	4.6	0.0	14.5	28.1	0.0	1.7	42.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	507	408	647	792		353	3071		93	2525	
V/C Ratio(X)	0.76	0.45	1.22	1.02	0.20		1.03	0.64		0.46	0.91	
Avail Cap(c_a), veh/h	475	507	408	647	792		353	3071		122	2550	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	46.2	43.5	50.0	36.7	0.0	52.5	21.7	0.0	56.9	32.8	0.0
Incr Delay (d2), s/veh	5.3	0.6	120.1	40.1	0.1	0.0	55.3	0.4	0.0	3.6	5.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.1	25.6	8.8	1.9	0.0	8.0	9.9	0.0	0.7	16.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.2	46.8	163.6	90.1	36.9	0.0	107.8	22.1	0.0	60.5	38.0	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	D	
Approach Vol, veh/h		900			821	A		2321	A		2332	A
Approach Delay, s/veh		114.0			79.6			35.5			38.4	
Approach LOS		F			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	64.7	24.0	22.5	19.0	54.0	13.9	32.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	3.7	30.1	21.5	20.0	16.5	44.1	9.0	6.6
Green Ext Time (p_c), s	0.0	19.2	0.0	0.0	0.0	5.4	0.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	53.3
HCM 6th LOS	D

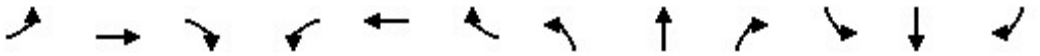
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			326			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



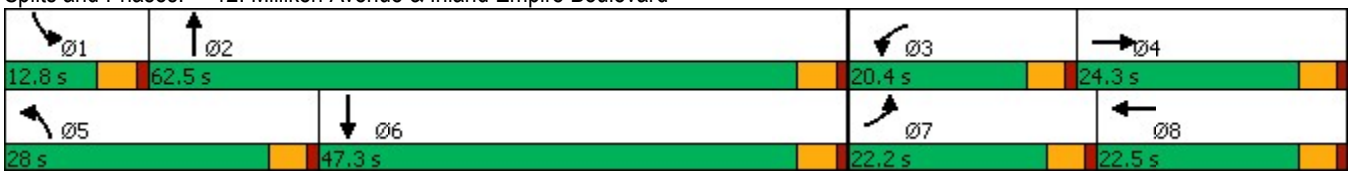
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	283	276	310	204	75	83	376	1528	351	93	1350	114
Future Volume (vph)	283	276	310	204	75	83	376	1528	351	93	1350	114
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	298	291	326	215	79	87	396	1608	369	98	1421	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	298	291	326	215	79	87	396	1608	369	98	1421	120

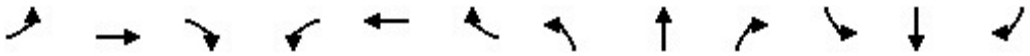
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	276	310	204	75	83	376	1528	351	93	1350	114
Future Volume (vph)	283	276	310	204	75	83	376	1528	351	93	1350	114
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.4	14.4	100.5	12.8	11.7	100.5	18.9	49.7	100.5	7.9	35.8	100.5
Actuated g/C Ratio	0.18	0.14	1.00	0.13	0.12	1.00	0.19	0.49	1.00	0.08	0.36	1.00
v/c Ratio	0.56	0.60	0.22	0.59	0.20	0.06	0.73	0.54	0.25	0.43	0.66	0.08
Control Delay	46.6	48.1	0.3	51.0	44.5	0.1	48.8	19.3	0.4	55.4	29.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	48.1	0.3	51.0	44.5	0.1	48.8	19.3	0.4	55.4	29.5	0.1
LOS	D	D	A	D	D	A	D	B	A	E	C	A
Approach Delay		30.6			38.1			21.3			28.9	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 26.4	Intersection LOS: C
Intersection Capacity Utilization 63.4%	ICU Level of Service B
Analysis Period (min) 15	

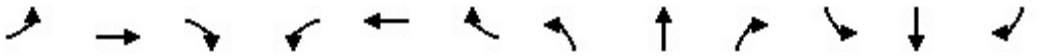
Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	298	291	326	215	79	87	396	1608	369	98	1421	120
v/c Ratio	0.56	0.60	0.22	0.59	0.20	0.06	0.73	0.54	0.25	0.43	0.66	0.08
Control Delay	46.6	48.1	0.3	51.0	44.5	0.1	48.8	19.3	0.4	55.4	29.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	48.1	0.3	51.0	44.5	0.1	48.8	19.3	0.4	55.4	29.5	0.1
Queue Length 50th (ft)	95	95	0	69	25	0	126	212	0	31	222	0
Queue Length 95th (ft)	164	156	0	122	52	0	204	283	0	67	308	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	564	682	1500	472	620	1500	699	3622	1500	246	2673	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.43	0.22	0.46	0.13	0.06	0.57	0.44	0.25	0.40	0.53	0.08

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	283	276	310	204	75	83	376	1528	351	93	1350	114
Future Volume (veh/h)	283	276	310	204	75	83	376	1528	351	93	1350	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	298	291	0	215	79	0	396	1608	0	98	1421	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	386	422		296	319		496	2964		164	2268	
Arrive On Green	0.13	0.13	0.00	0.10	0.09	0.00	0.17	0.49	0.00	0.06	0.37	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	298	291	0	215	79	0	396	1608	0	98	1421	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	7.7	6.5	0.0	5.6	1.7	0.0	10.2	14.4	0.0	2.6	14.9	0.0
Cycle Q Clear(g_c), s	7.7	6.5	0.0	5.6	1.7	0.0	10.2	14.4	0.0	2.6	14.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	386	422		296	319		496	2964		164	2268	
V/C Ratio(X)	0.77	0.69		0.73	0.25		0.80	0.54		0.60	0.63	
Avail Cap(c_a), veh/h	659	852		592	775		874	4521		309	3336	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.8	32.7	0.0	34.1	32.8	0.0	31.1	14.0	0.0	36.0	20.1	0.0
Incr Delay (d2), s/veh	3.3	2.0	0.0	3.4	0.4	0.0	3.0	0.2	0.0	3.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	2.7	0.0	2.1	0.7	0.0	3.7	4.5	0.0	1.0	5.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.1	34.7	0.0	37.4	33.2	0.0	34.1	14.2	0.0	39.5	20.4	0.0
LnGrp LOS	D	C		D	C		C	B		D	C	
Approach Vol, veh/h		589	A		294	A		2004	A		1519	A
Approach Delay, s/veh		35.4			36.3			18.1			21.6	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	42.5	12.5	14.3	17.8	33.6	14.9	11.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	4.6	16.4	7.6	8.5	12.2	16.9	9.7	3.7
Green Ext Time (p_c), s	0.1	17.7	0.4	1.3	1.1	12.2	0.6	0.3

Intersection Summary	
HCM 6th Ctrl Delay	22.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.983	0.850				
Flt Protected	0.957					
Satd. Flow (prot)	3042	1365	6071	0	0	6071
Flt Permitted	0.957					
Satd. Flow (perm)	3042	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	4				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

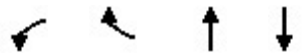
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	479	302	2147	0	0	2178
Future Volume (vph)	479	302	2147	0	0	2178
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	499	315	2236	0	0	2269
Shared Lane Traffic (%)		20%				
Lane Group Flow (vph)	562	252	2236	0	0	2269

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	479	302	2147	2178
Future Volume (vph)	479	302	2147	2178
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	16.2	16.2	36.4	36.4
Actuated g/C Ratio	0.26	0.26	0.59	0.59
v/c Ratio	0.70	0.70	0.62	0.63
Control Delay	25.4	31.2	9.6	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	25.4	31.2	9.6	9.7
LOS	C	C	A	A
Approach Delay	27.2		9.6	9.7
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 61.6	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 12.3	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	562	252	2236	2269
v/c Ratio	0.70	0.70	0.62	0.63
Control Delay	25.4	31.2	9.6	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	25.4	31.2	9.6	9.7
Queue Length 50th (ft)	96	91	145	148
Queue Length 95th (ft)	144	169	198	202
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	969	436	3611	3611
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.58	0.62	0.63

Intersection Summary

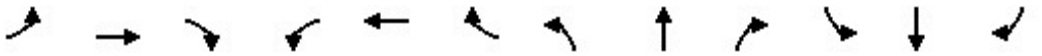
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	479	302	2147	0	0	2178
Future Volume (veh/h)	479	302	2147	0	0	2178
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	540	271	2236	0	0	2269
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	773	364	3615	0	0	3615
Arrive On Green	0.24	0.24	0.59	0.00	0.00	0.59
Sat Flow, veh/h	3188	1502	6592	0	0	6592
Grp Volume(v), veh/h	540	271	2236	0	0	2269
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	8.4	9.1	12.9	0.0	0.0	13.2
Cycle Q Clear(g_c), s	8.4	9.1	12.9	0.0	0.0	13.2
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	773	364	3615	0	0	3615
V/C Ratio(X)	0.70	0.74	0.62	0.00	0.00	0.63
Avail Cap(c_a), veh/h	1137	536	4070	0	0	4070
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	19.1	7.2	0.0	0.0	7.2
Incr Delay (d2), s/veh	1.2	3.2	0.2	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	3.2	3.0	0.0	0.0	3.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.0	22.3	7.4	0.0	0.0	7.5
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	811		2236			2269
Approach Delay, s/veh	20.8		7.4			7.5
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		36.9			36.9	17.7
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		14.9			15.2	11.1
Green Ext Time (p_c), s		17.2			17.2	2.1

Intersection Summary	
HCM 6th Ctrl Delay	9.5
HCM 6th LOS	A

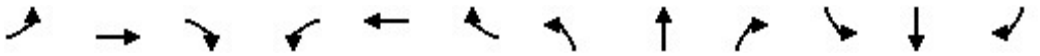
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147			136			294			60
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



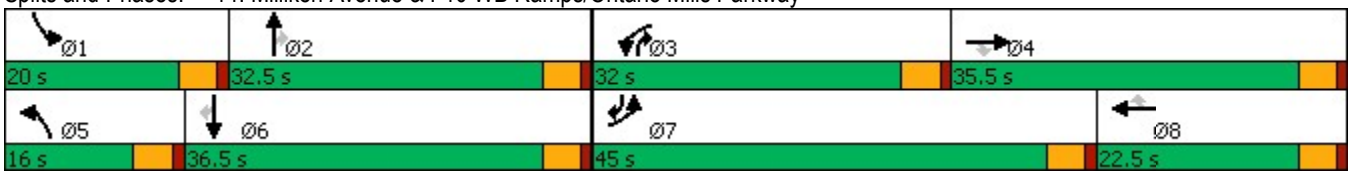
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	745	189	228	243	289	61	231	980	435	319	1031	460
Future Volume (vph)	745	189	228	243	289	61	231	980	435	319	1031	460
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	776	197	238	253	301	64	241	1021	453	332	1074	479
Shared Lane Traffic (%)												
Lane Group Flow (vph)	776	197	238	253	301	64	241	1021	453	332	1074	479

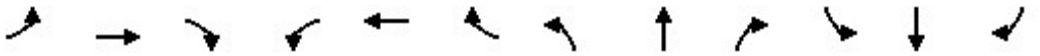
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	745	189	228	243	289	61	231	980	435	319	1031	460
Future Volume (vph)	745	189	228	243	289	61	231	980	435	319	1031	460
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	34.6	34.1	34.1	15.3	14.8	14.8	11.5	25.6	45.5	15.2	29.3	68.4
Actuated g/C Ratio	0.32	0.31	0.31	0.14	0.14	0.14	0.11	0.24	0.42	0.14	0.27	0.63
v/c Ratio	0.84	0.36	0.42	0.62	0.66	0.20	0.79	0.71	0.57	0.82	0.66	0.49
Control Delay	44.4	32.0	14.5	52.0	53.2	1.4	68.5	42.1	11.1	64.8	38.1	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	32.0	14.5	52.0	53.2	1.4	68.5	42.1	11.1	64.8	38.1	11.3
LOS	D	C	B	D	D	A	E	D	B	E	D	B
Approach Delay		36.5			47.3			37.6			36.0	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 108.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 37.9	Intersection LOS: D
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	776	197	238	253	301	64	241	1021	453	332	1074	479
v/c Ratio	0.84	0.36	0.42	0.62	0.66	0.20	0.79	0.71	0.57	0.82	0.66	0.49
Control Delay	44.4	32.0	14.5	52.0	53.2	1.4	68.5	42.1	11.1	64.8	38.1	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	32.0	14.5	52.0	53.2	1.4	68.5	42.1	11.1	64.8	38.1	11.3
Queue Length 50th (ft)	270	109	48	92	112	0	91	200	79	125	202	144
Queue Length 95th (ft)	357	186	124	135	164	0	#170	253	176	#215	256	233
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1098	581	593	745	565	366	311	1594	940	420	1821	1056
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.34	0.40	0.34	0.53	0.17	0.77	0.64	0.48	0.79	0.59	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	745	189	228	243	289	61	231	980	435	319	1031	460
Future Volume (veh/h)	745	189	228	243	289	61	231	980	435	319	1031	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	776	197	238	253	301	64	241	1021	453	332	1074	479
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	871	541	459	325	397	177	295	1667	578	389	1862	908
Arrive On Green	0.30	0.31	0.31	0.11	0.12	0.12	0.10	0.27	0.27	0.13	0.31	0.31
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	776	197	238	253	301	64	241	1021	453	332	1074	479
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	26.1	8.9	13.4	8.7	8.9	4.0	8.3	15.0	27.2	11.4	15.2	19.0
Cycle Q Clear(g_c), s	26.1	8.9	13.4	8.7	8.9	4.0	8.3	15.0	27.2	11.4	15.2	19.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	871	541	459	325	397	177	295	1667	578	389	1862	908
V/C Ratio(X)	0.89	0.36	0.52	0.78	0.76	0.36	0.82	0.61	0.78	0.85	0.58	0.53
Avail Cap(c_a), veh/h	1151	541	459	782	592	264	327	1667	578	440	1905	919
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	27.8	29.3	44.3	43.8	41.6	45.1	32.5	27.7	43.4	30.0	11.7
Incr Delay (d2), s/veh	7.2	0.4	1.0	4.1	3.2	1.2	13.6	0.7	7.0	13.7	0.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	3.8	4.9	3.3	3.8	1.5	3.5	5.5	10.6	4.8	5.6	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.5	28.2	30.4	48.3	46.9	42.9	58.7	33.1	34.7	57.1	30.4	12.3
LnGrp LOS	D	C	C	D	D	D	E	C	C	E	C	B
Approach Vol, veh/h		1211			618			1715			1885	
Approach Delay, s/veh		37.1			47.1			37.1			30.5	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.2	32.5	15.9	35.8	14.9	35.8	35.2	16.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	13.4	29.2	10.7	15.4	10.3	21.0	28.1	10.9
Green Ext Time (p_c), s	0.3	0.0	0.8	1.7	0.1	6.7	2.6	1.2

Intersection Summary	
HCM 6th Ctrl Delay	36.0
HCM 6th LOS	D

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3066	1365	0	6071	6071	0
Flt Permitted	0.955					
Satd. Flow (perm)	3066	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6	16				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

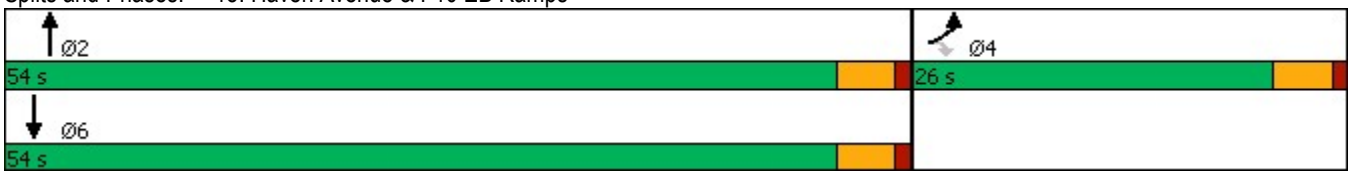
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	485	237	0	2369	1826	0
Future Volume (vph)	485	237	0	2369	1826	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	505	247	0	2468	1902	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	530	222	0	2468	1902	0

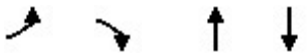
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	485	237	2369	1826
Future Volume (vph)	485	237	2369	1826
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	18.0	18.0	49.1	49.1
Actuated g/C Ratio	0.24	0.24	0.65	0.65
v/c Ratio	0.73	0.66	0.63	0.49
Control Delay	32.8	34.8	9.4	7.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.8	34.8	9.4	7.8
LOS	C	C	A	A
Approach Delay	33.4		9.4	7.8
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 12.3	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	530	222	2468	1902
v/c Ratio	0.73	0.66	0.63	0.49
Control Delay	32.8	34.8	9.4	7.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.8	34.8	9.4	7.8
Queue Length 50th (ft)	119	97	186	123
Queue Length 95th (ft)	170	176	243	163
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	873	398	3964	3964
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.56	0.62	0.48

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	485	237	0	2369	1826	0
Future Volume (veh/h)	485	237	0	2369	1826	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	505	247	0	2468	1902	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	686	323	0	3962	3962	0
Arrive On Green	0.22	0.22	0.00	0.65	0.65	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	505	247	0	2468	1902	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	9.9	10.3	0.0	15.9	10.6	0.0
Cycle Q Clear(g_c), s	9.9	10.3	0.0	15.9	10.6	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	686	323	0	3962	3962	0
V/C Ratio(X)	0.74	0.76	0.00	0.62	0.48	0.00
Avail Cap(c_a), veh/h	1026	483	0	4518	4518	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.4	24.6	0.0	6.9	5.9	0.0
Incr Delay (d2), s/veh	1.6	4.1	0.0	0.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	3.8	0.0	3.8	2.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.0	28.7	0.0	7.1	6.0	0.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	752			2468	1902	
Approach Delay, s/veh	26.9			7.1	6.0	
Approach LOS	C			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		47.9		18.9		47.9
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		17.9		12.3		12.6
Green Ext Time (p_c), s		25.5		2.1		21.3

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		11				92
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	493	194	313	1159	978	540
Future Volume (vph)	493	194	313	1159	978	540
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	508	200	323	1195	1008	557
Shared Lane Traffic (%)						
Lane Group Flow (vph)	508	200	323	1195	1008	557

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	493	194	313	1159	978	540
Future Volume (vph)	493	194	313	1159	978	540
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.0	29.3	9.7	30.5	16.2	35.8
Actuated g/C Ratio	0.27	0.54	0.18	0.56	0.30	0.65
v/c Ratio	0.64	0.25	0.63	0.35	0.56	0.55
Control Delay	22.0	7.6	28.2	7.3	18.0	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	7.6	28.2	7.3	18.0	6.5
LOS	C	A	C	A	B	A
Approach Delay	17.9			11.7	13.9	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 53.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

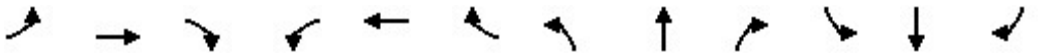
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	508	200	323	1195	1008	557
v/c Ratio	0.64	0.25	0.63	0.35	0.56	0.55
Control Delay	22.0	7.6	28.2	7.3	18.0	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	7.6	28.2	7.3	18.0	6.5
Queue Length 50th (ft)	79	32	55	59	84	63
Queue Length 95th (ft)	122	62	93	82	116	123
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	968	832	559	3728	2045	1099
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.24	0.58	0.32	0.49	0.51

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	493	194	313	1159	978	540
Future Volume (veh/h)	493	194	313	1159	978	540
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	508	200	323	1195	1008	557
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	689	583	440	3556	2086	869
Arrive On Green	0.24	0.24	0.15	0.58	0.34	0.34
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	508	200	323	1195	1008	557
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	8.1	4.7	5.3	5.1	6.5	12.4
Cycle Q Clear(g_c), s	8.1	4.7	5.3	5.1	6.5	12.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	689	583	440	3556	2086	869
V/C Ratio(X)	0.74	0.34	0.73	0.34	0.48	0.64
Avail Cap(c_a), veh/h	1046	767	604	4017	2203	898
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.7	10.8	20.3	5.4	13.0	7.1
Incr Delay (d2), s/veh	1.6	0.3	3.0	0.1	0.2	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	4.5	1.8	1.1	1.9	5.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.2	11.2	23.2	5.5	13.2	8.5
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	708			1518	1565	
Approach Delay, s/veh	16.9			9.2	11.5	
Approach LOS	B			A	B	

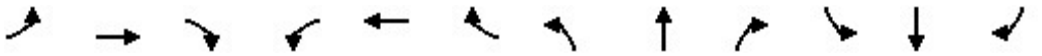
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		33.7		16.4	12.1	21.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		7.1		10.1	7.3	14.4
Green Ext Time (p_c), s		9.9		1.8	0.4	2.7

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.972				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49				173			262		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



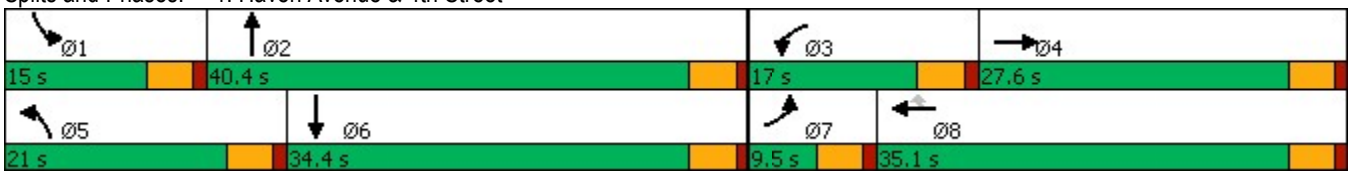
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	50	530	123	199	503	163	178	1103	347	169	1072	76
Future Volume (vph)	50	530	123	199	503	163	178	1103	347	169	1072	76
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	53	564	131	212	535	173	189	1173	369	180	1140	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	695	0	212	535	173	189	1173	369	180	1221	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	50	530	199	503	163	178	1103	347	169	1072
Future Volume (vph)	50	530	199	503	163	178	1103	347	169	1072
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	19.4	11.2	27.7	27.7	11.5	36.1	94.5	9.7	34.3
Actuated g/C Ratio	0.05	0.21	0.12	0.29	0.29	0.12	0.38	1.00	0.10	0.36
v/c Ratio	0.35	0.69	0.62	0.54	0.31	0.54	0.64	0.25	0.61	0.56
Control Delay	51.7	36.3	48.8	30.9	5.7	45.3	26.7	0.4	50.8	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	36.3	48.8	30.9	5.7	45.3	26.7	0.4	50.8	26.1
LOS	D	D	D	C	A	D	C	A	D	C
Approach Delay		37.4		30.3			23.1			29.2
Approach LOS		D		C			C			C

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 94.5	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	695	212	535	173	189	1173	369	180	1221
v/c Ratio	0.35	0.69	0.62	0.54	0.31	0.54	0.64	0.25	0.61	0.56
Control Delay	51.7	36.3	48.8	30.9	5.7	45.3	26.7	0.4	50.8	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	36.3	48.8	30.9	5.7	45.3	26.7	0.4	50.8	26.1
Queue Length 50th (ft)	16	135	64	147	0	57	217	0	55	171
Queue Length 95th (ft)	37	178	105	200	47	91	280	0	93	231
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	153	1186	384	1090	604	507	1838	1500	322	2189
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.59	0.55	0.49	0.29	0.37	0.64	0.25	0.56	0.56

Intersection Summary

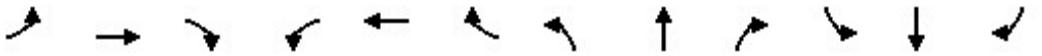
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	530	123	199	503	163	178	1103	347	169	1072	76
Future Volume (veh/h)	50	530	123	199	503	163	178	1103	347	169	1072	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	53	564	131	212	535	173	189	1173	0	180	1140	81
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	121	773	176	281	846	377	261	2007		245	2396	169
Arrive On Green	0.04	0.20	0.20	0.10	0.25	0.25	0.09	0.41	0.00	0.08	0.41	0.41
Sat Flow, veh/h	2910	3939	896	2910	3367	1502	2910	4837	1502	2910	5855	414
Grp Volume(v), veh/h	53	460	235	212	535	173	189	1173	0	180	889	332
Grp Sat Flow(s),veh/h/ln	1455	1612	1611	1455	1683	1502	1455	1612	1502	1455	1524	1697
Q Serve(g_s), s	1.5	11.6	11.9	6.1	12.2	8.4	5.5	16.2	0.0	5.2	12.3	12.4
Cycle Q Clear(g_c), s	1.5	11.6	11.9	6.1	12.2	8.4	5.5	16.2	0.0	5.2	12.3	12.4
Prop In Lane	1.00		0.56	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	121	633	316	281	846	377	261	2007		245	1871	695
V/C Ratio(X)	0.44	0.73	0.74	0.75	0.63	0.46	0.72	0.58		0.73	0.48	0.48
Avail Cap(c_a), veh/h	168	861	430	420	1191	531	555	2007		353	1871	695
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.5	32.6	32.7	38.1	28.8	27.4	38.3	19.6	0.0	38.7	18.7	18.8
Incr Delay (d2), s/veh	2.5	2.0	4.6	4.2	0.8	0.9	3.8	1.3	0.0	4.5	0.9	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.6	4.9	2.3	4.9	3.0	2.1	6.0	0.0	2.0	4.3	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.0	34.6	37.4	42.3	29.6	28.3	42.1	20.8	0.0	43.2	19.6	21.1
LnGrp LOS	D	C	D	D	C	C	D	C		D	B	C
Approach Vol, veh/h		748			920			1362	A		1401	
Approach Delay, s/veh		36.1			32.3			23.8			23.0	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.8	40.4	12.9	21.5	12.3	39.9	8.1	26.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	7.2	18.2	8.1	13.9	7.5	14.4	3.5	14.2
Green Ext Time (p_c), s	0.2	8.0	0.3	3.1	0.4	7.4	0.0	3.9

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

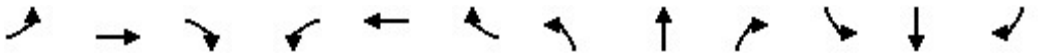
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.999				0.850			0.850		0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	1667	6065	0	1583	4818	1500	1667	1765	1500	1583	2850	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	1667	6065	0	1583	4818	1500	1667	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				153			387		401	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



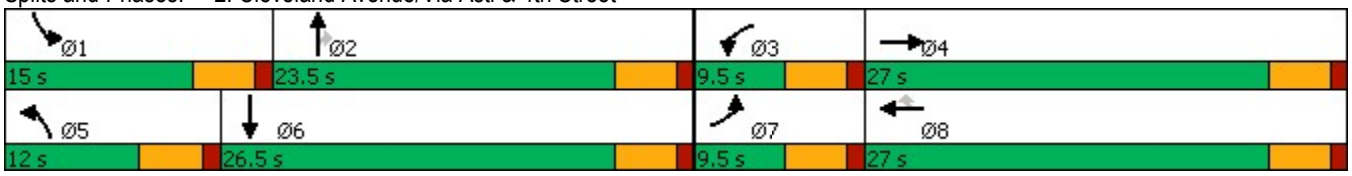
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1125	4	3	877	4	0	0	4	3	0	1
Future Volume (vph)	0	1125	4	3	877	4	0	0	4	3	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1160	4	3	904	4	0	0	4	3	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1164	0	3	904	4	0	0	4	3	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT	Ø5	Ø7
Lane Configurations									
Traffic Volume (vph)	1125	3	877	4	4	3	0		
Future Volume (vph)	1125	3	877	4	4	3	0		
Turn Type	NA	Prot	NA	Perm	Perm	Prot	NA		
Protected Phases	4	3	8			1	6	5	7
Permitted Phases				8	2				
Detector Phase	4	3	8	8	2	1	6		
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	22.5	9.5	22.5	9.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	23.5	15.0	26.5	12.0	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	31.3%	20.0%	35.3%	16%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
Lead/Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min	None	None
Act Effct Green (s)	16.7	5.4	17.8	17.8	6.0	6.0	7.2		
Actuated g/C Ratio	0.48	0.16	0.51	0.51	0.17	0.17	0.21		
v/c Ratio	0.40	0.01	0.37	0.00	0.01	0.01	0.00		
Control Delay	7.3	19.0	5.6	0.0	0.0	18.0	0.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	7.3	19.0	5.6	0.0	0.0	18.0	0.0		
LOS	A	B	A	A	A	B	A		
Approach Delay	7.3		5.6				13.5		
Approach LOS	A		A				B		

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 34.8	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 6.5	Intersection LOS: A
Intersection Capacity Utilization 36.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



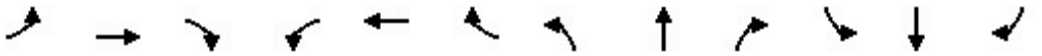
Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT
Lane Group Flow (vph)	1164	3	904	4	4	3	1
v/c Ratio	0.40	0.01	0.37	0.00	0.01	0.01	0.00
Control Delay	7.3	19.0	5.6	0.0	0.0	18.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	19.0	5.6	0.0	0.0	18.0	0.0
Queue Length 50th (ft)	24	1	24	0	0	1	0
Queue Length 95th (ft)	110	8	75	0	0	7	0
Internal Link Dist (ft)	2546		362				358
Turn Bay Length (ft)		130		145	165	50	
Base Capacity (vph)	4243	245	3530	1140	1044	517	2076
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.01	0.26	0.00	0.00	0.01	0.00

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1125	4	3	877	4	0	0	4	3	0	1
Future Volume (veh/h)	0	1125	4	3	877	4	0	0	4	3	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	0	1160	4	3	904	4	0	0	4	3	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	2394	8	7	2433	755	4	236	200	7	433	386
Arrive On Green	0.00	0.38	0.38	0.00	0.50	0.50	0.00	0.00	0.13	0.00	0.00	0.26
Sat Flow, veh/h	1594	6318	22	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	0	839	325	3	904	4	0	0	4	3	0	1
Grp Sat Flow(s),veh/h/ln	1594	1524	1768	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.0	5.2	5.2	0.1	4.3	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.2	5.2	0.1	4.3	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	4	1733	670	7	2433	755	4	236	200	7	433	386
V/C Ratio(X)	0.00	0.48	0.48	0.46	0.37	0.01	0.00	0.00	0.02	0.46	0.00	0.00
Avail Cap(c_a), veh/h	212	2741	1060	212	2900	900	318	897	760	446	987	880
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	8.9	8.9	18.6	5.7	4.6	0.0	0.0	14.1	18.6	0.0	10.4
Incr Delay (d2), s/veh	0.0	0.2	0.5	42.9	0.1	0.0	0.0	0.0	0.0	42.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	1.5	0.1	0.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	9.1	9.4	61.5	5.8	4.7	0.0	0.0	14.2	61.5	0.0	10.4
LnGrp LOS	A	A	A	E	A	A	A	A	B	E	A	B
Approach Vol, veh/h		1164			911			4			4	
Approach Delay, s/veh		9.2			6.0			14.2			48.7	
Approach LOS		A			A			B			D	

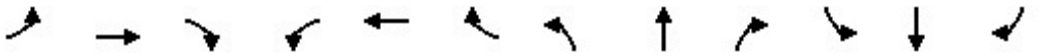
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.7	9.5	4.7	18.7	0.0	14.2	0.0	23.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	2.1	2.1	2.1	7.2	0.0	2.0	0.0	6.3
Green Ext Time (p_c), s	0.0	0.0	0.0	7.0	0.0	0.0	0.0	5.8

Intersection Summary	
HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.993				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4784	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.726				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4784	0	1210	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			15				226			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



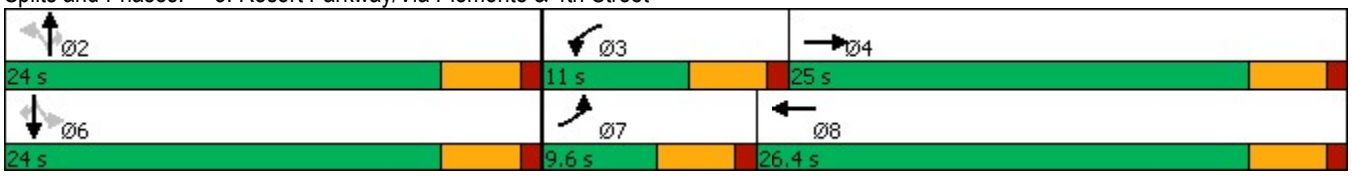
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	1106	8	5	850	45	3	0	8	45	1	15
Future Volume (vph)	11	1106	8	5	850	45	3	0	8	45	1	15
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	1140	8	5	876	46	3	0	8	46	1	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1148	0	5	922	0	3	0	8	0	47	15

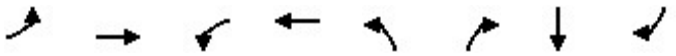
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	11	1106	5	850	3	8	45	1	15
Future Volume (vph)	11	1106	5	850	3	8	45	1	15
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.4	16.2	6.0	16.3	7.0	7.0		7.0	7.0
Actuated g/C Ratio	0.16	0.48	0.18	0.48	0.21	0.21		0.21	0.21
v/c Ratio	0.02	0.40	0.02	0.40	0.01	0.02		0.18	0.04
Control Delay	16.8	6.9	16.4	6.8	14.3	0.0		15.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	16.8	6.9	16.4	6.8	14.3	0.0		15.8	0.2
LOS	B	A	B	A	B	A		B	A
Approach Delay		7.0		6.8				12.0	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 34.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 7.0	Intersection LOS: A
Intersection Capacity Utilization 38.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	11	1148	5	922	3	8	47	15
v/c Ratio	0.02	0.40	0.02	0.40	0.01	0.02	0.18	0.04
Control Delay	16.8	6.9	16.4	6.8	14.3	0.0	15.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	6.9	16.4	6.8	14.3	0.0	15.8	0.2
Queue Length 50th (ft)	1	27	1	27	1	0	6	0
Queue Length 95th (ft)	7	88	9	89	6	0	34	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	455	3847	317	3239	728	992	776	946
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.30	0.02	0.28	0.00	0.01	0.06	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1106	8	5	850	45	3	0	8	45	1	15
Future Volume (veh/h)	11	1106	8	5	850	45	3	0	8	45	1	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	11	1140	8	5	876	46	3	0	8	46	1	15
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	2554	18	11	1874	98	400	281	238	444	7	238
Arrive On Green	0.01	0.41	0.41	0.01	0.40	0.40	0.16	0.00	0.16	0.16	0.16	0.16
Sat Flow, veh/h	2910	6291	44	1594	4706	247	1320	1772	1502	1371	45	1502
Grp Volume(v), veh/h	11	828	320	5	600	322	3	0	8	47	0	15
Grp Sat Flow(s),veh/h/ln	1455	1524	1764	1594	1612	1728	1320	1772	1502	1417	0	1502
Q Serve(g_s), s	0.1	4.1	4.1	0.1	4.3	4.3	0.1	0.0	0.1	0.9	0.0	0.3
Cycle Q Clear(g_c), s	0.1	4.1	4.1	0.1	4.3	4.3	1.0	0.0	0.1	0.9	0.0	0.3
Prop In Lane	1.00		0.03	1.00		0.14	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	42	1856	716	11	1284	688	400	281	238	451	0	238
V/C Ratio(X)	0.26	0.45	0.45	0.46	0.47	0.47	0.01	0.00	0.03	0.10	0.00	0.06
Avail Cap(c_a), veh/h	471	2975	1148	329	2242	1201	1008	1097	929	1101	0	929
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	6.8	6.8	15.6	7.0	7.0	11.9	0.0	11.2	11.5	0.0	11.3
Incr Delay (d2), s/veh	3.2	0.2	0.4	27.6	0.3	0.5	0.0	0.0	0.1	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.8	1.0	0.1	0.9	1.0	0.0	0.0	0.0	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.5	7.0	7.2	43.2	7.3	7.5	12.0	0.0	11.3	11.6	0.0	11.4
LnGrp LOS	B	A	A	D	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1159			927			11			62	
Approach Delay, s/veh		7.1			7.5			11.5			11.6	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	4.7	17.3		9.5	5.0	17.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		3.0	2.1	6.1		2.9	2.1	6.3				
Green Ext Time (p_c), s		0.0	0.0	6.6		0.2	0.0	5.5				

Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	4774	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4774	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1087	72	0	920	0	15
Future Volume (vph)	1087	72	0	920	0	15
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1144	76	0	968	0	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1220	0	0	968	0	16

Intersection Summary

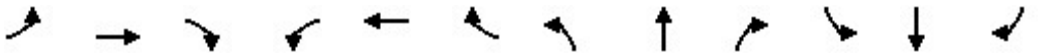
Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1087	72	0	920	0	15
Future Vol, veh/h	1087	72	0	920	0	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1144	76	0	968	0	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	610
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	375
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	375
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

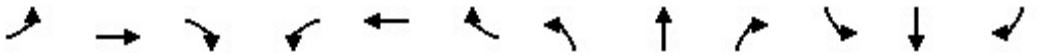
Approach	EB	WB	NB
HCM Control Delay, s	0	0	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	375	-	-	-
HCM Lane V/C Ratio	0.042	-	-	-
HCM Control Delay (s)	15	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			259			281			95		38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



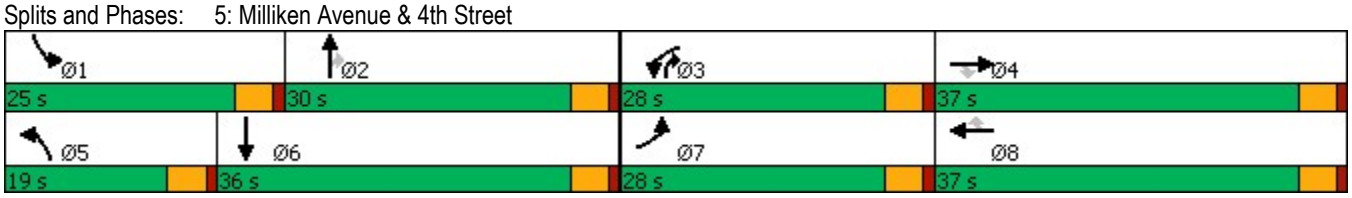
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	263	882	272	507	636	267	199	820	350	375	793	146
Future Volume (vph)	263	882	272	507	636	267	199	820	350	375	793	146
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	277	928	286	534	669	281	209	863	368	395	835	154
Shared Lane Traffic (%)												
Lane Group Flow (vph)	277	928	286	534	669	281	209	863	368	395	989	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	263	882	272	507	636	267	199	820	350	375	793
Future Volume (vph)	263	882	272	507	636	267	199	820	350	375	793
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	16.2	29.5	29.5	23.0	36.3	36.3	12.6	22.9	50.4	18.8	29.2
Actuated g/C Ratio	0.14	0.26	0.26	0.20	0.32	0.32	0.11	0.20	0.45	0.17	0.26
v/c Ratio	0.67	0.73	0.49	0.91	0.43	0.42	0.65	0.70	0.51	0.82	0.63
Control Delay	54.6	42.3	9.1	65.2	32.1	5.8	58.8	45.4	19.4	60.6	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	42.3	9.1	65.2	32.1	5.8	58.8	45.4	19.4	60.6	37.9
LOS	D	D	A	E	C	A	E	D	B	E	D
Approach Delay		38.2			39.0			40.7			44.4
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 40.5	Intersection LOS: D
Intersection Capacity Utilization 75.4%	ICU Level of Service D
Analysis Period (min) 15	

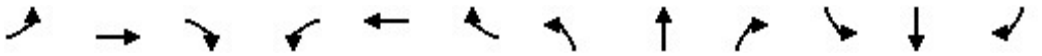
Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	277	928	286	534	669	281	209	863	368	395	989
v/c Ratio	0.67	0.73	0.49	0.91	0.43	0.42	0.65	0.70	0.51	0.82	0.63
Control Delay	54.6	42.3	9.1	65.2	32.1	5.8	58.8	45.4	19.4	60.6	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.6	42.3	9.1	65.2	32.1	5.8	58.8	45.4	19.4	60.6	37.9
Queue Length 50th (ft)	105	235	15	209	145	0	79	179	147	151	187
Queue Length 95th (ft)	146	289	89	#319	197	65	121	217	238	#224	227
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	610	1406	621	610	1565	676	376	1390	735	532	1705
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.66	0.46	0.88	0.43	0.42	0.56	0.62	0.50	0.74	0.58

Intersection Summary

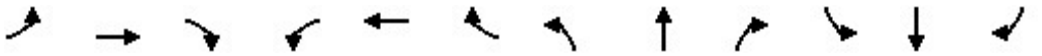
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	882	272	507	636	267	199	820	350	375	793	146
Future Volume (veh/h)	263	882	272	507	636	267	199	820	350	375	793	146
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	277	928	286	534	669	281	209	863	368	395	835	154
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	344	1205	374	589	1613	501	266	1371	642	456	1517	274
Arrive On Green	0.12	0.25	0.25	0.20	0.33	0.33	0.09	0.22	0.22	0.16	0.29	0.29
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5229	945
Grp Volume(v), veh/h	277	928	286	534	669	281	209	863	368	395	728	261
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1602
Q Serve(g_s), s	10.0	19.2	19.0	19.3	11.5	16.5	7.6	13.8	20.0	14.3	14.5	14.9
Cycle Q Clear(g_c), s	10.0	19.2	19.0	19.3	11.5	16.5	7.6	13.8	20.0	14.3	14.5	14.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	344	1205	374	589	1613	501	266	1371	642	456	1326	465
V/C Ratio(X)	0.81	0.77	0.76	0.91	0.41	0.56	0.79	0.63	0.57	0.87	0.55	0.56
Avail Cap(c_a), veh/h	634	1458	453	634	1613	501	391	1442	659	553	1336	468
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	37.6	37.5	42.0	27.8	29.5	47.9	37.7	23.4	44.4	32.3	32.4
Incr Delay (d2), s/veh	4.5	2.1	6.2	16.1	0.2	1.4	6.3	0.8	1.2	11.8	0.5	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	7.7	7.6	8.2	4.4	6.1	3.0	5.2	7.1	5.9	5.4	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.8	39.7	43.8	58.1	28.0	30.9	54.2	38.5	24.6	56.2	32.8	34.0
LnGrp LOS	D	D	D	E	C	C	D	D	C	E	C	C
Approach Vol, veh/h		1491			1484			1440			1384	
Approach Delay, s/veh		42.6			39.3			37.2			39.7	
Approach LOS		D			D			D			D	

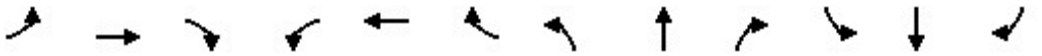
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.4	28.7	26.3	31.3	14.3	35.8	17.2	40.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	16.3	22.0	21.3	21.2	9.6	16.9	12.0	18.5
Green Ext Time (p_c), s	0.6	2.2	0.5	5.6	0.3	5.9	0.7	4.8

Intersection Summary	
HCM 6th Ctrl Delay	39.7
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.947	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3042	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3042	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			156			277			375		79	403
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



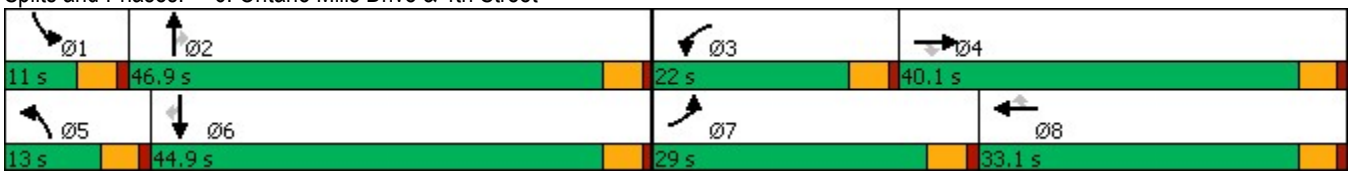
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	702	1026	150	394	846	404	175	306	469	65	607	745
Future Volume (vph)	702	1026	150	394	846	404	175	306	469	65	607	745
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	731	1069	156	410	881	421	182	319	489	68	632	776
Shared Lane Traffic (%)												44%
Lane Group Flow (vph)	731	1069	156	410	881	421	182	319	489	68	973	435

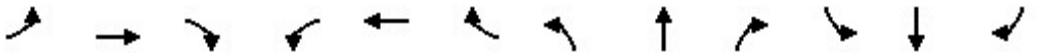
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	702	1026	150	394	846	404	175	306	469	65	607	745
Future Volume (vph)	702	1026	150	394	846	404	175	306	469	65	607	745
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	34.7	34.7	17.5	27.7	27.7	8.5	41.4	41.4	6.5	39.4	39.4
Actuated g/C Ratio	0.21	0.29	0.29	0.15	0.23	0.23	0.07	0.35	0.35	0.06	0.33	0.33
v/c Ratio	1.22	0.76	0.28	0.96	0.78	0.75	1.60	0.27	0.64	0.78	0.91	0.60
Control Delay	153.1	42.0	6.3	84.6	48.1	23.3	342.4	28.4	11.7	106.7	48.3	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	153.1	42.0	6.3	84.6	48.1	23.3	342.4	28.4	11.7	106.7	48.3	8.0
LOS	F	D	A	F	D	C	F	C	B	F	D	A
Approach Delay		80.7			50.7			77.9			39.1	
Approach LOS		F			D			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.1	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.60	
Intersection Signal Delay: 61.9	Intersection LOS: E
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



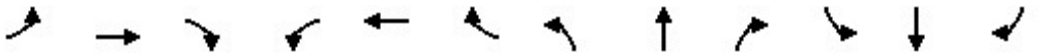


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	731	1069	156	410	881	421	182	319	489	68	973	435
v/c Ratio	1.22	0.76	0.28	0.96	0.78	0.75	1.60	0.27	0.64	0.78	0.91	0.60
Control Delay	153.1	42.0	6.3	84.6	48.1	23.3	342.4	28.4	11.7	106.7	48.3	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	153.1	42.0	6.3	84.6	48.1	23.3	342.4	28.4	11.7	106.7	48.3	8.0
Queue Length 50th (ft)	~362	273	0	164	234	103	~203	92	61	53	366	18
Queue Length 95th (ft)	#484	328	50	#267	285	232	#351	130	180	#137	#500	119
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	600	1454	561	428	1168	573	114	1205	779	87	1093	732
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.74	0.28	0.96	0.75	0.73	1.60	0.26	0.63	0.78	0.89	0.59

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



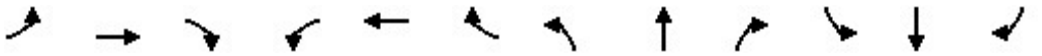
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	702	1026	150	394	846	404	175	306	469	65	607	745
Future Volume (veh/h)	702	1026	150	394	846	404	175	306	469	65	607	745
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	731	1069	156	410	881	421	182	319	489	68	623	782
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	1435	445	424	1153	358	113	1194	533	84	597	1011
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	731	1069	156	410	881	421	182	319	489	68	623	782
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	24.5	23.9	9.8	16.8	20.4	28.6	8.5	8.1	37.4	5.1	40.4	28.0
Cycle Q Clear(g_c), s	24.5	23.9	9.8	16.8	20.4	28.6	8.5	8.1	37.4	5.1	40.4	28.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	1435	445	424	1153	358	113	1194	533	84	597	1011
V/C Ratio(X)	1.23	0.74	0.35	0.97	0.76	1.18	1.61	0.27	0.92	0.81	1.04	0.77
Avail Cap(c_a), veh/h	594	1435	445	424	1153	358	113	1194	533	86	597	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	38.1	33.1	51.0	42.6	45.7	55.8	27.6	37.0	56.2	39.8	35.7
Incr Delay (d2), s/veh	117.9	2.2	0.5	34.8	3.1	104.8	312.5	0.1	21.0	40.9	48.9	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.5	9.7	3.6	8.2	8.4	21.0	13.2	3.3	16.6	3.0	25.4	10.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	165.6	40.3	33.6	85.8	45.7	150.5	368.2	27.7	58.1	97.1	88.7	39.5
LnGrp LOS	F	D	C	F	D	F	F	C	E	F	F	D
Approach Vol, veh/h		1956			1712			990			1473	
Approach Delay, s/veh		86.6			81.0			105.3			63.0	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	47.1	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	7.1	39.4	18.8	25.9	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	1.2	0.0	5.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	82.4
HCM 6th LOS	F

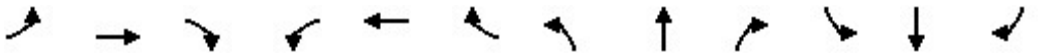
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.981			0.938				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (prot)	2891	4818	1500	1583	4726	0	1583	3145	0	1504	1670	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (perm)	2891	4818	1500	1583	4726	0	1583	3145	0	1504	1670	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95		18			48				444
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



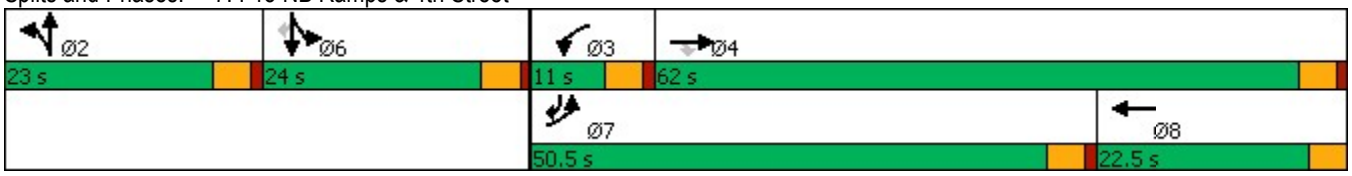
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	975	459	89	31	488	70	91	65	45	68	73	1090
Future Volume (vph)	975	459	89	31	488	70	91	65	45	68	73	1090
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1037	488	95	33	519	74	97	69	48	72	78	1160
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	1037	488	95	33	593	0	97	117	0	65	85	1160

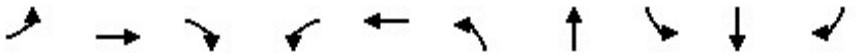
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	975	459	89	31	488	91	65	68	73	1090
Future Volume (vph)	975	459	89	31	488	91	65	68	73	1090
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	43.5	58.2	58.2	6.3	17.2	11.6	11.6	10.6	10.6	58.7
Actuated g/C Ratio	0.43	0.58	0.58	0.06	0.17	0.12	0.12	0.11	0.11	0.59
v/c Ratio	0.83	0.17	0.10	0.33	0.72	0.53	0.29	0.41	0.48	0.67
Control Delay	33.2	11.7	3.3	58.8	44.8	54.9	28.3	52.6	54.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	11.7	3.3	58.8	44.8	54.9	28.3	52.6	54.3	10.7
LOS	C	B	A	E	D	D	C	D	D	B
Approach Delay		25.0			45.5		40.3		15.6	
Approach LOS		C			D		D		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.3	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 26.0	Intersection LOS: C
Intersection Capacity Utilization 68.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1037	488	95	33	593	97	117	65	85	1160
v/c Ratio	0.83	0.17	0.10	0.33	0.72	0.53	0.29	0.41	0.48	0.67
Control Delay	33.2	11.7	3.3	58.8	44.8	54.9	28.3	52.6	54.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	11.7	3.3	58.8	44.8	54.9	28.3	52.6	54.3	10.7
Queue Length 50th (ft)	301	56	0	22	132	62	22	43	56	168
Queue Length 95th (ft)	#492	93	27	57	193	120	51	92	114	278
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1350	2891	938	104	926	297	630	297	330	1802
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.17	0.10	0.32	0.64	0.33	0.19	0.22	0.26	0.64

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

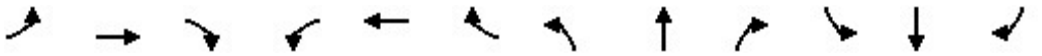
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	975	459	89	31	488	70	91	65	45	68	73	1090
Future Volume (veh/h)	975	459	89	31	488	70	91	65	45	68	73	1090
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1037	488	95	33	519	74	97	69	48	72	78	1160
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1133	2488	772	48	664	93	136	168	107	307	341	1748
Arrive On Green	0.39	0.51	0.51	0.03	0.15	0.15	0.09	0.09	0.09	0.19	0.19	0.19
Sat Flow, veh/h	2910	4837	1502	1594	4287	601	1594	1973	1257	1594	1772	3003
Grp Volume(v), veh/h	1037	488	95	33	388	205	97	58	59	72	78	1160
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1664	1594	1683	1546	1594	1772	1502
Q Serve(g_s), s	34.2	5.5	3.3	2.1	11.7	12.0	6.0	3.3	3.7	3.9	3.8	19.5
Cycle Q Clear(g_c), s	34.2	5.5	3.3	2.1	11.7	12.0	6.0	3.3	3.7	3.9	3.8	19.5
Prop In Lane	1.00		1.00	1.00		0.36	1.00		0.81	1.00		1.00
Lane Grp Cap(c), veh/h	1133	2488	772	48	499	258	136	143	132	307	341	1748
V/C Ratio(X)	0.92	0.20	0.12	0.69	0.78	0.79	0.71	0.40	0.45	0.23	0.23	0.66
Avail Cap(c_a), veh/h	1323	2748	853	102	605	312	291	308	283	307	341	1748
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	13.3	12.7	48.6	41.1	41.2	45.1	43.9	44.0	34.5	34.5	14.4
Incr Delay (d2), s/veh	9.1	0.0	0.1	16.5	5.2	11.1	6.8	1.8	2.4	0.4	0.3	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	2.0	1.1	1.0	5.0	5.7	2.6	1.4	1.5	1.5	1.6	8.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.4	13.3	12.8	65.1	46.3	52.3	51.9	45.7	46.4	34.9	34.8	15.4
LnGrp LOS	D	B	B	E	D	D	D	D	D	C	C	B
Approach Vol, veh/h		1620			626			214			1310	
Approach Delay, s/veh		29.4			49.3			48.7			17.6	
Approach LOS		C			D			D			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.1	7.5	56.6		24.0	43.9	20.2				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.5	6.5	57.5		19.5	46.0	* 19				
Max Q Clear Time (g_c+I1), s		8.0	4.1	7.5		21.5	36.2	14.0				
Green Ext Time (p_c), s		0.6	0.0	4.1		0.0	3.2	1.7				

Intersection Summary	
HCM 6th Ctrl Delay	29.7
HCM 6th LOS	C

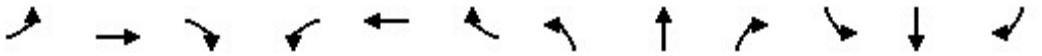
Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



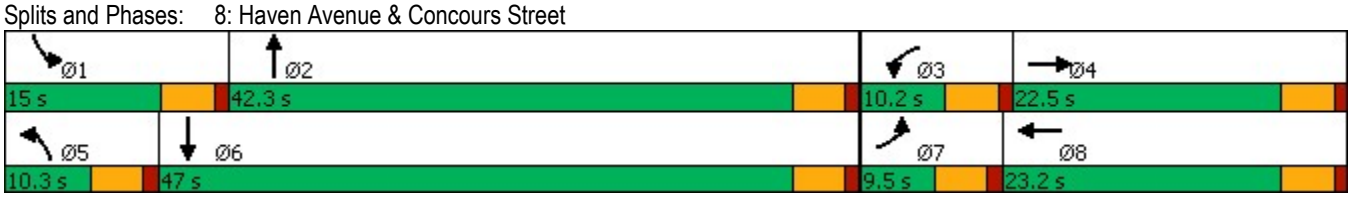
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	12	24	45	121	52	58	43	1523	192	41	1416	30
Future Volume (vph)	12	24	45	121	52	58	43	1523	192	41	1416	30
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	26	48	129	55	62	46	1620	204	44	1506	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	74	0	129	55	62	46	1620	204	44	1506	32

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	12	24	121	52	58	43	1523	192	41	1416	30
Future Volume (vph)	12	24	121	52	58	43	1523	192	41	1416	30
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.4	6.7	6.2	12.8	63.0	6.2	37.9	63.0	6.9	38.6	63.0
Actuated g/C Ratio	0.09	0.11	0.10	0.20	1.00	0.10	0.60	1.00	0.11	0.61	1.00
v/c Ratio	0.05	0.20	0.33	0.08	0.04	0.16	0.44	0.14	0.14	0.40	0.02
Control Delay	34.5	17.6	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	17.6	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.0	0.0
LOS	C	B	C	C	A	C	B	A	C	A	A
Approach Delay		20.2		24.1			10.4			10.4	
Approach LOS		C		C			B			B	

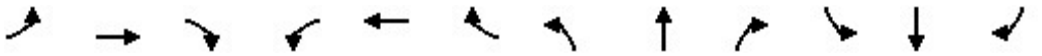
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 40.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	74	129	55	62	46	1620	204	44	1506	32
v/c Ratio	0.05	0.20	0.33	0.08	0.04	0.16	0.44	0.14	0.14	0.40	0.02
Control Delay	34.5	17.6	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	17.6	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.0	0.0
Queue Length 50th (ft)	2	5	19	10	0	9	135	0	9	120	0
Queue Length 95th (ft)	11	25	40	30	0	27	182	0	25	154	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	248	971	386	1079	1500	288	3981	1500	522	4284	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.08	0.33	0.05	0.04	0.16	0.41	0.14	0.08	0.35	0.02

Intersection Summary



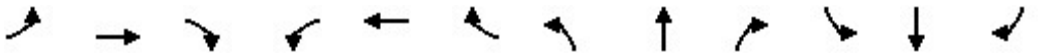
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	24	45	121	52	58	43	1523	192	41	1416	30
Future Volume (veh/h)	12	24	45	121	52	58	43	1523	192	41	1416	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	13	26	48	129	55	0	46	1620	0	44	1506	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	48	134	120	307	474		133	2903		129	2895	
Arrive On Green	0.02	0.08	0.08	0.08	0.14	0.00	0.05	0.48	0.00	0.04	0.47	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	13	26	48	129	55	0	46	1620	0	44	1506	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.2	0.8	1.7	1.7	0.8	0.0	0.9	10.6	0.0	0.8	9.6	0.0
Cycle Q Clear(g_c), s	0.2	0.8	1.7	1.7	0.8	0.0	0.9	10.6	0.0	0.8	9.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	48	134	120	307	474		133	2903		129	2895	
V/C Ratio(X)	0.27	0.19	0.40	0.42	0.12		0.35	0.56		0.34	0.52	
Avail Cap(c_a), veh/h	261	543	484	405	1127		302	4126		547	4639	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.1	24.0	24.4	24.6	21.0	0.0	25.8	10.4	0.0	25.9	10.2	0.0
Incr Delay (d2), s/veh	3.0	0.7	2.2	0.9	0.1	0.0	1.5	0.2	0.0	1.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	0.6	0.5	0.3	0.0	0.3	2.9	0.0	0.3	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.2	24.7	26.6	25.5	21.1	0.0	27.4	10.6	0.0	27.4	10.4	0.0
LnGrp LOS	C	C	C	C	C		C	B		C	B	
Approach Vol, veh/h		87			184	A		1666	A		1550	A
Approach Delay, s/veh		26.6			24.2			11.1			10.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	31.1	8.8	8.9	7.1	31.0	5.4	12.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	2.8	12.6	3.7	3.7	2.9	11.6	2.2	2.8
Green Ext Time (p_c), s	0.0	14.0	0.1	0.2	0.0	14.2	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

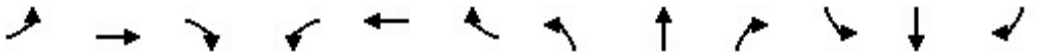
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.936									0.990	
Flt Protected	0.950	0.972					0.950					
Satd. Flow (prot)	1593	1525	0	0	1765	0	1676	4818	0	1765	4769	0
Flt Permitted	0.950	0.972					0.950					
Satd. Flow (perm)	1593	1525	0	0	1765	0	1676	4818	0	1765	4769	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143						1			13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



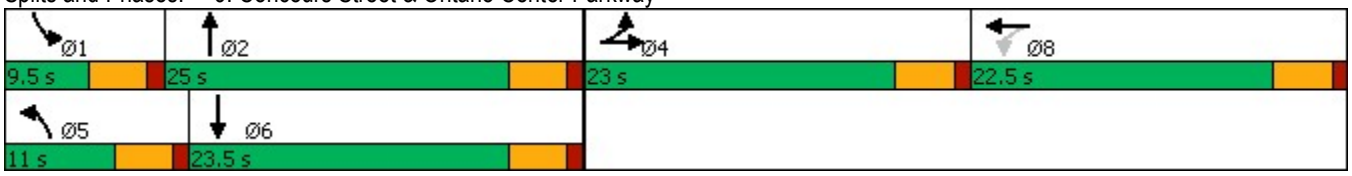
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	0	3	0	0	0	5	291	1	0	217	15
Future Volume (vph)	11	0	3	0	0	0	5	291	1	0	217	15
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	12	0	3	0	0	0	6	323	1	0	241	17
Shared Lane Traffic (%)	36%											
Lane Group Flow (vph)	8	7	0	0	0	0	6	324	0	0	258	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	11	0	5	291	217		
Future Volume (vph)	11	0	5	291	217		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	6.0	6.0	5.9	27.1	25.6		
Actuated g/C Ratio	0.21	0.21	0.20	0.93	0.88		
v/c Ratio	0.02	0.02	0.02	0.07	0.06		
Control Delay	12.9	0.0	13.0	1.0	2.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	12.9	0.0	13.0	1.0	2.9		
LOS	B	A	B	A	A		
Approach Delay		6.9		1.2	2.9		
Approach LOS		A		A	A		

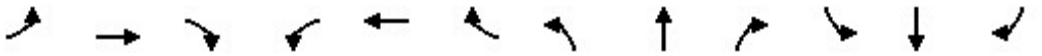
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 29.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.07	
Intersection Signal Delay: 2.1	Intersection LOS: A
Intersection Capacity Utilization 17.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	7	6	324	258
v/c Ratio	0.02	0.02	0.02	0.07	0.06
Control Delay	12.9	0.0	13.0	1.0	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.9	0.0	13.0	1.0	2.9
Queue Length 50th (ft)	1	0	1	0	0
Queue Length 95th (ft)	10	0	9	14	24
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	1061	1064	392	4481	4230
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.02	0.07	0.06

Intersection Summary



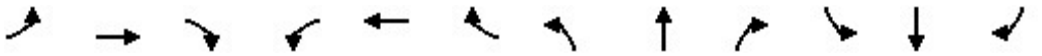
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	3	0	0	0	5	291	1	0	217	15
Future Volume (veh/h)	11	0	3	0	0	0	5	291	1	0	217	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	8	6	3	0	0	0	6	323	1	0	241	17
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	25	13	0	9	0	14	2519	8	9	1210	84
Arrive On Green	0.02	0.02	0.02	0.00	0.00	0.00	0.01	0.51	0.51	0.00	0.26	0.26
Sat Flow, veh/h	1688	1114	557	0	1772	0	1688	4979	15	1688	4618	321
Grp Volume(v), veh/h	8	0	9	0	0	0	6	209	115	0	167	91
Grp Sat Flow(s),veh/h/ln	1688	0	1672	0	1772	0	1688	1612	1769	1688	1612	1714
Q Serve(g_s), s	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.7	0.7	0.0	0.8	0.8
Cycle Q Clear(g_c), s	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.7	0.7	0.0	0.8	0.8
Prop In Lane	1.00		0.33	0.00		0.00	1.00		0.01	1.00		0.19
Lane Grp Cap(c), veh/h	38	0	38	0	9	0	14	1632	895	9	845	449
V/C Ratio(X)	0.21	0.00	0.24	0.00	0.00	0.00	0.43	0.13	0.13	0.00	0.20	0.20
Avail Cap(c_a), veh/h	1636	0	1620	0	1671	0	575	3464	1900	442	3210	1706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	9.2	0.0	0.0	0.0	9.4	2.5	2.5	0.0	5.5	5.5
Incr Delay (d2), s/veh	2.7	0.0	3.2	0.0	0.0	0.0	19.9	0.0	0.1	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.9	0.0	12.4	0.0	0.0	0.0	29.4	2.5	2.6	0.0	5.6	5.7
LnGrp LOS	B	A	B	A	A	A	C	A	A	A	A	A
Approach Vol, veh/h		17			0			330			258	
Approach Delay, s/veh		12.1			0.0			3.0			5.6	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	14.2		4.9	4.7	9.5		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	2.7		2.1	2.1	2.8		0.0				
Green Ext Time (p_c), s	0.0	1.8		0.0	0.0	1.3		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	4.4
HCM 6th LOS	A

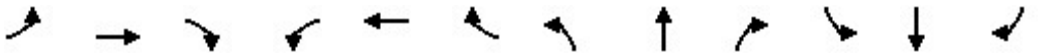
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186			182			215			238
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



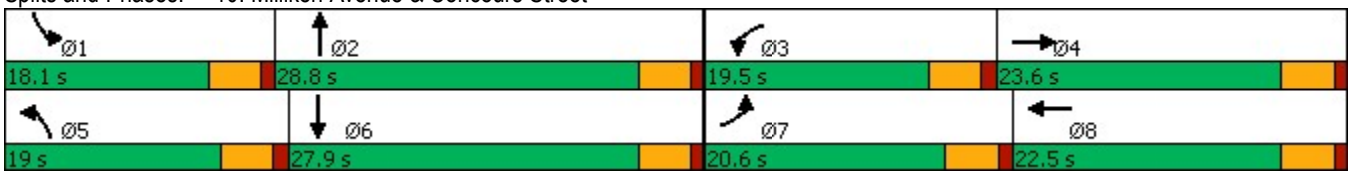
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	290	150	173	251	98	155	214	961	234	270	965	226
Future Volume (vph)	290	150	173	251	98	155	214	961	234	270	965	226
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	312	161	186	270	105	167	230	1033	252	290	1038	243
Shared Lane Traffic (%)												
Lane Group Flow (vph)	312	161	186	270	105	167	230	1033	252	290	1038	243

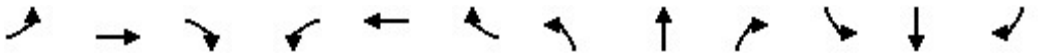
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	150	173	251	98	155	214	961	234	270	965	226
Future Volume (vph)	290	150	173	251	98	155	214	961	234	270	965	226
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	15.6	9.0	71.8	11.9	8.0	71.8	11.1	20.6	71.8	11.8	21.4	71.8
Actuated g/C Ratio	0.22	0.13	1.00	0.17	0.11	1.00	0.15	0.29	1.00	0.16	0.30	1.00
v/c Ratio	0.50	0.38	0.12	0.56	0.28	0.11	0.52	0.59	0.17	0.61	0.57	0.16
Control Delay	30.6	33.6	0.2	33.8	33.7	0.1	33.7	24.0	0.2	35.3	23.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	33.6	0.2	33.8	33.7	0.1	33.7	24.0	0.2	35.3	23.4	0.2
LOS	C	C	A	C	C	A	C	C	A	D	C	A
Approach Delay		22.7			23.4			21.5			22.0	
Approach LOS		C			C			C			C	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 71.8		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.61		
Intersection Signal Delay: 22.1	Intersection LOS: C	
Intersection Capacity Utilization 52.8%	ICU Level of Service A	
Analysis Period (min) 15		

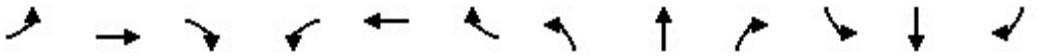
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	312	161	186	270	105	167	230	1033	252	290	1038	243
v/c Ratio	0.50	0.38	0.12	0.56	0.28	0.11	0.52	0.59	0.17	0.61	0.57	0.16
Control Delay	30.6	33.6	0.2	33.8	33.7	0.1	33.7	24.0	0.2	35.3	23.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	33.6	0.2	33.8	33.7	0.1	33.7	24.0	0.2	35.3	23.4	0.2
Queue Length 50th (ft)	69	36	0	59	24	0	51	116	0	63	113	0
Queue Length 95th (ft)	116	69	0	103	49	0	90	165	0	113	169	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	694	911	1500	617	858	1500	596	2099	1500	559	2050	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.18	0.12	0.44	0.12	0.11	0.39	0.49	0.17	0.52	0.51	0.16

Intersection Summary



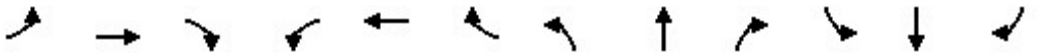
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	290	150	173	251	98	155	214	961	234	270	965	226
Future Volume (veh/h)	290	150	173	251	98	155	214	961	234	270	965	226
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	312	161	0	270	105	0	230	1033	0	290	1038	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	436	361		388	305		341	1791		406	1928	
Arrive On Green	0.15	0.11	0.00	0.13	0.09	0.00	0.12	0.29	0.00	0.14	0.32	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	312	161	0	270	105	0	230	1033	0	290	1038	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	5.6	2.5	0.0	4.9	1.6	0.0	4.2	8.0	0.0	5.3	7.7	0.0
Cycle Q Clear(g_c), s	5.6	2.5	0.0	4.9	1.6	0.0	4.2	8.0	0.0	5.3	7.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	436	361		388	305		341	1791		406	1928	
V/C Ratio(X)	0.71	0.45		0.70	0.34		0.67	0.58		0.71	0.54	
Avail Cap(c_a), veh/h	849	1165		791	1098		764	2683		717	2584	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.3	23.1	0.0	22.9	23.6	0.0	23.4	16.6	0.0	22.7	15.5	0.0
Incr Delay (d2), s/veh	2.2	0.9	0.0	2.3	0.7	0.0	2.3	0.3	0.0	2.3	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	1.0	0.0	1.7	0.6	0.0	1.4	2.5	0.0	1.8	2.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	24.0	0.0	25.1	24.2	0.0	25.7	16.9	0.0	25.0	15.8	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		473	A		375	A		1263	A		1328	A
Approach Delay, s/veh		24.3			24.9			18.5			17.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	20.7	11.9	10.4	11.0	22.0	12.8	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	7.3	10.0	6.9	4.5	6.2	9.7	7.6	3.6
Green Ext Time (p_c), s	0.5	6.3	0.6	0.7	0.5	6.1	0.7	0.4

Intersection Summary	
HCM 6th Ctrl Delay	19.7
HCM 6th LOS	B

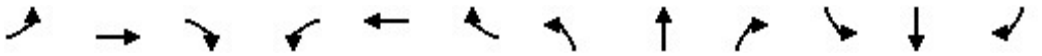
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			473			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



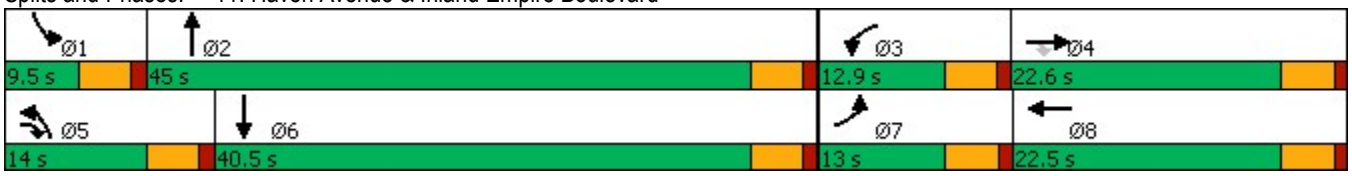
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	69	121	252	182	119	68	163	1625	548	53	1427	45
Future Volume (vph)	69	121	252	182	119	68	163	1625	548	53	1427	45
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	71	125	260	188	123	70	168	1675	565	55	1471	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	125	260	188	123	70	168	1675	565	55	1471	46

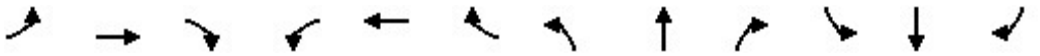
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	121	252	182	119	68	163	1625	548	53	1427	45
Future Volume (vph)	69	121	252	182	119	68	163	1625	548	53	1427	45
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	7.2	8.3	18.7	8.1	9.0	71.6	8.9	39.2	71.6	5.2	30.7	71.6
Actuated g/C Ratio	0.10	0.12	0.26	0.11	0.13	1.00	0.12	0.55	1.00	0.07	0.43	1.00
v/c Ratio	0.24	0.32	0.58	0.42	0.29	0.05	0.47	0.50	0.38	0.26	0.57	0.03
Control Delay	35.4	34.6	22.5	35.8	33.7	0.1	37.1	12.5	0.7	39.2	16.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	34.6	22.5	35.8	33.7	0.1	37.1	12.5	0.7	39.2	16.9	0.0
LOS	D	C	C	D	C	A	D	B	A	D	B	A
Approach Delay		27.8			28.6			11.4			17.2	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 16.2	Intersection LOS: B
Intersection Capacity Utilization 53.9%	ICU Level of Service A
Analysis Period (min) 15	

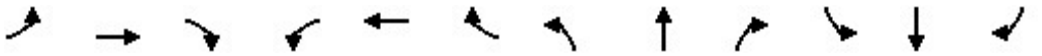
Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	125	260	188	123	70	168	1675	565	55	1471	46
v/c Ratio	0.24	0.32	0.58	0.42	0.29	0.05	0.47	0.50	0.38	0.26	0.57	0.03
Control Delay	35.4	34.6	22.5	35.8	33.7	0.1	37.1	12.5	0.7	39.2	16.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.4	34.6	22.5	35.8	33.7	0.1	37.1	12.5	0.7	39.2	16.9	0.0
Queue Length 50th (ft)	16	30	73	30	28	0	39	157	0	13	149	0
Queue Length 95th (ft)	37	56	152	54	56	0	73	202	0	32	193	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	357	881	466	481	876	1500	398	3572	1500	210	3175	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.14	0.56	0.39	0.14	0.05	0.42	0.47	0.38	0.26	0.46	0.03

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	121	252	182	119	68	163	1625	548	53	1427	45
Future Volume (veh/h)	69	121	252	182	119	68	163	1625	548	53	1427	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	71	125	260	188	123	0	168	1675	0	55	1471	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	643	412	296	717		242	2655		135	2431	
Arrive On Green	0.05	0.19	0.19	0.07	0.21	0.00	0.08	0.44	0.00	0.05	0.40	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	71	125	260	188	123	0	168	1675	0	55	1471	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.7	2.2	10.8	3.3	2.1	0.0	4.0	15.3	0.0	1.3	13.7	0.0
Cycle Q Clear(g_c), s	1.7	2.2	10.8	3.3	2.1	0.0	4.0	15.3	0.0	1.3	13.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	154	643	412	296	717		242	2655		135	2431	
V/C Ratio(X)	0.46	0.19	0.63	0.63	0.17		0.69	0.63		0.41	0.61	
Avail Cap(c_a), veh/h	346	853	506	466	849		387	3457		204	3073	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.8	24.3	22.7	32.1	23.0	0.0	31.8	15.7	0.0	33.1	17.0	0.0
Incr Delay (d2), s/veh	2.1	0.1	1.8	2.2	0.1	0.0	3.5	0.2	0.0	2.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.9	3.8	1.1	0.8	0.0	1.5	4.9	0.0	0.5	4.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.0	24.4	24.5	34.3	23.1	0.0	35.4	15.9	0.0	35.0	17.3	0.0
LnGrp LOS	C	C	C	C	C		D	B		D	B	
Approach Vol, veh/h		456			311	A		1843	A		1526	A
Approach Delay, s/veh		26.1			29.9			17.7			17.9	
Approach LOS		C			C			B			B	

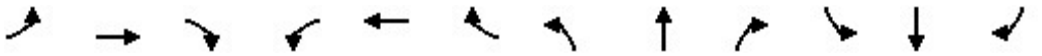
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	35.6	9.8	18.1	10.4	33.0	8.3	19.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	3.3	17.3	5.3	12.8	6.0	15.7	3.7	4.1
Green Ext Time (p_c), s	0.0	13.8	0.2	0.8	0.2	11.1	0.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Notes

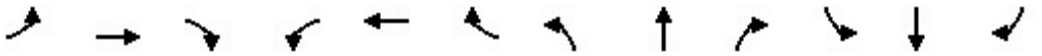
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			270			193			596			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



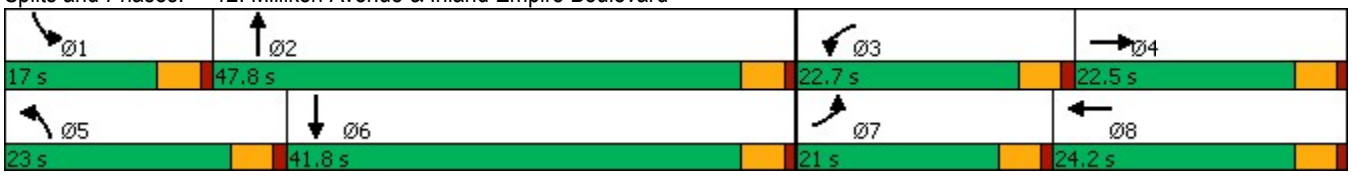
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	172	286	262	346	134	131	335	1069	763	137	1279	108
Future Volume (vph)	172	286	262	346	134	131	335	1069	763	137	1279	108
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	177	295	270	357	138	135	345	1102	787	141	1319	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	295	270	357	138	135	345	1102	787	141	1319	111

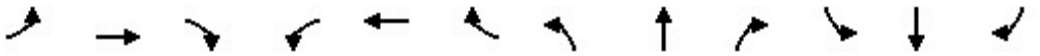
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	286	262	346	134	131	335	1069	763	137	1279	108
Future Volume (vph)	172	286	262	346	134	131	335	1069	763	137	1279	108
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	11.5	13.9	96.2	16.1	18.5	96.2	15.9	37.7	96.2	10.0	31.9	96.2
Actuated g/C Ratio	0.12	0.14	1.00	0.17	0.19	1.00	0.17	0.39	1.00	0.10	0.33	1.00
v/c Ratio	0.51	0.61	0.18	0.74	0.21	0.09	0.72	0.46	0.52	0.47	0.66	0.07
Control Delay	47.5	46.1	0.3	49.9	36.0	0.1	49.2	22.8	1.3	48.7	29.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	46.1	0.3	49.9	36.0	0.1	49.2	22.8	1.3	48.7	29.8	0.1
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		29.8			36.2			19.3			29.4	
Approach LOS		C			D			B			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 96.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 25.9	Intersection LOS: C
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	177	295	270	357	138	135	345	1102	787	141	1319	111
v/c Ratio	0.51	0.61	0.18	0.74	0.21	0.09	0.72	0.46	0.52	0.47	0.66	0.07
Control Delay	47.5	46.1	0.3	49.9	36.0	0.1	49.2	22.8	1.3	48.7	29.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	46.1	0.3	49.9	36.0	0.1	49.2	22.8	1.3	48.7	29.8	0.1
Queue Length 50th (ft)	57	96	0	113	40	0	110	148	0	45	210	0
Queue Length 95th (ft)	94	147	0	#179	73	0	171	197	0	80	267	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	508	643	1500	561	725	1500	570	2810	1500	385	2415	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.46	0.18	0.64	0.19	0.09	0.61	0.39	0.52	0.37	0.55	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	286	262	346	134	131	335	1069	763	137	1279	108
Future Volume (veh/h)	172	286	262	346	134	131	335	1069	763	137	1279	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	177	295	0	357	138	0	345	1102	0	141	1319	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	255	423		448	645		436	2537		210	2063	
Arrive On Green	0.09	0.13	0.00	0.15	0.19	0.00	0.15	0.42	0.00	0.07	0.34	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	177	295	0	357	138	0	345	1102	0	141	1319	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	4.6	6.5	0.0	9.2	2.7	0.0	8.9	10.0	0.0	3.7	14.2	0.0
Cycle Q Clear(g_c), s	4.6	6.5	0.0	9.2	2.7	0.0	8.9	10.0	0.0	3.7	14.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	255	423		448	645		436	2537		210	2063	
V/C Ratio(X)	0.69	0.70		0.80	0.21		0.79	0.43		0.67	0.64	
Avail Cap(c_a), veh/h	620	782		684	856		695	3407		470	2935	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.3	32.5	0.0	31.6	26.4	0.0	31.8	16.1	0.0	35.0	21.6	0.0
Incr Delay (d2), s/veh	3.4	2.1	0.0	3.8	0.2	0.0	3.3	0.1	0.0	3.7	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	2.7	0.0	3.4	1.1	0.0	3.2	3.3	0.0	1.4	4.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.7	34.6	0.0	35.4	26.6	0.0	35.0	16.2	0.0	38.7	22.0	0.0
LnGrp LOS	D	C		D	C		D	B		D	C	
Approach Vol, veh/h		472	A		495	A		1447	A		1460	A
Approach Delay, s/veh		35.7			33.0			20.7			23.6	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	36.7	16.4	14.2	16.1	30.7	11.3	19.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	5.7	12.0	11.2	8.5	10.9	16.2	6.6	4.7
Green Ext Time (p_c), s	0.2	9.5	0.8	1.2	0.8	10.1	0.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.925	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	2919	1365	6071	0	0	6071
Flt Permitted	0.976					
Satd. Flow (perm)	2919	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	8	8				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

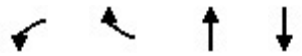
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	233	465	1834	0	0	1247
Future Volume (vph)	233	465	1834	0	0	1247
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	238	474	1871	0	0	1272
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	475	237	1871	0	0	1272

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	233	465	1834	1247
Future Volume (vph)	233	465	1834	1247
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	14.5	14.5	29.9	29.9
Actuated g/C Ratio	0.27	0.27	0.56	0.56
v/c Ratio	0.60	0.63	0.55	0.38
Control Delay	20.2	25.2	8.8	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.2	25.2	8.8	7.4
LOS	C	C	A	A
Approach Delay	21.9		8.8	7.4
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 53.6	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	475	237	1871	1272
v/c Ratio	0.60	0.63	0.55	0.38
Control Delay	20.2	25.2	8.8	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.2	25.2	8.8	7.4
Queue Length 50th (ft)	69	72	99	59
Queue Length 95th (ft)	107	140	154	94
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1088	511	3638	3638
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.46	0.51	0.35

Intersection Summary

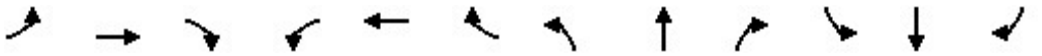
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	233	465	1834	0	0	1247
Future Volume (veh/h)	233	465	1834	0	0	1247
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	237	475	1871	0	0	1272
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	378	713	3420	0	0	3420
Arrive On Green	0.24	0.24	0.56	0.00	0.00	0.56
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	237	475	1871	0	0	1272
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	5.9	6.4	8.7	0.0	0.0	5.2
Cycle Q Clear(g_c), s	5.9	6.4	8.7	0.0	0.0	5.2
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	378	713	3420	0	0	3420
V/C Ratio(X)	0.63	0.67	0.55	0.00	0.00	0.37
Avail Cap(c_a), veh/h	696	1312	4302	0	0	4302
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	15.4	6.2	0.0	0.0	5.4
Incr Delay (d2), s/veh	1.7	1.1	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.0	1.7	0.0	0.0	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.0	16.5	6.3	0.0	0.0	5.5
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	712		1871			1272
Approach Delay, s/veh	16.7		6.3			5.5
Approach LOS	B		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	29.5			29.5	15.1
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s	10.7			7.2	8.4
Green Ext Time (p_c), s	14.4			10.4	2.2

Intersection Summary	
HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

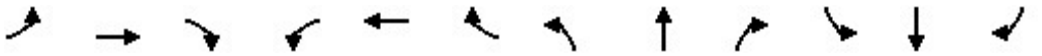
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			230			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



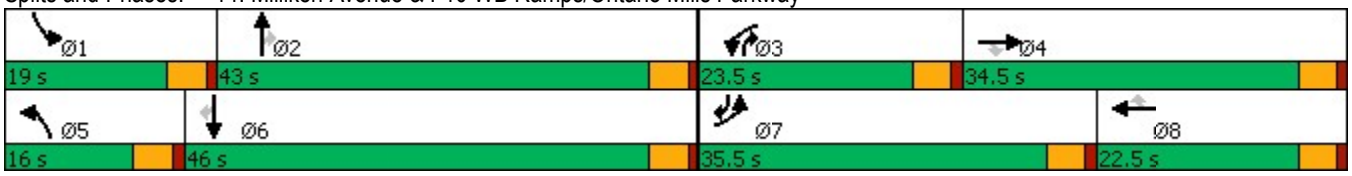
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	595	220	125	266	332	99	202	1301	404	293	964	767
Future Volume (vph)	595	220	125	266	332	99	202	1301	404	293	964	767
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	640	237	134	286	357	106	217	1399	434	315	1037	825
Shared Lane Traffic (%)												
Lane Group Flow (vph)	640	237	134	286	357	106	217	1399	434	315	1037	825

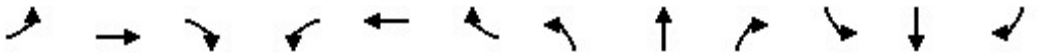
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	595	220	125	266	332	99	202	1301	404	293	964	767
Future Volume (vph)	595	220	125	266	332	99	202	1301	404	293	964	767
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	29.3	29.3	29.3	16.2	16.2	16.2	11.2	35.8	56.5	14.3	39.0	72.8
Actuated g/C Ratio	0.26	0.26	0.26	0.14	0.14	0.14	0.10	0.31	0.50	0.13	0.34	0.64
v/c Ratio	0.86	0.52	0.29	0.70	0.75	0.32	0.76	0.73	0.50	0.87	0.50	0.84
Control Delay	53.8	42.2	14.5	56.7	58.2	6.2	69.5	37.7	10.5	73.5	31.0	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	42.2	14.5	56.7	58.2	6.2	69.5	37.7	10.5	73.5	31.0	25.0
LOS	D	D	B	E	E	A	E	D	B	E	C	C
Approach Delay		45.8			50.3			35.3			34.9	
Approach LOS		D			D			D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 38.8	Intersection LOS: D
Intersection Capacity Utilization 77.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

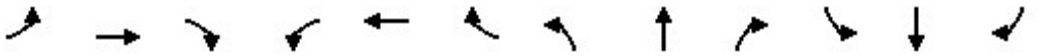




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	640	237	134	286	357	106	217	1399	434	315	1037	825
v/c Ratio	0.86	0.52	0.29	0.70	0.75	0.32	0.76	0.73	0.50	0.87	0.50	0.84
Control Delay	53.8	42.2	14.5	56.7	58.2	6.2	69.5	37.7	10.5	73.5	31.0	25.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	42.2	14.5	56.7	58.2	6.2	69.5	37.7	10.5	73.5	31.0	25.0
Queue Length 50th (ft)	243	158	23	108	140	0	86	276	92	125	182	434
Queue Length 95th (ft)	#338	244	76	155	193	30	#146	320	175	#210	217	671
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	793	476	474	486	534	353	294	2069	893	371	2231	1003
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.50	0.28	0.59	0.67	0.30	0.74	0.68	0.49	0.85	0.46	0.82

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	595	220	125	266	332	99	202	1301	404	293	964	767
Future Volume (veh/h)	595	220	125	266	332	99	202	1301	404	293	964	767
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	640	237	134	286	357	106	217	1399	434	315	1037	825
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	706	452	383	346	441	197	267	2071	688	364	2272	924
Arrive On Green	0.24	0.25	0.25	0.12	0.13	0.13	0.09	0.34	0.34	0.12	0.37	0.37
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	640	237	134	286	357	106	217	1399	434	315	1037	825
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	23.8	12.8	8.1	10.7	11.5	7.3	8.1	21.9	24.5	11.8	14.3	41.5
Cycle Q Clear(g_c), s	23.8	12.8	8.1	10.7	11.5	7.3	8.1	21.9	24.5	11.8	14.3	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	706	452	383	346	441	197	267	2071	688	364	2272	924
V/C Ratio(X)	0.91	0.52	0.35	0.83	0.81	0.54	0.81	0.68	0.63	0.87	0.46	0.89
Avail Cap(c_a), veh/h	810	477	405	497	544	243	301	2108	698	379	2272	924
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.9	35.7	33.9	47.9	47.0	45.2	49.6	31.5	23.0	47.8	26.4	18.3
Incr Delay (d2), s/veh	12.7	0.9	0.5	7.6	7.4	2.3	14.0	0.9	1.8	18.1	0.1	11.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	5.6	3.0	4.2	5.2	2.9	3.5	8.1	8.8	5.2	5.2	19.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.6	36.6	34.5	55.6	54.4	47.5	63.6	32.3	24.8	65.9	26.5	29.2
LnGrp LOS	D	D	C	E	D	D	E	C	C	E	C	C
Approach Vol, veh/h		1011			749			2050			2177	
Approach Delay, s/veh		47.1			53.9			34.0			33.3	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.4	42.3	17.7	32.9	14.7	46.0	31.5	19.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	13.8	26.5	12.7	14.8	10.1	43.5	25.8	13.5
Green Ext Time (p_c), s	0.1	8.4	0.5	1.6	0.1	0.0	1.3	1.1

Intersection Summary	
HCM 6th Ctrl Delay	38.4
HCM 6th LOS	D

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.992	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.955					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11	11				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

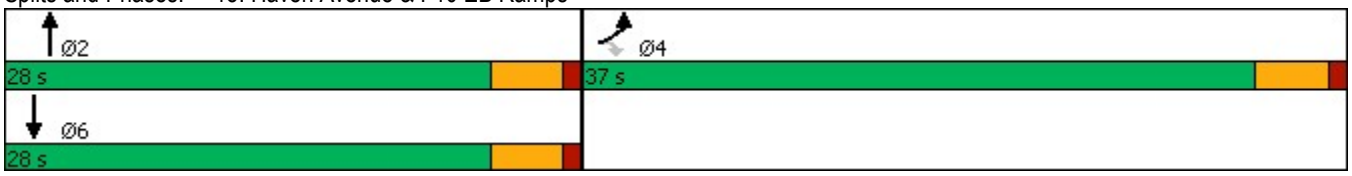
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	961	516	0	1427	1170	0
Future Volume (vph)	961	516	0	1427	1170	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	991	532	0	1471	1206	0
Shared Lane Traffic (%)		11%				
Lane Group Flow (vph)	1050	473	0	1471	1206	0

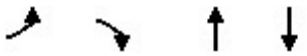
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	961	516	1427	1170
Future Volume (vph)	961	516	1427	1170
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	26.5	26.5	22.6	22.6
Actuated g/C Ratio	0.46	0.46	0.39	0.39
v/c Ratio	0.75	0.76	0.63	0.51
Control Delay	16.9	21.8	16.6	15.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.9	21.8	16.6	15.3
LOS	B	C	B	B
Approach Delay	18.4		16.6	15.3
Approach LOS	B		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 58.2	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1050	473	1471	1206
v/c Ratio	0.75	0.76	0.63	0.51
Control Delay	16.9	21.8	16.6	15.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.9	21.8	16.6	15.3
Queue Length 50th (ft)	149	142	120	93
Queue Length 95th (ft)	212	257	175	138
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1749	782	2499	2499
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.60	0.60	0.59	0.48

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	961	516	0	1427	1170	0
Future Volume (veh/h)	961	516	0	1427	1170	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1014	508	0	1471	1206	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1406	662	0	2332	2332	0
Arrive On Green	0.44	0.44	0.00	0.38	0.38	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1014	508	0	1471	1206	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	13.3	14.6	0.0	10.0	7.8	0.0
Cycle Q Clear(g_c), s	13.3	14.6	0.0	10.0	7.8	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1406	662	0	2332	2332	0
V/C Ratio(X)	0.72	0.77	0.00	0.63	0.52	0.00
Avail Cap(c_a), veh/h	2031	957	0	2808	2808	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.7	12.0	0.0	12.8	12.1	0.0
Incr Delay (d2), s/veh	0.7	2.3	0.0	0.3	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	4.3	0.0	2.9	2.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.4	14.4	0.0	13.2	12.3	0.0
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	1522			1471	1206	
Approach Delay, s/veh	13.1			13.2	12.3	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		24.0		27.0		24.0
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		12.0		16.6		9.8
Green Ext Time (p_c), s		7.5		5.9		7.1

Intersection Summary	
HCM 6th Ctrl Delay	12.9
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		14				138
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	853	213	152	1102	804	576
Future Volume (vph)	853	213	152	1102	804	576
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	879	220	157	1136	829	594
Shared Lane Traffic (%)						
Lane Group Flow (vph)	879	220	157	1136	829	594

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	853	213	152	1102	804	576
Future Volume (vph)	853	213	152	1102	804	576
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	26.4	38.4	7.4	27.9	15.9	47.0
Actuated g/C Ratio	0.42	0.60	0.12	0.44	0.25	0.74
v/c Ratio	0.73	0.24	0.47	0.43	0.55	0.52
Control Delay	19.9	6.5	34.4	13.6	22.9	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	6.5	34.4	13.6	22.9	4.2
LOS	B	A	C	B	C	A
Approach Delay	17.2			16.1	15.1	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 63.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 16.0	Intersection LOS: B
Intersection Capacity Utilization 57.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	879	220	157	1136	829	594
v/c Ratio	0.73	0.24	0.47	0.43	0.55	0.52
Control Delay	19.9	6.5	34.4	13.6	22.9	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	6.5	34.4	13.6	22.9	4.2
Queue Length 50th (ft)	142	33	30	85	82	48
Queue Length 95th (ft)	217	68	65	133	125	88
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1612	920	350	3091	1913	1324
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.24	0.45	0.37	0.43	0.45

Intersection Summary

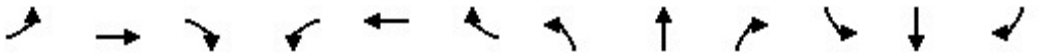
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	853	213	152	1102	804	576
Future Volume (veh/h)	853	213	152	1102	804	576
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	879	220	157	1136	829	594
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1097	689	238	2840	1863	1025
Arrive On Green	0.38	0.38	0.08	0.47	0.31	0.31
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	879	220	157	1136	829	594
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	15.4	5.3	3.0	7.0	6.3	11.9
Cycle Q Clear(g_c), s	15.4	5.3	3.0	7.0	6.3	11.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1097	689	238	2840	1863	1025
V/C Ratio(X)	0.80	0.32	0.66	0.40	0.45	0.58
Avail Cap(c_a), veh/h	1753	1027	381	3352	2075	1077
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.9	9.8	25.5	10.0	16.0	4.8
Incr Delay (d2), s/veh	1.4	0.3	3.1	0.1	0.2	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	5.4	1.1	2.0	2.0	7.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.4	10.1	28.6	10.1	16.2	5.5
LnGrp LOS	B	B	C	B	B	A
Approach Vol, veh/h	1099			1293	1423	
Approach Delay, s/veh	15.9			12.4	11.7	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		31.2		26.1	9.2	22.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		9.0		17.4	5.0	13.9
Green Ext Time (p_c), s		8.7		4.1	0.1	3.6

Intersection Summary	
HCM 6th Ctrl Delay	13.1
HCM 6th LOS	B

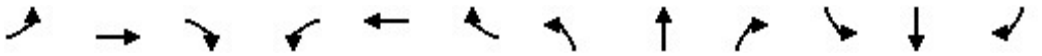
Appendix C

Intersection LOS Analysis Sheets
Existing Plus Project Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.962				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66				149			238		9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



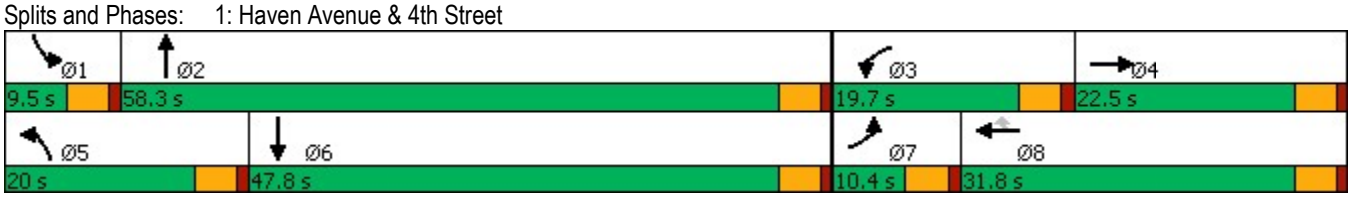
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	89	293	98	265	512	147	201	1479	469	95	1186	53
Future Volume (vph)	89	293	98	265	512	147	201	1479	469	95	1186	53
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	98	322	108	291	563	162	221	1625	515	104	1303	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	430	0	291	563	162	221	1625	515	104	1361	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	89	293	265	512	147	201	1479	469	95	1186
Future Volume (vph)	89	293	265	512	147	201	1479	469	95	1186
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	15.1	14.1	23.3	23.3	12.9	53.9	106.1	5.0	46.0
Actuated g/C Ratio	0.06	0.14	0.13	0.22	0.22	0.12	0.51	1.00	0.05	0.43
v/c Ratio	0.61	0.60	0.76	0.77	0.36	0.63	0.66	0.34	0.76	0.52
Control Delay	66.7	39.7	58.3	46.3	9.3	52.8	21.5	0.6	84.7	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	39.7	58.3	46.3	9.3	52.8	21.5	0.6	84.7	23.6
LOS	E	D	E	D	A	D	C	A	F	C
Approach Delay		44.7		43.8			19.9			27.9
Approach LOS		D		D			B			C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 106.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 29.1	Intersection LOS: C
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

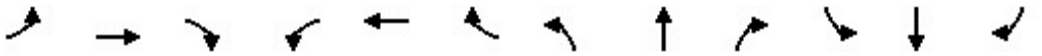
Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	98	430	291	563	162	221	1625	515	104	1361
v/c Ratio	0.61	0.60	0.76	0.77	0.36	0.63	0.66	0.34	0.76	0.52
Control Delay	66.7	39.7	58.3	46.3	9.3	52.8	21.5	0.6	84.7	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	39.7	58.3	46.3	9.3	52.8	21.5	0.6	84.7	23.6
Queue Length 50th (ft)	34	86	100	189	7	75	296	0	37	197
Queue Length 95th (ft)	#71	122	#154	251	60	115	368	0	#86	251
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	161	842	414	864	497	423	2447	1500	136	2619
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.51	0.70	0.65	0.33	0.52	0.66	0.34	0.76	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



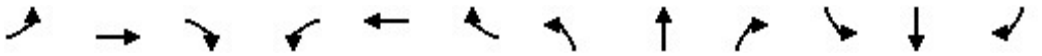
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	293	98	265	512	147	201	1479	469	95	1186	53
Future Volume (veh/h)	89	293	98	265	512	147	201	1479	469	95	1186	53
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	98	322	108	291	563	162	221	1625	0	104	1303	58
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	144	494	157	350	696	310	282	2521		141	2849	127
Arrive On Green	0.05	0.14	0.14	0.12	0.21	0.21	0.10	0.52	0.00	0.05	0.47	0.47
Sat Flow, veh/h	2910	3633	1155	2910	3367	1502	2910	4837	1502	2910	6027	268
Grp Volume(v), veh/h	98	284	146	291	563	162	221	1625	0	104	988	373
Grp Sat Flow(s),veh/h/ln	1455	1612	1564	1455	1683	1502	1455	1612	1502	1455	1524	1724
Q Serve(g_s), s	3.4	8.6	9.2	10.1	16.4	9.9	7.7	25.0	0.0	3.6	15.0	15.1
Cycle Q Clear(g_c), s	3.4	8.6	9.2	10.1	16.4	9.9	7.7	25.0	0.0	3.6	15.0	15.1
Prop In Lane	1.00		0.74	1.00		1.00	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	144	439	213	350	696	310	282	2521		141	2161	815
V/C Ratio(X)	0.68	0.65	0.69	0.83	0.81	0.52	0.78	0.64		0.74	0.46	0.46
Avail Cap(c_a), veh/h	166	562	273	428	890	397	437	2521		141	2161	815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.3	42.3	42.5	44.4	39.0	36.4	45.6	17.8	0.0	48.5	18.3	18.3
Incr Delay (d2), s/veh	9.0	1.7	4.9	11.1	4.4	1.4	5.0	1.3	0.0	18.3	0.7	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	3.5	3.8	4.2	7.1	3.7	2.9	9.1	0.0	1.7	5.3	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	43.9	47.4	55.5	43.4	37.8	50.5	19.1	0.0	66.8	19.0	20.2
LnGrp LOS	E	D	D	E	D	D	D	B		E	B	C
Approach Vol, veh/h		528			1016			1846	A		1465	
Approach Delay, s/veh		47.4			46.0			22.9			22.7	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	58.3	16.9	18.5	14.5	53.3	9.6	25.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	5.6	27.0	12.1	11.2	9.7	17.1	5.4	18.4
Green Ext Time (p_c), s	0.0	14.6	0.3	1.5	0.4	11.0	0.0	2.9

Intersection Summary	
HCM 6th Ctrl Delay	30.3
HCM 6th LOS	C

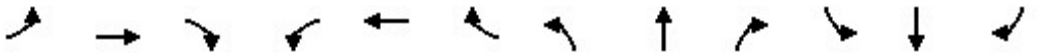
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.988				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	5998	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1583	5998	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				164			164		327	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	37	476	40	1	676	54	43	1	1	0	0	3
Future Volume (vph)	37	476	40	1	676	54	43	1	1	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	41	529	44	1	751	60	48	1	1	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	573	0	1	751	60	48	1	1	0	3	0

Intersection Summary

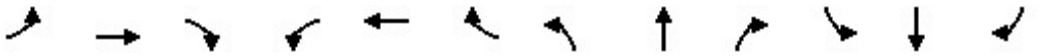
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT	Ø1
Lane Configurations										
Traffic Volume (vph)	37	476	1	676	54	43	1	1	0	
Future Volume (vph)	37	476	1	676	54	43	1	1	0	
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	NA	
Protected Phases	7	4	3	8		5	2		6	1
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	6	
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	22.5	9.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	26.7	15.0
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	38.1%	21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min	None
Act Effct Green (s)	5.7	15.7	5.7	14.4	14.4	7.0	9.4	9.4	6.3	
Actuated g/C Ratio	0.16	0.43	0.16	0.39	0.39	0.19	0.26	0.26	0.17	
v/c Ratio	0.17	0.22	0.00	0.40	0.09	0.16	0.00	0.00	0.00	
Control Delay	21.7	7.6	21.0	10.4	0.2	19.7	12.0	0.0	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.7	7.6	21.0	10.4	0.2	19.7	12.0	0.0	0.0	
LOS	C	A	C	B	A	B	B	A	A	
Approach Delay		8.5		9.7			19.1			
Approach LOS		A		A			B			

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 36.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 38.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	41	573	1	751	60	48	1	1	3
v/c Ratio	0.17	0.22	0.00	0.40	0.09	0.16	0.00	0.00	0.00
Control Delay	21.7	7.6	21.0	10.4	0.2	19.7	12.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	7.6	21.0	10.4	0.2	19.7	12.0	0.0	0.0
Queue Length 50th (ft)	6	10	0	19	0	6	0	0	0
Queue Length 95th (ft)	36	53	4	95	0	39	3	0	0
Internal Link Dist (ft)		2546		362			269		358
Turn Bay Length (ft)	130		130		145	165		165	
Base Capacity (vph)	245	3572	245	2696	911	334	1015	932	2067
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.00	0.28	0.07	0.14	0.00	0.00	0.00

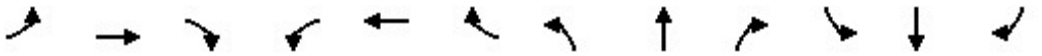
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	37	476	40	1	676	54	43	1	1	0	0	3
Future Volume (veh/h)	37	476	40	1	676	54	43	1	1	0	0	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	41	529	44	1	751	60	48	1	1	0	0	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	1943	159	4	1407	437	84	540	457	4	223	199
Arrive On Green	0.05	0.34	0.34	0.00	0.29	0.29	0.05	0.30	0.30	0.00	0.00	0.13
Sat Flow, veh/h	1594	5786	472	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	41	416	157	1	751	60	48	1	1	0	0	3
Grp Sat Flow(s),veh/h/ln	1594	1524	1687	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.9	2.5	2.6	0.0	4.9	1.1	1.1	0.0	0.0	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.9	2.5	2.6	0.0	4.9	1.1	1.1	0.0	0.0	0.0	0.0	0.1
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	74	1535	567	4	1407	437	84	540	457	4	223	199
V/C Ratio(X)	0.56	0.27	0.28	0.24	0.53	0.14	0.57	0.00	0.00	0.00	0.00	0.02
Avail Cap(c_a), veh/h	211	2184	806	211	2311	717	288	870	737	444	992	885
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.6	9.1	9.2	18.8	11.2	9.9	17.4	9.1	9.1	0.0	0.0	14.2
Incr Delay (d2), s/veh	6.4	0.1	0.3	26.4	0.3	0.1	6.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.6	0.7	0.0	1.4	0.3	0.5	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.0	9.2	9.4	45.2	11.5	10.0	23.5	9.1	9.1	0.0	0.0	14.2
LnGrp LOS	C	A	A	D	B	B	C	A	A	A	A	B
Approach Vol, veh/h		614			812			50			3	
Approach Delay, s/veh		10.3			11.5			23.0			14.2	
Approach LOS		B			B			C			B	

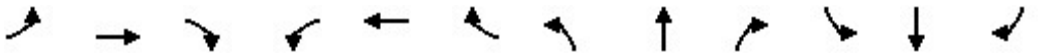
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	16.0	4.6	17.2	6.5	9.5	6.2	15.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	0.0	2.0	2.0	4.6	3.1	2.1	2.9	6.9
Green Ext Time (p_c), s	0.0	0.0	0.0	3.1	0.0	0.0	0.0	4.1

Intersection Summary	
HCM 6th Ctrl Delay	11.4
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	2891	6065	0	1583	4798	0	1583	1765	1500	0	1687	1500
Flt Permitted	0.950			0.950			0.732				0.741	
Satd. Flow (perm)	2891	6065	0	1583	4798	0	1220	1765	1500	0	1308	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



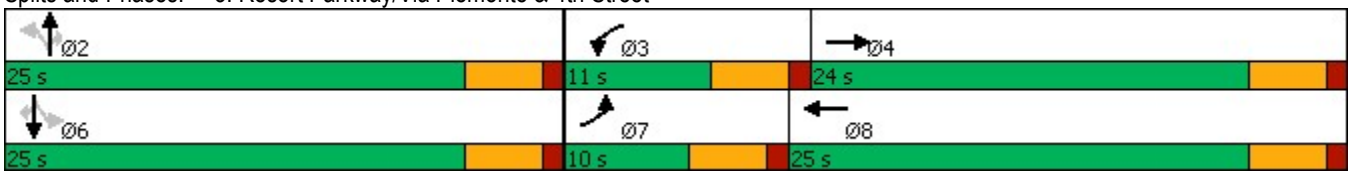
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	14	472	4	35	675	19	28	3	31	33	3	16
Future Volume (vph)	14	472	4	35	675	19	28	3	31	33	3	16
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	15	508	4	38	726	20	30	3	33	35	3	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	512	0	38	746	0	30	3	33	0	38	17

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	14	472	35	675	28	3	31	33	3	16
Future Volume (vph)	14	472	35	675	28	3	31	33	3	16
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.8	11.9	6.4	12.0	6.8	6.8	6.8		6.8	6.8
Actuated g/C Ratio	0.20	0.40	0.22	0.41	0.23	0.23	0.23		0.23	0.23
v/c Ratio	0.03	0.21	0.11	0.38	0.11	0.01	0.08		0.13	0.04
Control Delay	14.1	6.6	13.9	7.3	13.1	12.7	0.4		13.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	14.1	6.6	13.9	7.3	13.1	12.7	0.4		13.2	0.2
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		6.8		7.6		6.7			9.2	
Approach LOS		A		A		A			A	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 29.6	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 38.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	15	512	38	746	30	3	33	38	17
v/c Ratio	0.03	0.21	0.11	0.38	0.11	0.01	0.08	0.13	0.04
Control Delay	14.1	6.6	13.9	7.3	13.1	12.7	0.4	13.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	6.6	13.9	7.3	13.1	12.7	0.4	13.2	0.2
Queue Length 50th (ft)	1	10	4	20	3	0	0	4	0
Queue Length 95th (ft)	8	39	29	71	24	6	0	28	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	570	4244	369	3531	897	1298	1132	962	1132
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.12	0.10	0.21	0.03	0.00	0.03	0.04	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	472	4	35	675	19	28	3	31	33	3	16
Future Volume (veh/h)	14	472	4	35	675	19	28	3	31	33	3	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	15	508	4	38	726	20	30	3	33	35	3	17
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	57	1953	15	73	1629	45	451	308	261	457	29	261
Arrive On Green	0.02	0.31	0.31	0.05	0.34	0.34	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	2910	6285	49	1594	4840	133	1315	1772	1502	1243	167	1502
Grp Volume(v), veh/h	15	369	143	38	483	263	30	3	33	38	0	17
Grp Sat Flow(s),veh/h/ln	1455	1524	1763	1594	1612	1748	1315	1772	1502	1410	0	1502
Q Serve(g_s), s	0.1	1.7	1.7	0.7	3.4	3.4	0.6	0.0	0.5	0.4	0.0	0.3
Cycle Q Clear(g_c), s	0.1	1.7	1.7	0.7	3.4	3.4	1.2	0.0	0.5	0.6	0.0	0.3
Prop In Lane	1.00		0.03	1.00		0.08	1.00		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	57	1421	548	73	1086	589	451	308	261	486	0	261
V/C Ratio(X)	0.26	0.26	0.26	0.52	0.45	0.45	0.07	0.01	0.13	0.08	0.00	0.07
Avail Cap(c_a), veh/h	557	3102	1196	360	2300	1247	1160	1264	1071	1239	0	1071
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	7.4	7.4	13.4	7.4	7.4	10.6	9.8	10.0	10.0	0.0	9.9
Incr Delay (d2), s/veh	2.4	0.1	0.2	5.7	0.3	0.5	0.1	0.0	0.2	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.4	0.3	0.7	0.8	0.1	0.0	0.1	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	7.5	7.7	19.2	7.7	8.0	10.6	9.8	10.2	10.1	0.0	10.0
LnGrp LOS	B	A	A	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h		527			784			66			55	
Approach Delay, s/veh		7.8			8.4			10.4			10.1	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.8	13.4		9.5	5.1	14.2				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		3.2	2.7	3.7		2.6	2.1	5.4				
Green Ext Time (p_c), s		0.1	0.0	3.0		0.2	0.0	4.3				

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.994					0.865
Flt Protected						
Satd. Flow (prot)	4789	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4789	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	528	20	0	688	0	23
Future Volume (vph)	528	20	0	688	0	23
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	574	22	0	748	0	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	596	0	0	748	0	25

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	528	20	0	688	0	23
Future Vol, veh/h	528	20	0	688	0	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	574	22	0	748	0	25

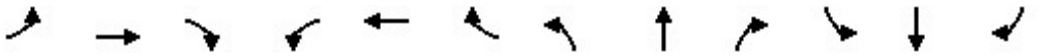
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	298
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	596
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	596
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	596	-	-	-
HCM Lane V/C Ratio	0.042	-	-	-
HCM Control Delay (s)	11.3	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5980	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5980	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			288			73		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



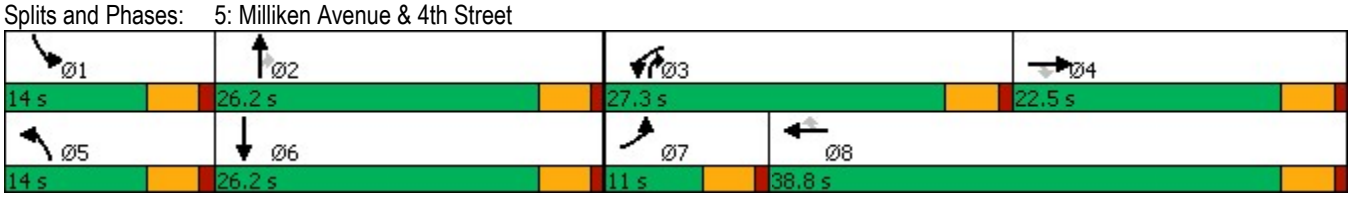
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	141	405	98	448	1152	377	191	917	150	190	795	91
Future Volume (vph)	141	405	98	448	1152	377	191	917	150	190	795	91
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	152	435	105	482	1239	405	205	986	161	204	855	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	435	105	482	1239	405	205	986	161	204	953	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	141	405	98	448	1152	377	191	917	150	190	795
Future Volume (vph)	141	405	98	448	1152	377	191	917	150	190	795
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	19.7	19.7	19.2	32.3	32.3	9.2	20.2	43.9	9.2	20.2
Actuated g/C Ratio	0.08	0.23	0.23	0.22	0.37	0.37	0.11	0.23	0.51	0.11	0.23
v/c Ratio	0.70	0.40	0.22	0.75	0.69	0.55	0.67	0.69	0.20	0.67	0.67
Control Delay	58.5	30.7	1.4	39.6	25.2	9.4	49.9	33.4	6.8	49.7	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.5	30.7	1.4	39.6	25.2	9.4	49.9	33.4	6.8	49.7	32.0
LOS	E	C	A	D	C	A	D	C	A	D	C
Approach Delay		32.3			25.5			32.7			35.1
Approach LOS		C			C			C			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86.4	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 30.3	Intersection LOS: C
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	152	435	105	482	1239	405	205	986	161	204	953
v/c Ratio	0.70	0.40	0.22	0.75	0.69	0.55	0.67	0.69	0.20	0.67	0.67
Control Delay	58.5	30.7	1.4	39.6	25.2	9.4	49.9	33.4	6.8	49.7	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.5	30.7	1.4	39.6	25.2	9.4	49.9	33.4	6.8	49.7	32.0
Queue Length 50th (ft)	44	76	0	132	210	44	58	148	24	58	137
Queue Length 95th (ft)	#90	112	4	179	261	126	#102	184	53	#102	173
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	218	1099	482	767	1925	771	320	1534	860	320	1533
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.40	0.22	0.63	0.64	0.53	0.64	0.64	0.19	0.64	0.62

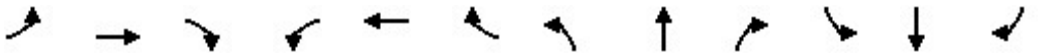
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	141	405	98	448	1152	377	191	917	150	190	795	91
Future Volume (veh/h)	141	405	98	448	1152	377	191	917	150	190	795	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	152	435	105	482	1239	405	205	986	161	204	855	98
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	216	1177	365	582	1786	555	276	1408	647	275	1291	146
Arrive On Green	0.07	0.24	0.24	0.20	0.37	0.37	0.09	0.23	0.23	0.09	0.23	0.23
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5597	633
Grp Volume(v), veh/h	152	435	105	482	1239	405	205	986	161	204	696	257
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1658
Q Serve(g_s), s	4.0	5.8	4.4	12.4	16.9	18.1	5.3	11.6	5.3	5.3	10.8	11.0
Cycle Q Clear(g_c), s	4.0	5.8	4.4	12.4	16.9	18.1	5.3	11.6	5.3	5.3	10.8	11.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.38
Lane Grp Cap(c), veh/h	216	1177	365	582	1786	555	276	1408	647	275	1054	382
V/C Ratio(X)	0.70	0.37	0.29	0.83	0.69	0.73	0.74	0.70	0.25	0.74	0.66	0.67
Avail Cap(c_a), veh/h	243	1177	365	852	2130	661	355	1698	719	355	1273	462
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.2	24.5	24.0	29.9	20.8	21.2	34.3	27.5	14.1	34.3	27.2	27.3
Incr Delay (d2), s/veh	7.8	0.2	0.4	4.5	0.8	3.4	6.0	1.0	0.2	5.9	1.0	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	2.2	1.6	4.5	6.1	6.5	2.1	4.1	1.7	2.1	3.9	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.0	24.7	24.4	34.4	21.6	24.6	40.4	28.5	14.3	40.3	28.2	30.2
LnGrp LOS	D	C	C	C	C	C	D	C	B	D	C	C
Approach Vol, veh/h		692			2126			1352			1157	
Approach Delay, s/veh		28.7			25.1			28.6			30.7	
Approach LOS		C			C			C			C	

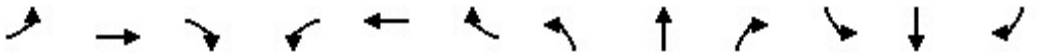
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.9	22.5	20.1	23.5	11.9	22.5	10.3	33.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	7.3	13.6	14.4	7.8	7.3	13.0	6.0	20.1
Green Ext Time (p_c), s	0.1	4.4	1.2	2.4	0.1	4.1	0.0	8.6

Intersection Summary	
HCM 6th Ctrl Delay	27.7
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.900	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2891	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2891	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		217	217
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



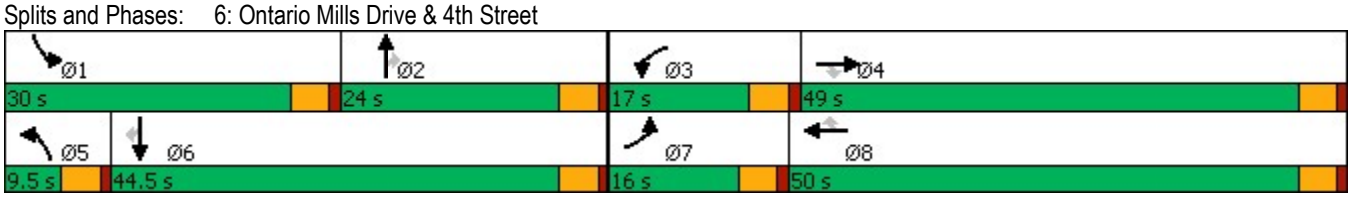
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	275	370	57	106	1253	126	69	68	75	141	214	847
Future Volume (vph)	275	370	57	106	1253	126	69	68	75	141	214	847
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	316	425	66	122	1440	145	79	78	86	162	246	974
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	316	425	66	122	1440	145	79	78	86	162	733	487

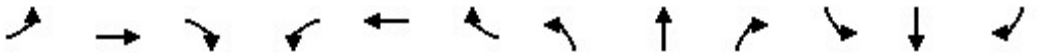
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	370	57	106	1253	126	69	68	75	141	214	847
Future Volume (vph)	275	370	57	106	1253	126	69	68	75	141	214	847
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.7	43.6	43.6	10.0	41.8	41.8	5.1	21.4	21.4	16.7	33.0	33.0
Actuated g/C Ratio	0.11	0.40	0.40	0.09	0.38	0.38	0.05	0.19	0.19	0.15	0.30	0.30
v/c Ratio	1.03	0.22	0.10	0.47	0.79	0.22	1.08	0.12	0.21	0.68	0.72	0.87
Control Delay	108.7	23.6	0.3	56.0	34.5	5.9	183.2	39.6	2.7	59.7	28.0	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.7	23.6	0.3	56.0	34.5	5.9	183.2	39.6	2.7	59.7	28.0	36.9
LOS	F	C	A	E	C	A	F	D	A	E	C	D
Approach Delay		55.0			33.6			73.2			34.8	
Approach LOS		E			C			E			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 110	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 40.5	Intersection LOS: D
Intersection Capacity Utilization 78.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



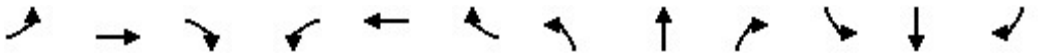


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	316	425	66	122	1440	145	79	78	86	162	733	487
v/c Ratio	1.03	0.22	0.10	0.47	0.79	0.22	1.08	0.12	0.21	0.68	0.72	0.87
Control Delay	108.7	23.6	0.3	56.0	34.5	5.9	183.2	39.6	2.7	59.7	28.0	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.7	23.6	0.3	56.0	34.5	5.9	183.2	39.6	2.7	59.7	28.0	36.9
Queue Length 50th (ft)	~145	79	0	46	354	4	~73	25	0	120	188	221
Queue Length 95th (ft)	#228	105	0	75	398	42	#169	48	8	178	246	363
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	308	2011	705	334	2031	711	73	693	418	374	1208	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.21	0.09	0.37	0.71	0.20	1.08	0.11	0.21	0.43	0.61	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



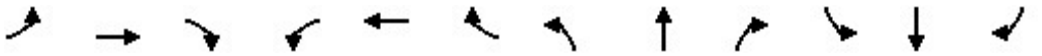
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	275	370	57	106	1253	126	69	68	75	141	214	847
Future Volume (veh/h)	275	370	57	106	1253	126	69	68	75	141	214	847
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	316	425	66	122	1440	145	79	78	86	162	246	974
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	290	1934	600	171	1735	539	69	896	400	190	606	1027
Arrive On Green	0.10	0.40	0.40	0.06	0.36	0.36	0.04	0.27	0.27	0.12	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	316	425	66	122	1440	145	79	78	86	162	246	974
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	11.5	6.7	3.2	4.7	31.3	7.9	5.0	2.0	5.1	11.5	12.2	36.4
Cycle Q Clear(g_c), s	11.5	6.7	3.2	4.7	31.3	7.9	5.0	2.0	5.1	11.5	12.2	36.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	290	1934	600	171	1735	539	69	896	400	190	606	1027
V/C Ratio(X)	1.09	0.22	0.11	0.71	0.83	0.27	1.14	0.09	0.22	0.85	0.41	0.95
Avail Cap(c_a), veh/h	290	1934	600	316	1910	593	69	896	400	353	615	1043
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	22.7	21.7	53.3	33.7	26.2	55.1	31.8	32.9	49.8	29.0	36.9
Incr Delay (d2), s/veh	78.3	0.1	0.1	5.5	3.0	0.3	152.0	0.0	0.3	10.3	0.4	16.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	2.5	1.1	1.9	12.5	2.9	4.9	0.8	1.9	5.1	5.3	15.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	130.2	22.8	21.8	58.8	36.7	26.5	207.1	31.8	33.2	60.1	29.4	53.7
LnGrp LOS	F	C	C	E	D	C	F	C	C	E	C	D
Approach Vol, veh/h		807			1707			243			1382	
Approach Delay, s/veh		64.8			37.4			89.3			50.2	
Approach LOS		E			D			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.2	35.2	11.3	50.6	9.5	43.9	16.0	45.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	13.5	7.1	6.7	8.7	7.0	38.4	13.5	33.3
Green Ext Time (p_c), s	0.3	0.5	0.2	3.4	0.0	1.0	0.0	8.0

Intersection Summary	
HCM 6th Ctrl Delay	50.1
HCM 6th LOS	D

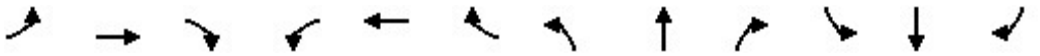
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.983			0.891				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (prot)	2891	4818	1500	1583	4736	0	1583	2987	0	1504	1619	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (perm)	2891	4818	1500	1583	4736	0	1583	2987	0	1504	1619	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		25			58				512
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



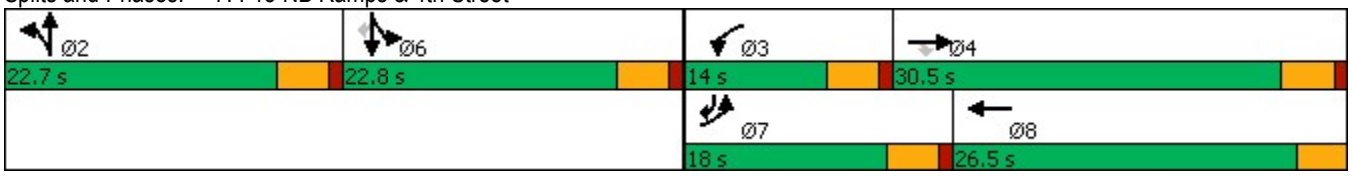
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	205	334	74	43	460	60	106	21	55	356	63	924
Future Volume (vph)	205	334	74	43	460	60	106	21	55	356	63	924
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	216	352	78	45	484	63	112	22	58	375	66	973
Shared Lane Traffic (%)										42%		
Lane Group Flow (vph)	216	352	78	45	547	0	112	80	0	217	224	973

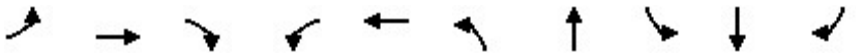
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	205	334	74	43	460	106	21	356	63	924
Future Volume (vph)	205	334	74	43	460	106	21	356	63	924
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	18.0	30.5	30.5	14.0	26.5	22.7	22.7	22.8	22.8	18.0
Total Split (%)	20.0%	33.9%	33.9%	15.6%	29.4%	25.2%	25.2%	25.3%	25.3%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	11.7	22.4	22.4	7.5	14.0	10.4	10.4	14.8	14.8	31.2
Actuated g/C Ratio	0.17	0.33	0.33	0.11	0.20	0.15	0.15	0.22	0.22	0.46
v/c Ratio	0.44	0.22	0.14	0.26	0.56	0.46	0.16	0.67	0.64	0.66
Control Delay	30.8	20.3	2.0	35.8	26.6	35.6	13.1	38.0	35.7	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	20.3	2.0	35.8	26.6	35.6	13.1	38.0	35.7	9.3
LOS	C	C	A	D	C	D	B	D	D	A
Approach Delay		21.6			27.3		26.2		17.9	
Approach LOS		C			C		C		B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street

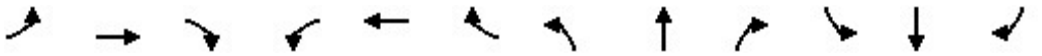




Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	216	352	78	45	547	112	80	217	224	973
v/c Ratio	0.44	0.22	0.14	0.26	0.56	0.46	0.16	0.67	0.64	0.66
Control Delay	30.8	20.3	2.0	35.8	26.6	35.6	13.1	38.0	35.7	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	20.3	2.0	35.8	26.6	35.6	13.1	38.0	35.7	9.3
Queue Length 50th (ft)	43	44	0	18	74	45	4	89	91	71
Queue Length 95th (ft)	88	78	11	53	121	101	23	#203	192	175
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	589	1903	669	227	1660	434	862	415	447	1548
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.18	0.12	0.20	0.33	0.26	0.09	0.52	0.50	0.63

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	334	74	43	460	60	106	21	55	356	63	924
Future Volume (veh/h)	205	334	74	43	460	60	106	21	55	356	63	924
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	216	352	78	45	484	63	112	22	58	422	0	973
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	314	1214	377	70	811	104	174	184	164	958	0	1227
Arrive On Green	0.11	0.25	0.25	0.04	0.19	0.19	0.11	0.11	0.11	0.30	0.00	0.30
Sat Flow, veh/h	2910	4837	1502	1594	4341	556	1594	1683	1502	3188	0	3003
Grp Volume(v), veh/h	216	352	78	45	357	190	112	22	58	422	0	973
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1672	1594	1683	1502	1594	0	1502
Q Serve(g_s), s	4.4	3.6	2.5	1.7	6.2	6.3	4.1	0.7	2.2	6.5	0.0	17.3
Cycle Q Clear(g_c), s	4.4	3.6	2.5	1.7	6.2	6.3	4.1	0.7	2.2	6.5	0.0	17.3
Prop In Lane	1.00		1.00	1.00		0.33	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	314	1214	377	70	602	312	174	184	164	958	0	1227
V/C Ratio(X)	0.69	0.29	0.21	0.65	0.59	0.61	0.64	0.12	0.35	0.44	0.00	0.79
Avail Cap(c_a), veh/h	645	2065	641	249	1218	631	476	503	449	958	0	1227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.2	18.4	18.0	28.7	22.6	22.7	26.0	24.5	25.1	17.2	0.0	15.8
Incr Delay (d2), s/veh	2.7	0.1	0.3	9.6	0.9	1.9	3.9	0.3	1.3	0.3	0.0	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	1.3	0.8	0.8	2.3	2.5	1.7	0.3	0.8	2.2	0.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	18.6	18.3	38.2	23.6	24.6	29.9	24.8	26.4	17.5	0.0	19.4
LnGrp LOS	C	B	B	D	C	C	C	C	C	B	A	B
Approach Vol, veh/h		646			592			192			1395	
Approach Delay, s/veh		22.0			25.0			28.3			18.8	
Approach LOS		C			C			C			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.2	7.2	19.8		22.8	11.1	15.9				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	13.5	* 23				
Max Q Clear Time (g_c+I1), s		6.1	3.7	5.6		19.3	6.4	8.3				
Green Ext Time (p_c), s		0.6	0.0	2.5		0.0	0.4	3.0				

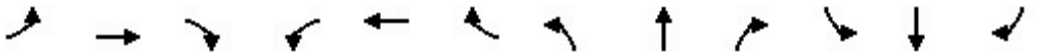
Intersection Summary	
HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

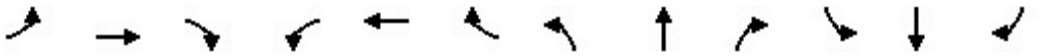
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



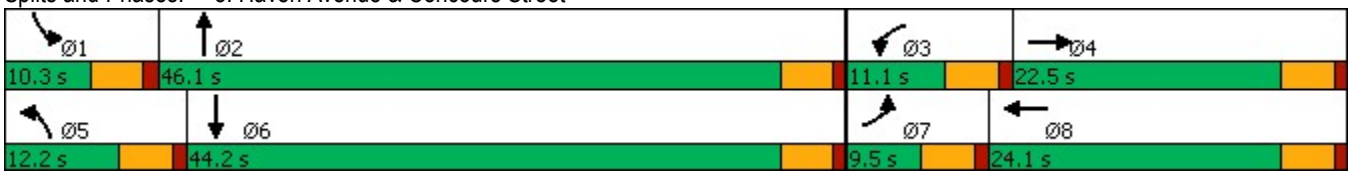
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	43	78	157	57	17	68	1742	141	93	1352	42
Future Volume (vph)	20	43	78	157	57	17	68	1742	141	93	1352	42
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	48	87	174	63	19	76	1936	157	103	1502	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	135	0	174	63	19	76	1936	157	103	1502	47

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	20	43	157	57	17	68	1742	141	93	1352	42
Future Volume (vph)	20	43	157	57	17	68	1742	141	93	1352	42
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	7.0	6.7	14.6	75.2	7.0	40.1	75.2	5.9	38.9	75.2
Actuated g/C Ratio	0.07	0.09	0.09	0.19	1.00	0.09	0.53	1.00	0.08	0.52	1.00
v/c Ratio	0.11	0.38	0.50	0.10	0.01	0.28	0.60	0.10	0.46	0.48	0.03
Control Delay	37.0	17.8	39.9	29.7	0.0	36.6	13.5	0.1	42.5	12.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	17.8	39.9	29.7	0.0	36.6	13.5	0.1	42.5	12.9	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.5		34.4			13.4			14.4	
Approach LOS		C		C			B			B	

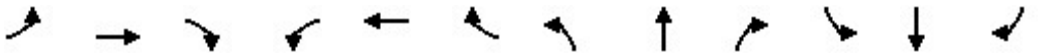
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 75.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 54.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	22	135	174	63	19	76	1936	157	103	1502	47
v/c Ratio	0.11	0.38	0.50	0.10	0.01	0.28	0.60	0.10	0.46	0.48	0.03
Control Delay	37.0	17.8	39.9	29.7	0.0	36.6	13.5	0.1	42.5	12.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	17.8	39.9	29.7	0.0	36.6	13.5	0.1	42.5	12.9	0.0
Queue Length 50th (ft)	5	11	29	12	0	18	178	0	25	131	0
Queue Length 95th (ft)	17	37	52	33	0	39	230	0	51	173	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	195	801	351	887	1500	300	3409	1500	226	3274	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.17	0.50	0.07	0.01	0.25	0.57	0.10	0.46	0.46	0.03

Intersection Summary



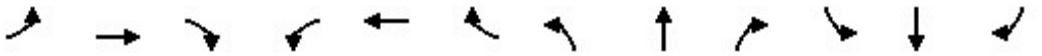
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	43	78	157	57	17	68	1742	141	93	1352	42
Future Volume (veh/h)	20	43	78	157	57	17	68	1742	141	93	1352	42
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	22	48	87	174	63	0	76	1936	0	103	1502	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	73	154	138	284	465		164	3081		185	3125	
Arrive On Green	0.03	0.09	0.09	0.07	0.14	0.00	0.06	0.51	0.00	0.06	0.51	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	22	48	87	174	63	0	76	1936	0	103	1502	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.5	1.8	3.8	2.9	1.1	0.0	1.7	15.5	0.0	2.3	10.7	0.0
Cycle Q Clear(g_c), s	0.5	1.8	3.8	2.9	1.1	0.0	1.7	15.5	0.0	2.3	10.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	73	154	138	284	465		164	3081		185	3125	
V/C Ratio(X)	0.30	0.31	0.63	0.61	0.14		0.46	0.63		0.56	0.48	
Avail Cap(c_a), veh/h	216	451	402	389	982		333	3773		251	3600	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.2	28.5	29.4	30.3	25.4	0.0	30.7	12.0	0.0	30.6	10.6	0.0
Incr Delay (d2), s/veh	2.3	1.1	4.7	2.2	0.1	0.0	2.0	0.2	0.0	2.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.7	1.5	0.9	0.4	0.0	0.6	4.6	0.0	0.8	3.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.5	29.7	34.2	32.5	25.6	0.0	32.8	12.3	0.0	33.2	10.7	0.0
LnGrp LOS	C	C	C	C	C		C	B		C	B	
Approach Vol, veh/h		157			237	A		2012	A		1605	A
Approach Delay, s/veh		32.8			30.6			13.0			12.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	38.5	9.3	10.7	8.3	39.0	6.2	13.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	4.3	17.5	4.9	5.8	3.7	12.7	2.5	3.1
Green Ext Time (p_c), s	0.0	16.5	0.1	0.5	0.1	13.3	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

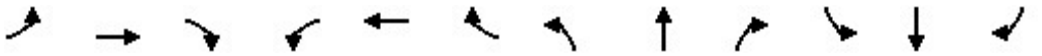
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.992			0.973			0.994			0.979	
Flt Protected	0.950	0.955			0.971		0.950			0.950		
Satd. Flow (prot)	1593	1588	0	0	1667	0	1676	4789	0	1676	4716	0
Flt Permitted	0.950	0.955					0.950			0.950		
Satd. Flow (perm)	1593	1588	0	0	1717	0	1676	4789	0	1676	4716	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143			1			7			36	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



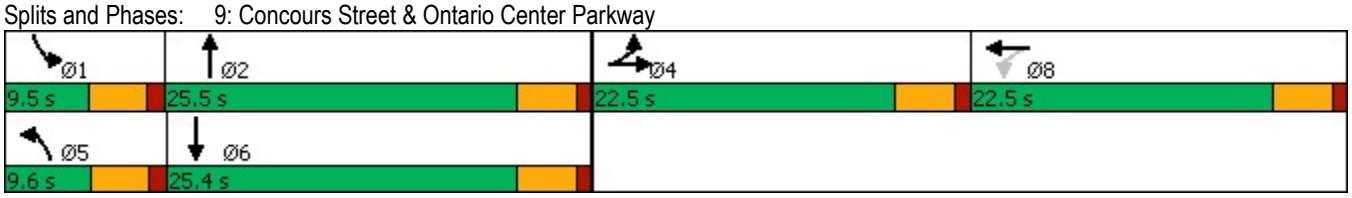
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	99	0	3	3	1	1	47	476	20	1	656	104
Future Volume (vph)	99	0	3	3	1	1	47	476	20	1	656	104
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	110	0	3	3	1	1	52	529	22	1	729	116
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	57	56	0	0	5	0	52	551	0	1	845	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	99	0	3	1	47	476	1	656
Future Volume (vph)	99	0	3	1	47	476	1	656
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.4	7.4		6.1	5.5	26.0	5.3	24.1
Actuated g/C Ratio	0.18	0.18		0.15	0.13	0.63	0.13	0.58
v/c Ratio	0.20	0.14		0.02	0.24	0.18	0.00	0.31
Control Delay	19.6	0.7		19.5	23.5	6.7	22.0	8.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	0.7		19.5	23.5	6.7	22.0	8.4
LOS	B	A		B	C	A	C	A
Approach Delay		10.2		19.5		8.2		8.4
Approach LOS		B		B		A		A

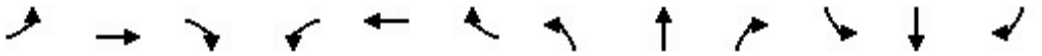
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 41.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.31	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 35.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	56	5	52	551	1	845
v/c Ratio	0.20	0.14	0.02	0.24	0.18	0.00	0.31
Control Delay	19.6	0.7	19.5	23.5	6.7	22.0	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	0.7	19.5	23.5	6.7	22.0	8.4
Queue Length 50th (ft)	9	0	1	9	15	0	24
Queue Length 95th (ft)	48	0	10	48	75	5	115
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	740	814	798	220	3040	216	2883
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.01	0.24	0.18	0.00	0.29

Intersection Summary



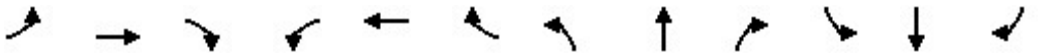
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	0	3	3	1	1	47	476	20	1	656	104
Future Volume (veh/h)	99	0	3	3	1	1	47	476	20	1	656	104
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	113	0	0	3	1	1	52	529	22	1	729	116
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	320	168	0	7	2	2	95	1849	77	5	1403	221
Arrive On Green	0.09	0.00	0.00	0.01	0.01	0.01	0.06	0.39	0.39	0.00	0.33	0.33
Sat Flow, veh/h	3375	1772	0	997	332	332	1688	4764	197	1688	4213	664
Grp Volume(v), veh/h	113	0	0	5	0	0	52	357	194	1	556	289
Grp Sat Flow(s),veh/h/ln	1688	1772	0	1662	0	0	1688	1612	1736	1688	1612	1652
Q Serve(g_s), s	1.1	0.0	0.0	0.1	0.0	0.0	1.1	2.7	2.7	0.0	4.9	5.0
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.1	0.0	0.0	1.1	2.7	2.7	0.0	4.9	5.0
Prop In Lane	1.00		0.00	0.60		0.20	1.00		0.11	1.00		0.40
Lane Grp Cap(c), veh/h	320	168	0	11	0	0	95	1252	674	5	1074	550
V/C Ratio(X)	0.35	0.00	0.00	0.44	0.00	0.00	0.54	0.29	0.29	0.21	0.52	0.52
Avail Cap(c_a), veh/h	1718	902	0	846	0	0	243	1915	1031	239	1905	976
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.0	0.0	0.0	17.5	0.0	0.0	16.2	7.4	7.5	17.6	9.5	9.5
Incr Delay (d2), s/veh	0.7	0.0	0.0	25.1	0.0	0.0	4.8	0.1	0.2	20.4	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.1	0.0	0.0	0.5	0.7	0.7	0.0	1.3	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	0.0	0.0	42.5	0.0	0.0	21.0	7.6	7.7	38.1	9.9	10.3
LnGrp LOS	B	A	A	D	A	A	C	A	A	D	A	B
Approach Vol, veh/h		113			5			603			846	
Approach Delay, s/veh		15.7			42.5			8.8			10.1	
Approach LOS		B			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	18.2		7.9	6.5	16.3		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	4.7		3.1	3.1	7.0		2.1				
Green Ext Time (p_c), s	0.0	3.2		0.3	0.0	4.8		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		10.1
HCM 6th LOS		B

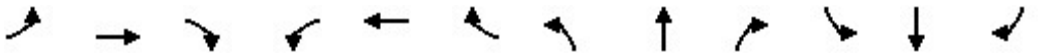
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			280
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



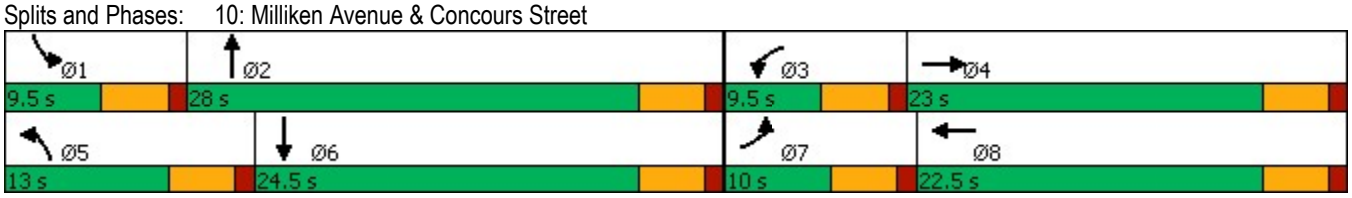
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	97	23	119	47	75	38	184	902	57	51	864	241
Future Volume (vph)	97	23	119	47	75	38	184	902	57	51	864	241
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	113	27	138	55	87	44	214	1049	66	59	1005	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	113	27	138	55	87	44	214	1049	66	59	1005	280

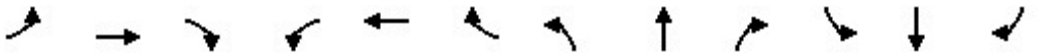
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	23	119	47	75	38	184	902	57	51	864	241
Future Volume (vph)	97	23	119	47	75	38	184	902	57	51	864	241
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.6	11.0	54.3	5.1	6.9	54.3	8.1	29.3	54.3	5.1	20.6	54.3
Actuated g/C Ratio	0.10	0.20	1.00	0.09	0.13	1.00	0.15	0.54	1.00	0.09	0.38	1.00
v/c Ratio	0.38	0.04	0.09	0.20	0.20	0.03	0.49	0.32	0.04	0.22	0.44	0.19
Control Delay	29.2	21.0	0.1	27.2	24.3	0.0	27.3	11.1	0.1	27.4	15.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	21.0	0.1	27.2	24.3	0.0	27.3	11.1	0.1	27.4	15.3	0.3
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		13.9			19.4			13.2			12.7	
Approach LOS		B			B			B			B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 54.3	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 40.7%	ICU Level of Service A
Analysis Period (min) 15	

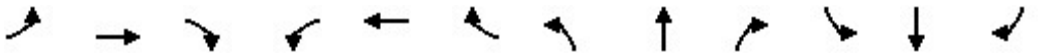
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	113	27	138	55	87	44	214	1049	66	59	1005	280
v/c Ratio	0.38	0.04	0.09	0.20	0.20	0.03	0.49	0.32	0.04	0.22	0.44	0.19
Control Delay	29.2	21.0	0.1	27.2	24.3	0.0	27.3	11.1	0.1	27.4	15.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	21.0	0.1	27.2	24.3	0.0	27.3	11.1	0.1	27.4	15.3	0.3
Queue Length 50th (ft)	19	3	0	9	14	0	35	75	0	10	79	0
Queue Length 95th (ft)	40	13	0	23	31	0	64	99	0	25	104	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	299	1168	1500	272	1137	1500	463	3301	1500	272	2429	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.02	0.09	0.20	0.08	0.03	0.46	0.32	0.04	0.22	0.41	0.19

Intersection Summary



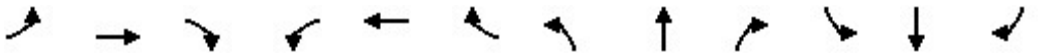
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	97	23	119	47	75	38	184	902	57	51	864	241
Future Volume (veh/h)	97	23	119	47	75	38	184	902	57	51	864	241
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	113	27	0	55	87	0	214	1049	0	59	1005	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	245	428		161	330		325	2177		169	1850	
Arrive On Green	0.08	0.13	0.00	0.06	0.10	0.00	0.11	0.36	0.00	0.06	0.30	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	113	27	0	55	87	0	214	1049	0	59	1005	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.7	0.3	0.0	0.8	1.1	0.0	3.2	6.0	0.0	0.9	6.2	0.0
Cycle Q Clear(g_c), s	1.7	0.3	0.0	0.8	1.1	0.0	3.2	6.0	0.0	0.9	6.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	245	428		161	330		325	2177		169	1850	
V/C Ratio(X)	0.46	0.06		0.34	0.26		0.66	0.48		0.35	0.54	
Avail Cap(c_a), veh/h	358	1392		325	1355		553	3202		325	2725	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.5	17.2	0.0	20.3	18.7	0.0	19.1	11.2	0.0	20.3	13.0	0.0
Incr Delay (d2), s/veh	1.3	0.1	0.0	1.2	0.4	0.0	2.3	0.2	0.0	1.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.1	0.0	0.3	0.4	0.0	1.0	1.6	0.0	0.3	1.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.9	17.2	0.0	21.6	19.1	0.0	21.3	11.3	0.0	21.5	13.2	0.0
LnGrp LOS	C	B		C	B		C	B		C	B	
Approach Vol, veh/h		140	A		142	A		1263	A		1064	A
Approach Delay, s/veh		20.2			20.1			13.0			13.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	20.5	7.0	10.2	9.5	18.1	8.3	8.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	2.9	8.0	2.8	2.3	5.2	8.2	3.7	3.1
Green Ext Time (p_c), s	0.0	6.7	0.0	0.1	0.2	5.4	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

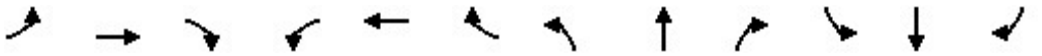
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			433			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



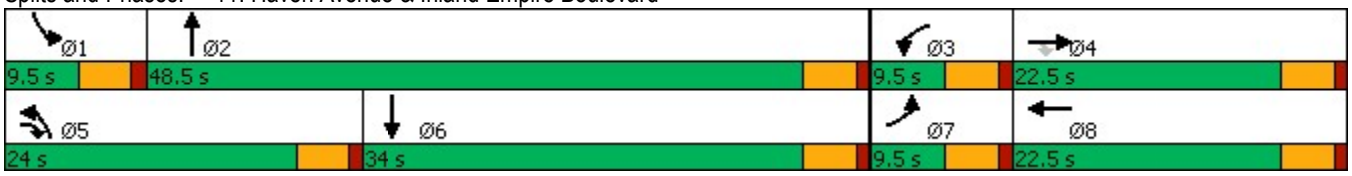
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	51	94	230	113	99	20	442	2014	622	50	1331	72
Future Volume (vph)	51	94	230	113	99	20	442	2014	622	50	1331	72
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	55	101	247	122	106	22	475	2166	669	54	1431	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	101	247	122	106	22	475	2166	669	54	1431	77

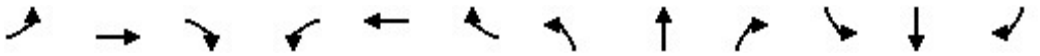
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	94	230	113	99	20	442	2014	622	50	1331	72
Future Volume (vph)	51	94	230	113	99	20	442	2014	622	50	1331	72
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.4	8.1	26.6	5.4	9.9	71.1	17.3	46.7	71.1	5.4	27.9	71.1
Actuated g/C Ratio	0.08	0.11	0.37	0.08	0.14	1.00	0.24	0.66	1.00	0.08	0.39	1.00
v/c Ratio	0.25	0.27	0.41	0.41	0.23	0.01	0.67	0.54	0.45	0.25	0.60	0.05
Control Delay	39.1	34.8	14.0	40.8	33.2	0.0	32.1	10.9	1.0	39.1	20.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	34.8	14.0	40.8	33.2	0.0	32.1	10.9	1.0	39.1	20.3	0.1
LOS	D	C	B	D	C	A	C	B	A	D	C	A
Approach Delay		22.7			34.0			11.9			19.9	
Approach LOS		C			C			B			B	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 71.1		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.67		
Intersection Signal Delay: 16.0	Intersection LOS: B	
Intersection Capacity Utilization 56.0%	ICU Level of Service B	
Analysis Period (min) 15		

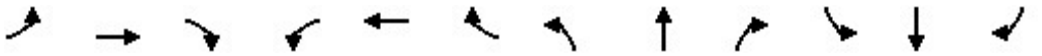
Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	55	101	247	122	106	22	475	2166	669	54	1431	77
v/c Ratio	0.25	0.27	0.41	0.41	0.23	0.01	0.67	0.54	0.45	0.25	0.60	0.05
Control Delay	39.1	34.8	14.0	40.8	33.2	0.0	32.1	10.9	1.0	39.1	20.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	34.8	14.0	40.8	33.2	0.0	32.1	10.9	1.0	39.1	20.3	0.1
Queue Length 50th (ft)	13	25	58	21	26	0	111	203	0	13	166	0
Queue Length 95th (ft)	32	48	114	40	50	0	166	256	0	31	214	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	219	915	680	298	915	1500	854	3989	1500	219	2721	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.11	0.36	0.41	0.12	0.01	0.56	0.54	0.45	0.25	0.53	0.05

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	94	230	113	99	20	442	2014	622	50	1331	72
Future Volume (veh/h)	51	94	230	113	99	20	442	2014	622	50	1331	72
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	55	101	247	122	106	0	475	2166	0	54	1431	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	130	546	535	235	595		564	3077		128	2164	
Arrive On Green	0.04	0.16	0.16	0.06	0.18	0.00	0.19	0.50	0.00	0.04	0.36	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	55	101	247	122	106	0	475	2166	0	54	1431	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.4	2.0	9.9	2.3	2.1	0.0	12.3	21.4	0.0	1.4	15.5	0.0
Cycle Q Clear(g_c), s	1.4	2.0	9.9	2.3	2.1	0.0	12.3	21.4	0.0	1.4	15.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	130	546	535	235	595		564	3077		128	2164	
V/C Ratio(X)	0.42	0.19	0.46	0.52	0.18		0.84	0.70		0.42	0.66	
Avail Cap(c_a), veh/h	186	773	636	253	773		724	3422		186	2294	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.5	28.4	19.5	35.8	27.4	0.0	30.4	14.9	0.0	36.5	21.3	0.0
Incr Delay (d2), s/veh	2.2	0.2	0.6	1.8	0.1	0.0	7.1	0.6	0.0	2.2	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.8	3.4	0.8	0.8	0.0	4.7	6.8	0.0	0.5	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.7	28.5	20.1	37.5	27.6	0.0	37.5	15.5	0.0	38.7	22.0	0.0
LnGrp LOS	D	C	C	D	C		D	B		D	C	
Approach Vol, veh/h		403			228	A		2641	A		1485	A
Approach Delay, s/veh		24.7			32.9			19.5			22.6	
Approach LOS		C			C			B			C	

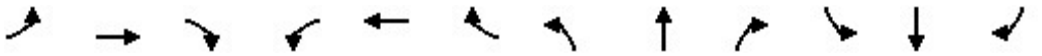
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	44.1	9.1	17.2	19.7	32.3	8.0	18.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.4	23.4	4.3	11.9	14.3	17.5	3.4	4.1
Green Ext Time (p_c), s	0.0	16.2	0.0	0.8	0.9	7.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	21.5
HCM 6th LOS	C

Notes

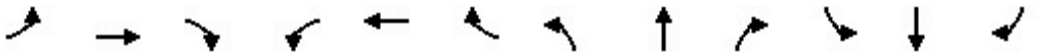
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



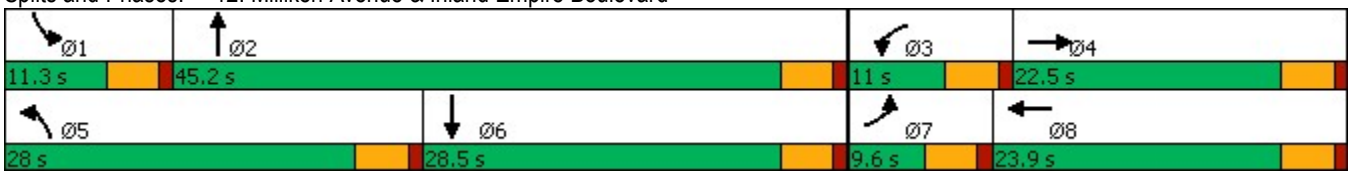
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	61	32	50	95	75	19	390	1044	106	31	862	125
Future Volume (vph)	61	32	50	95	75	19	390	1044	106	31	862	125
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	71	37	58	110	87	22	453	1214	123	36	1002	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	37	58	110	87	22	453	1214	123	36	1002	145

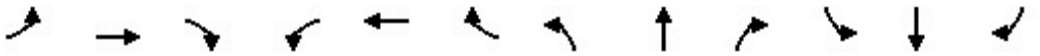
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	32	50	95	75	19	390	1044	106	31	862	125
Future Volume (vph)	61	32	50	95	75	19	390	1044	106	31	862	125
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	7.1	61.5	9.1	7.9	61.5	15.9	39.1	61.5	6.9	19.8	61.5
Actuated g/C Ratio	0.09	0.12	1.00	0.15	0.13	1.00	0.26	0.64	1.00	0.11	0.32	1.00
v/c Ratio	0.26	0.10	0.04	0.26	0.20	0.01	0.61	0.31	0.08	0.11	0.51	0.10
Control Delay	34.9	31.1	0.0	32.0	30.6	0.0	26.4	8.8	0.1	31.8	19.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	31.1	0.0	32.0	30.6	0.0	26.4	8.8	0.1	31.8	19.8	0.1
LOS	C	C	A	C	C	A	C	A	A	C	B	A
Approach Delay		21.9			28.2			12.7			17.7	
Approach LOS		C			C			B			B	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 61.5		
Natural Cycle: 70		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.61		
Intersection Signal Delay: 15.9	Intersection LOS: B	
Intersection Capacity Utilization 47.5%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	37	58	110	87	22	453	1214	123	36	1002	145
v/c Ratio	0.26	0.10	0.04	0.26	0.20	0.01	0.61	0.31	0.08	0.11	0.51	0.10
Control Delay	34.9	31.1	0.0	32.0	30.6	0.0	26.4	8.8	0.1	31.8	19.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	31.1	0.0	32.0	30.6	0.0	26.4	8.8	0.1	31.8	19.8	0.1
Queue Length 50th (ft)	14	7	0	22	17	0	87	61	0	7	98	0
Queue Length 95th (ft)	35	21	0	48	39	0	134	119	0	21	139	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	274	1123	1500	440	1211	1500	1264	4077	1500	366	2712	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.03	0.04	0.25	0.07	0.01	0.36	0.30	0.08	0.10	0.37	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	32	50	95	75	19	390	1044	106	31	862	125
Future Volume (veh/h)	61	32	50	95	75	19	390	1044	106	31	862	125
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	71	37	0	110	87	0	453	1214	0	36	1002	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	177	297		219	345		609	2814		113	1774	
Arrive On Green	0.06	0.09	0.00	0.08	0.10	0.00	0.21	0.46	0.00	0.04	0.29	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	71	37	0	110	87	0	453	1214	0	36	1002	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.3	0.5	0.0	1.9	1.3	0.0	7.8	7.2	0.0	0.6	7.5	0.0
Cycle Q Clear(g_c), s	1.3	0.5	0.0	1.9	1.3	0.0	7.8	7.2	0.0	0.6	7.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	297		219	345		609	2814		113	1774	
V/C Ratio(X)	0.40	0.12		0.50	0.25		0.74	0.43		0.32	0.56	
Avail Cap(c_a), veh/h	277	1132		353	1220		1277	4633		370	2732	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.2	22.5	0.0	23.8	22.1	0.0	19.8	9.7	0.0	25.1	16.1	0.0
Incr Delay (d2), s/veh	1.5	0.2	0.0	1.8	0.4	0.0	1.8	0.1	0.0	1.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.2	0.0	0.7	0.5	0.0	2.5	2.0	0.0	0.2	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	22.7	0.0	25.6	22.5	0.0	21.6	9.8	0.0	26.7	16.4	0.0
LnGrp LOS	C	C		C	C		C	A		C	B	
Approach Vol, veh/h		108	A		197	A		1667	A		1038	A
Approach Delay, s/veh		24.6			24.2			13.0			16.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	29.2	8.5	9.2	15.7	20.1	7.8	10.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	2.6	9.2	3.9	2.5	9.8	9.5	3.3	3.3
Green Ext Time (p_c), s	0.0	10.8	0.1	0.1	1.4	6.1	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.943	0.850				
Flt Protected	0.970					
Satd. Flow (prot)	2958	1365	6071	0	0	6071
Flt Permitted	0.970					
Satd. Flow (perm)	2958	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	2	2				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

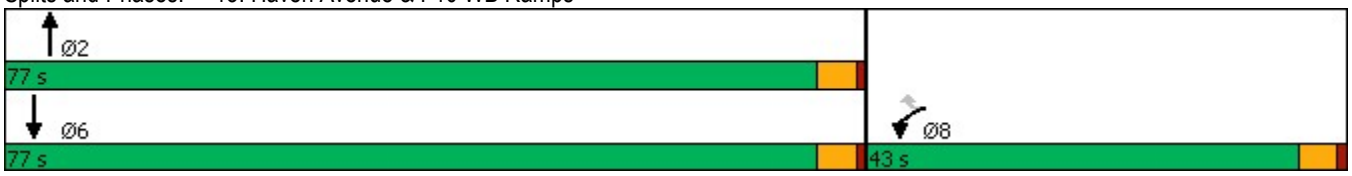
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	477	653	2518	0	0	1478
Future Volume (vph)	477	653	2518	0	0	1478
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	524	718	2767	0	0	1624
Shared Lane Traffic (%)		45%				
Lane Group Flow (vph)	847	395	2767	0	0	1624

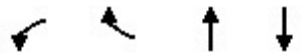
Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	477	653	2518	1478
Future Volume (vph)	477	653	2518	1478
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	37.0	37.0	72.5	72.5
Actuated g/C Ratio	0.31	0.31	0.61	0.61
v/c Ratio	0.92	0.93	0.74	0.44
Control Delay	54.8	68.3	18.2	12.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	54.8	68.3	18.2	12.8
LOS	D	E	B	B
Approach Delay	59.1		18.2	12.8
Approach LOS	E		B	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 77.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps





Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	847	395	2767	1624
v/c Ratio	0.92	0.93	0.74	0.44
Control Delay	54.8	68.3	18.2	12.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	54.8	68.3	18.2	12.8
Queue Length 50th (ft)	320	318	425	185
Queue Length 95th (ft)	#434	#527	470	212
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	962	445	3715	3715
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.88	0.89	0.74	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

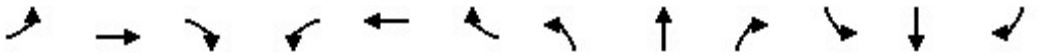
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	477	653	2518	0	0	1478
Future Volume (veh/h)	477	653	2518	0	0	1478
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	414	836	2767	0	0	1624
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	495	934	3711	0	0	3711
Arrive On Green	0.31	0.31	0.61	0.00	0.00	0.61
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	414	836	2767	0	0	1624
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	27.1	29.8	36.4	0.0	0.0	15.9
Cycle Q Clear(g_c), s	27.1	29.8	36.4	0.0	0.0	15.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	495	934	3711	0	0	3711
V/C Ratio(X)	0.84	0.90	0.75	0.00	0.00	0.44
Avail Cap(c_a), veh/h	548	1033	3947	0	0	3947
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	35.9	36.8	15.7	0.0	0.0	11.7
Incr Delay (d2), s/veh	10.0	9.6	0.8	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	12.0	12.0	0.0	0.0	5.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	45.9	46.5	16.4	0.0	0.0	11.8
LnGrp LOS	D	D	B	A	A	B
Approach Vol, veh/h	1250		2767			1624
Approach Delay, s/veh	46.3		16.4			11.8
Approach LOS	D		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		72.7			72.7	39.3
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s		38.4			17.9	31.8
Green Ext Time (p_c), s		29.7			19.7	3.0

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C

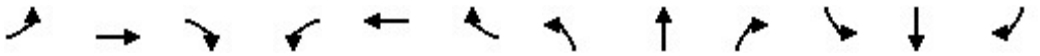
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			256			182			325			249
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



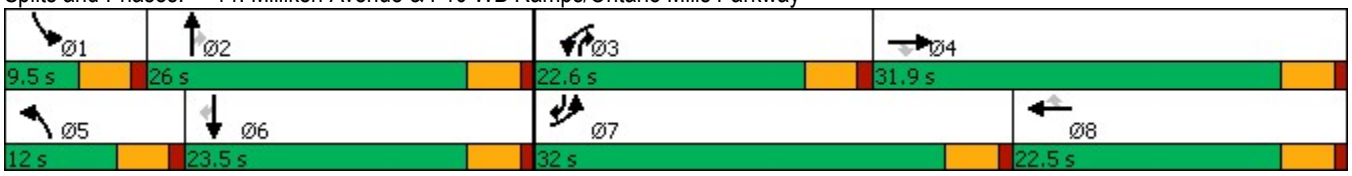
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	594	86	228	156	178	33	148	864	289	80	595	243
Future Volume (vph)	594	86	228	156	178	33	148	864	289	80	595	243
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	667	97	256	175	200	37	166	971	325	90	669	273
Shared Lane Traffic (%)												
Lane Group Flow (vph)	667	97	256	175	200	37	166	971	325	90	669	273

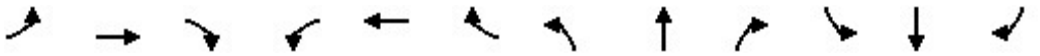
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	594	86	228	156	178	33	148	864	289	80	595	243
Future Volume (vph)	594	86	228	156	178	33	148	864	289	80	595	243
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	22.4	22.2	22.2	10.2	10.0	10.0	7.5	21.1	35.9	5.1	16.2	43.2
Actuated g/C Ratio	0.30	0.30	0.30	0.14	0.13	0.13	0.10	0.28	0.48	0.07	0.22	0.58
v/c Ratio	0.77	0.19	0.41	0.44	0.45	0.10	0.57	0.56	0.36	0.45	0.51	0.28
Control Delay	31.0	21.7	5.3	35.0	34.8	0.6	43.6	25.9	3.0	44.8	27.7	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	21.7	5.3	35.0	34.8	0.6	43.6	25.9	3.0	44.8	27.7	2.2
LOS	C	C	A	D	C	A	D	C	A	D	C	A
Approach Delay		23.6			31.8			22.8			22.5	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 57.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

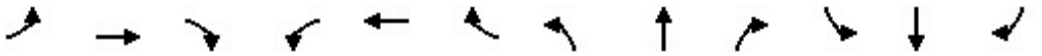




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	667	97	256	175	200	37	166	971	325	90	669	273
v/c Ratio	0.77	0.19	0.41	0.44	0.45	0.10	0.57	0.56	0.36	0.45	0.51	0.28
Control Delay	31.0	21.7	5.3	35.0	34.8	0.6	43.6	25.9	3.0	44.8	27.7	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	21.7	5.3	35.0	34.8	0.6	43.6	25.9	3.0	44.8	27.7	2.2
Queue Length 50th (ft)	150	34	0	41	47	0	40	118	0	22	80	4
Queue Length 95th (ft)	218	74	50	72	83	0	#83	167	40	#47	118	33
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1093	664	724	719	829	508	298	1795	1023	198	1586	1071
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.15	0.35	0.24	0.24	0.07	0.56	0.54	0.32	0.45	0.42	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	594	86	228	156	178	33	148	864	289	80	595	243
Future Volume (veh/h)	594	86	228	156	178	33	148	864	289	80	595	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	667	97	256	175	200	37	166	971	325	90	669	273
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	809	513	435	266	347	155	243	1698	556	180	1568	804
Arrive On Green	0.28	0.29	0.29	0.09	0.10	0.10	0.08	0.28	0.28	0.06	0.26	0.26
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	667	97	256	175	200	37	166	971	325	90	669	273
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	13.9	2.7	9.4	3.8	3.7	1.5	3.6	8.8	11.3	1.9	5.9	6.7
Cycle Q Clear(g_c), s	13.9	2.7	9.4	3.8	3.7	1.5	3.6	8.8	11.3	1.9	5.9	6.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	809	513	435	266	347	155	243	1698	556	180	1568	804
V/C Ratio(X)	0.82	0.19	0.59	0.66	0.58	0.24	0.68	0.57	0.58	0.50	0.43	0.34
Avail Cap(c_a), veh/h	1238	751	636	815	937	418	338	2027	637	225	1791	859
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.9	17.3	19.7	28.4	27.6	26.7	28.8	20.0	16.4	29.4	20.0	8.5
Incr Delay (d2), s/veh	2.8	0.2	1.3	2.8	1.5	0.8	3.4	0.3	1.1	2.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	1.0	3.2	1.4	1.5	0.5	1.3	2.9	3.7	0.7	2.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	17.4	20.9	31.1	29.2	27.4	32.2	20.3	17.4	31.5	20.2	8.8
LnGrp LOS	C	B	C	C	C	C	C	C	B	C	C	A
Approach Vol, veh/h		1020			412			1462			1032	
Approach Delay, s/veh		23.0			29.8			21.0			18.2	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	22.5	10.4	23.2	9.9	21.1	22.5	11.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	3.9	13.3	5.8	11.4	5.6	8.7	15.9	5.7
Green Ext Time (p_c), s	0.0	4.8	0.4	1.3	0.1	4.1	2.1	1.0

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	4	4				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

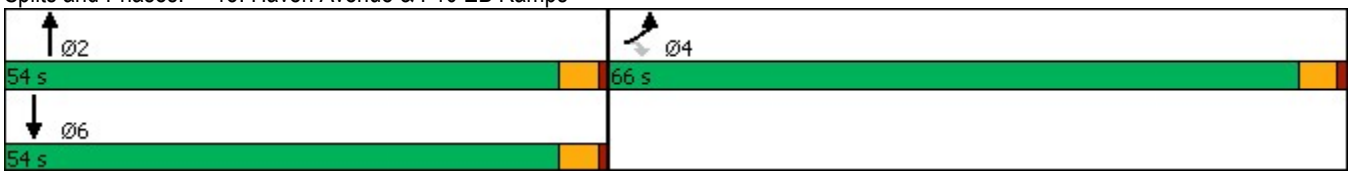
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1205	560	0	1629	1467	0
Future Volume (vph)	1205	560	0	1629	1467	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1354	629	0	1830	1648	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1417	566	0	1830	1648	0

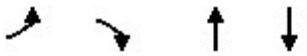
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1205	560	1629	1467
Future Volume (vph)	1205	560	1629	1467
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	57.3	57.3	47.3	47.3
Actuated g/C Ratio	0.50	0.50	0.42	0.42
v/c Ratio	0.92	0.82	0.72	0.65
Control Delay	36.8	35.6	30.2	28.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.8	35.6	30.2	28.5
LOS	D	D	C	C
Approach Delay	36.5		30.2	28.5
Approach LOS	D		C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 32.0	Intersection LOS: C
Intersection Capacity Utilization 77.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1417	566	1830	1648
v/c Ratio	0.92	0.82	0.72	0.65
Control Delay	36.8	35.6	30.2	28.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.8	35.6	30.2	28.5
Queue Length 50th (ft)	494	384	341	294
Queue Length 95th (ft)	598	561	379	331
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1676	748	2672	2672
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.85	0.76	0.68	0.62

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1205	560	0	1629	1467	0
Future Volume (veh/h)	1205	560	0	1629	1467	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1354	629	0	1830	1648	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1567	738	0	2551	2551	0
Arrive On Green	0.49	0.49	0.00	0.42	0.42	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1354	629	0	1830	1648	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	37.5	36.6	0.0	24.9	21.5	0.0
Cycle Q Clear(g_c), s	37.5	36.6	0.0	24.9	21.5	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1567	738	0	2551	2551	0
V/C Ratio(X)	0.86	0.85	0.00	0.72	0.65	0.00
Avail Cap(c_a), veh/h	1961	924	0	3019	3019	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.5	22.2	0.0	24.2	23.2	0.0
Incr Delay (d2), s/veh	3.6	6.4	0.0	0.7	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.0	13.5	0.0	8.8	7.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.0	28.6	0.0	24.8	23.5	0.0
LnGrp LOS	C	C	A	C	C	A
Approach Vol, veh/h	1983			1830	1648	
Approach Delay, s/veh	26.9			24.8	23.5	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		46.3		53.6		46.3
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		26.9		39.5		23.5
Green Ext Time (p_c), s		14.9		9.6		14.5

Intersection Summary	
HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		8				323
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	629	564	153	676	709	281
Future Volume (vph)	629	564	153	676	709	281
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	723	648	176	777	815	323
Shared Lane Traffic (%)						
Lane Group Flow (vph)	723	648	176	777	815	323

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	629	564	153	676	709	281
Future Volume (vph)	629	564	153	676	709	281
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	27.0	27.0	52.0	25.0	38.0
Total Split (%)	42.2%	30.0%	30.0%	57.8%	27.8%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	22.5	38.8	11.5	32.7	16.4	43.7
Actuated g/C Ratio	0.35	0.60	0.18	0.51	0.25	0.68
v/c Ratio	0.72	0.72	0.34	0.25	0.53	0.29
Control Delay	23.7	14.4	27.2	9.8	23.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	14.4	27.2	9.8	23.7	1.4
LOS	C	B	C	A	C	A
Approach Delay	19.3			13.0	17.3	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 64.7	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 55.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

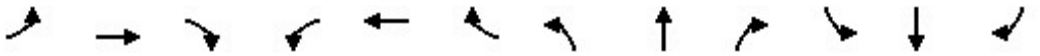
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	723	648	176	777	815	323
v/c Ratio	0.72	0.72	0.34	0.25	0.53	0.29
Control Delay	23.7	14.4	27.2	9.8	23.7	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	14.4	27.2	9.8	23.7	1.4
Queue Length 50th (ft)	120	154	31	46	77	0
Queue Length 95th (ft)	223	273	66	80	146	23
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1581	1185	1062	4641	2032	1331
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.55	0.17	0.17	0.40	0.24

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	629	564	153	676	709	281
Future Volume (veh/h)	629	564	153	676	709	281
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	723	648	176	777	815	323
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1308	816	274	2458	1436	1028
Arrive On Green	0.45	0.45	0.09	0.40	0.24	0.24
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	723	648	176	777	815	323
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	11.1	21.2	3.6	5.3	7.2	5.3
Cycle Q Clear(g_c), s	11.1	21.2	3.6	5.3	7.2	5.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1308	816	274	2458	1436	1028
V/C Ratio(X)	0.55	0.79	0.64	0.32	0.57	0.31
Avail Cap(c_a), veh/h	1595	965	1071	4738	2045	1179
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.3	11.2	26.7	12.5	20.6	3.9
Incr Delay (d2), s/veh	0.4	4.0	2.5	0.1	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.9	1.3	1.6	2.4	4.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	15.2	29.2	12.5	21.0	4.0
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	1371			953	1138	
Approach Delay, s/veh	13.9			15.6	16.2	
Approach LOS	B			B	B	

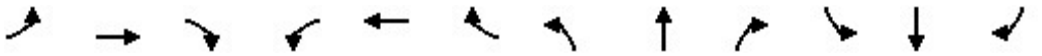
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.1		32.0	10.3	18.9
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	22.5	20.5
Max Q Clear Time (g_c+I1), s		7.3		23.2	5.6	9.2
Green Ext Time (p_c), s		6.4		4.3	0.5	5.2

Intersection Summary	
HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.965				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4649	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4649	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		64				136			177		65	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	350	675	208	155	577	123	242	1468	186	170	1412	356
Future Volume (vph)	350	675	208	155	577	123	242	1468	186	170	1412	356
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	380	734	226	168	627	134	263	1596	202	185	1535	387
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	960	0	168	627	134	263	1596	202	185	1922	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	350	675	155	577	123	242	1468	186	170	1412
Future Volume (vph)	350	675	155	577	123	242	1468	186	170	1412
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.3	32.3	9.4	24.3	24.3	9.5	52.5	119.6	7.5	50.5
Actuated g/C Ratio	0.14	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	0.91	0.74	0.75	0.92	0.33	1.15	0.75	0.13	1.02	0.76
Control Delay	76.8	41.1	74.3	67.1	8.7	154.3	31.1	0.2	128.6	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.8	41.1	74.3	67.1	8.7	154.3	31.1	0.2	128.6	30.8
LOS	E	D	E	E	A	F	C	A	F	C
Approach Delay		51.2		59.9			43.8			39.4
Approach LOS		D		E			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 46.2	Intersection LOS: D
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	380	960	168	627	134	263	1596	202	185	1922
v/c Ratio	0.91	0.74	0.75	0.92	0.33	1.15	0.75	0.13	1.02	0.76
Control Delay	76.8	41.1	74.3	67.1	8.7	154.3	31.1	0.2	128.6	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.8	41.1	74.3	67.1	8.7	154.3	31.1	0.2	128.6	30.8
Queue Length 50th (ft)	151	232	66	252	0	~123	373	0	~78	352
Queue Length 95th (ft)	#240	285	#118	#361	51	#210	434	0	#155	399
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	422	1309	229	686	415	229	2114	1500	181	2523
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.73	0.73	0.91	0.32	1.15	0.75	0.13	1.02	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

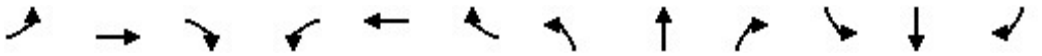
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	350	675	208	155	577	123	242	1468	186	170	1412	356
Future Volume (veh/h)	350	675	208	155	577	123	242	1468	186	170	1412	356
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	380	734	226	168	627	134	263	1596	0	185	1535	387
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	423	1007	306	214	681	304	231	2125		183	2065	521
Arrive On Green	0.15	0.27	0.27	0.07	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	2910	3677	1119	2910	3367	1502	2910	4837	1502	2910	4889	1233
Grp Volume(v), veh/h	380	643	317	168	627	134	263	1596	0	185	1435	487
Grp Sat Flow(s),veh/h/ln	1455	1612	1571	1455	1683	1502	1455	1612	1502	1455	1524	1550
Q Serve(g_s), s	15.3	21.6	22.0	6.8	21.8	9.3	9.5	33.0	0.0	7.5	31.6	31.6
Cycle Q Clear(g_c), s	15.3	21.6	22.0	6.8	21.8	9.3	9.5	33.0	0.0	7.5	31.6	31.6
Prop In Lane	1.00		0.71	1.00		1.00	1.00		1.00	1.00		0.80
Lane Grp Cap(c), veh/h	423	883	430	214	681	304	231	2125		183	1931	655
V/C Ratio(X)	0.90	0.73	0.74	0.79	0.92	0.44	1.14	0.75		1.01	0.74	0.74
Avail Cap(c_a), veh/h	426	883	430	231	690	308	231	2125		183	1931	655
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.2	39.3	39.5	54.4	46.8	41.8	55.0	28.1	0.0	56.0	29.1	29.1
Incr Delay (d2), s/veh	21.3	3.0	6.5	15.2	17.7	1.0	101.1	2.5	0.0	70.1	2.6	7.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	8.9	9.2	2.9	10.8	3.6	6.7	13.0	0.0	4.5	11.8	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	71.6	42.4	46.0	69.6	64.4	42.8	156.1	30.6	0.0	126.1	31.7	36.5
LnGrp LOS	E	D	D	E	E	D	F	C		F	C	D
Approach Vol, veh/h		1340			929			1859	A		2107	
Approach Delay, s/veh		51.5			62.3			48.3			41.1	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	13.3	37.2	14.0	55.0	21.9	28.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	9.5	35.0	8.8	24.0	11.5	33.6	17.3	23.8
Green Ext Time (p_c), s	0.0	10.9	0.0	4.1	0.0	12.2	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	48.6
HCM 6th LOS	D

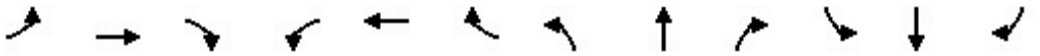
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.995				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6040	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6040	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				127			202		186	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	1731	65	1	1069	14	63	0	9	45	0	12
Future Volume (vph)	4	1731	65	1	1069	14	63	0	9	45	0	12
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	1822	68	1	1125	15	66	0	9	47	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	1890	0	1	1125	15	66	0	9	47	13	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	1731	1	1069	14	63	9	45	0
Future Volume (vph)	4	1731	1	1069	14	63	9	45	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.3	35.3	5.3	35.3	35.3	7.1	5.8	7.5	6.4
Actuated g/C Ratio	0.09	0.60	0.09	0.60	0.60	0.12	0.10	0.13	0.11
v/c Ratio	0.03	0.52	0.01	0.39	0.02	0.35	0.03	0.23	0.03
Control Delay	31.5	8.8	31.0	8.0	0.0	34.1	0.1	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	8.8	31.0	8.0	0.0	34.1	0.1	30.4	0.1
LOS	C	A	C	A	A	C	A	C	A
Approach Delay		8.9		7.9					23.8
Approach LOS		A		A					C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 58.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 47.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

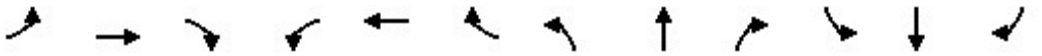
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	4	1890	1	1125	15	66	9	47	13
v/c Ratio	0.03	0.52	0.01	0.39	0.02	0.35	0.03	0.23	0.03
Control Delay	31.5	8.8	31.0	8.0	0.0	34.1	0.1	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	8.8	31.0	8.0	0.0	34.1	0.1	30.4	0.1
Queue Length 50th (ft)	2	112	0	75	0	24	0	17	0
Queue Length 95th (ft)	11	216	5	155	0	68	0	51	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	142	4125	142	3288	1064	207	650	282	1231
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.46	0.01	0.34	0.01	0.32	0.01	0.17	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1731	65	1	1069	14	63	0	9	45	0	12
Future Volume (veh/h)	4	1731	65	1	1069	14	63	0	9	45	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	4	1822	68	1	1125	15	66	0	9	47	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	3172	118	3	2506	778	92	181	154	74	153	137
Arrive On Green	0.01	0.52	0.52	0.00	0.52	0.52	0.06	0.00	0.10	0.05	0.00	0.09
Sat Flow, veh/h	1594	6076	227	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	4	1371	519	1	1125	15	66	0	9	47	0	13
Grp Sat Flow(s),veh/h/ln	1594	1524	1731	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.1	11.2	11.2	0.0	8.0	0.3	2.2	0.0	0.3	1.6	0.0	0.4
Cycle Q Clear(g_c), s	0.1	11.2	11.2	0.0	8.0	0.3	2.2	0.0	0.3	1.6	0.0	0.4
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	9	2387	904	3	2506	778	92	181	154	74	153	137
V/C Ratio(X)	0.47	0.57	0.57	0.34	0.45	0.02	0.72	0.00	0.06	0.63	0.00	0.10
Avail Cap(c_a), veh/h	145	3155	1195	145	3338	1036	212	619	525	287	668	596
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.2	9.0	9.0	27.4	8.3	6.4	25.4	0.0	22.3	25.7	0.0	22.9
Incr Delay (d2), s/veh	34.5	0.2	0.6	58.7	0.1	0.0	9.9	0.0	0.2	8.6	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.9	3.4	0.1	2.2	0.1	1.0	0.0	0.1	0.7	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.7	9.2	9.5	86.1	8.4	6.5	35.3	0.0	22.4	34.3	0.0	23.2
LnGrp LOS	E	A	A	F	A	A	D	A	C	C	A	C
Approach Vol, veh/h		1894			1141			75			60	
Approach Delay, s/veh		9.4			8.5			33.8			31.9	
Approach LOS		A			A			C			C	

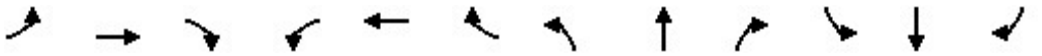
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	10.1	4.6	33.2	7.7	9.5	4.8	32.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	3.6	2.3	2.0	13.2	4.2	2.4	2.1	10.0
Green Ext Time (p_c), s	0.0	0.0	0.0	15.4	0.0	0.0	0.0	9.5

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4794	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.728				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4794	0	1213	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10				155			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



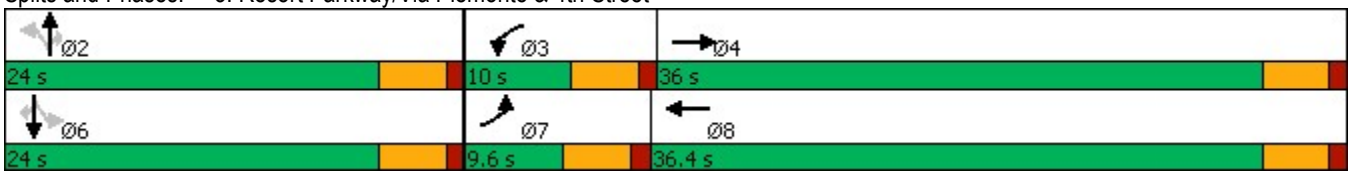
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	28	1747	8	65	1044	37	36	0	44	41	1	19
Future Volume (vph)	28	1747	8	65	1044	37	36	0	44	41	1	19
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	29	1839	8	68	1099	39	38	0	46	43	1	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1847	0	68	1138	0	38	0	46	0	44	20

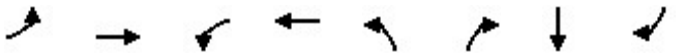
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	28	1747	65	1044	36	44	41	1	19
Future Volume (vph)	28	1747	65	1044	36	44	41	1	19
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.3	29.9	5.7	31.9	7.4	7.4		7.4	7.4
Actuated g/C Ratio	0.10	0.58	0.11	0.61	0.14	0.14		0.14	0.14
v/c Ratio	0.10	0.53	0.39	0.39	0.22	0.13		0.24	0.07
Control Delay	25.9	8.3	32.9	6.4	25.5	0.8		25.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	25.9	8.3	32.9	6.4	25.5	0.8		25.7	0.4
LOS	C	A	C	A	C	A		C	A
Approach Delay		8.6		7.9				17.8	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 52	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 51.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	29	1847	68	1138	38	46	44	20
v/c Ratio	0.10	0.53	0.39	0.39	0.22	0.13	0.24	0.07
Control Delay	25.9	8.3	32.9	6.4	25.5	0.8	25.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	8.3	32.9	6.4	25.5	0.8	25.7	0.4
Queue Length 50th (ft)	5	108	23	38	12	0	14	0
Queue Length 95th (ft)	15	154	#66	113	35	0	39	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	294	3814	173	3216	472	678	501	641
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.48	0.39	0.35	0.08	0.07	0.09	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	28	1747	8	65	1044	37	36	0	44	41	1	19
Future Volume (veh/h)	28	1747	8	65	1044	37	36	0	44	41	1	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	29	1839	8	68	1099	39	38	0	46	43	1	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	98	3348	15	101	2687	95	264	194	165	302	5	165
Arrive On Green	0.03	0.53	0.53	0.06	0.56	0.56	0.11	0.00	0.11	0.11	0.11	0.11
Sat Flow, veh/h	2910	6311	27	1594	4796	170	1314	1772	1502	1324	47	1502
Grp Volume(v), veh/h	29	1332	515	68	739	399	38	0	46	44	0	20
Grp Sat Flow(s),veh/h/ln	1455	1524	1767	1594	1612	1741	1314	1772	1502	1371	0	1502
Q Serve(g_s), s	0.4	8.8	8.8	1.9	6.0	6.0	1.2	0.0	1.3	1.3	0.0	0.5
Cycle Q Clear(g_c), s	0.4	8.8	8.8	1.9	6.0	6.0	2.6	0.0	1.3	1.3	0.0	0.5
Prop In Lane	1.00		0.02	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	98	2425	937	101	1806	975	264	194	165	307	0	165
V/C Ratio(X)	0.30	0.55	0.55	0.67	0.41	0.41	0.14	0.00	0.28	0.14	0.00	0.12
Avail Cap(c_a), veh/h	326	3161	1222	192	2258	1219	682	759	643	742	0	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	7.1	7.1	20.9	5.7	5.7	19.8	0.0	18.6	18.6	0.0	18.3
Incr Delay (d2), s/veh	1.7	0.2	0.5	7.6	0.1	0.3	0.2	0.0	0.9	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.0	2.3	0.8	1.3	1.5	0.4	0.0	0.4	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	7.3	7.6	28.4	5.9	6.0	20.1	0.0	19.5	18.9	0.0	18.6
LnGrp LOS	C	A	A	C	A	A	C	A	B	B	A	B
Approach Vol, veh/h		1876			1206			84			64	
Approach Delay, s/veh		7.6			7.2			19.8			18.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	7.4	28.7		9.5	6.0	30.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		4.6	3.9	10.8		3.3	2.4	8.0				
Green Ext Time (p_c), s		0.2	0.0	13.4		0.2	0.0	8.5				

Intersection Summary												
HCM 6th Ctrl Delay			8.0									
HCM 6th LOS			A									

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	4794	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4794	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1779	61	0	1120	0	51
Future Volume (vph)	1779	61	0	1120	0	51
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1853	64	0	1167	0	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1917	0	0	1167	0	53

Intersection Summary

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1779	61	0	1120	0	51
Future Vol, veh/h	1779	61	0	1120	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1853	64	0	1167	0	53

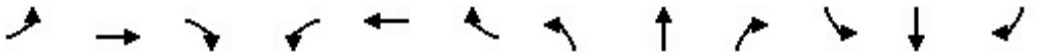
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	959
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	221
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	221
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	26.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	221	-	-	-
HCM Lane V/C Ratio	0.24	-	-	-
HCM Control Delay (s)	26.4	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.9	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			179			275			55		31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



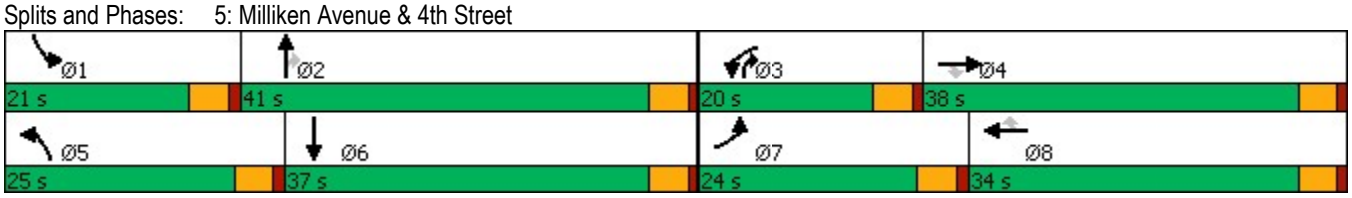
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	419	1079	198	369	873	264	290	1455	363	415	914	138
Future Volume (vph)	419	1079	198	369	873	264	290	1455	363	415	914	138
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	436	1124	206	384	909	275	302	1516	378	432	952	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	436	1124	206	384	909	275	302	1516	378	432	1096	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	419	1079	198	369	873	264	290	1455	363	415	914
Future Volume (vph)	419	1079	198	369	873	264	290	1455	363	415	914
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.4	32.7	32.7	15.5	28.8	28.8	17.2	36.1	56.1	16.5	35.4
Actuated g/C Ratio	0.16	0.28	0.28	0.13	0.24	0.24	0.14	0.30	0.47	0.14	0.30
v/c Ratio	0.93	0.85	0.38	1.02	0.78	0.48	0.72	0.82	0.51	1.08	0.61
Control Delay	76.2	47.9	9.3	102.6	47.5	7.3	58.9	42.9	21.4	115.4	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.2	47.9	9.3	102.6	47.5	7.3	58.9	42.9	21.4	115.4	37.0
LOS	E	D	A	F	D	A	E	D	C	F	D
Approach Delay		50.4			53.9			41.4			59.2
Approach LOS		D			D			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 50.3	Intersection LOS: D
Intersection Capacity Utilization 85.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	436	1124	206	384	909	275	302	1516	378	432	1096
v/c Ratio	0.93	0.85	0.38	1.02	0.78	0.48	0.72	0.82	0.51	1.08	0.61
Control Delay	76.2	47.9	9.3	102.6	47.5	7.3	58.9	42.9	21.4	115.4	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.2	47.9	9.3	102.6	47.5	7.3	58.9	42.9	21.4	115.4	37.0
Queue Length 50th (ft)	173	300	15	~163	240	0	116	315	169	~193	206
Queue Length 95th (ft)	#271	357	77	#264	293	69	161	363	261	#297	254
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	474	1359	551	377	1196	579	498	1865	737	401	1796
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.83	0.37	1.02	0.76	0.47	0.61	0.81	0.51	1.08	0.61

Intersection Summary

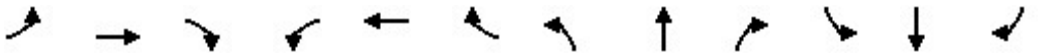
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	419	1079	198	369	873	264	290	1455	363	415	914	138
Future Volume (veh/h)	419	1079	198	369	873	264	290	1455	363	415	914	138
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	436	1124	206	384	909	275	302	1516	378	432	952	144
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	480	1309	406	388	1155	359	360	1827	650	413	1714	256
Arrive On Green	0.16	0.27	0.27	0.13	0.24	0.24	0.12	0.30	0.30	0.14	0.32	0.32
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5394	805
Grp Volume(v), veh/h	436	1124	206	384	909	275	302	1516	378	432	805	291
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1627
Q Serve(g_s), s	17.1	25.7	13.5	15.3	20.5	19.9	11.8	27.0	22.2	16.5	17.0	17.3
Cycle Q Clear(g_c), s	17.1	25.7	13.5	15.3	20.5	19.9	11.8	27.0	22.2	16.5	17.0	17.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.49
Lane Grp Cap(c), veh/h	480	1309	406	388	1155	359	360	1827	650	413	1453	517
V/C Ratio(X)	0.91	0.86	0.51	0.99	0.79	0.77	0.84	0.83	0.58	1.05	0.55	0.56
Avail Cap(c_a), veh/h	488	1392	432	388	1226	381	513	1912	671	413	1453	517
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.7	40.3	35.9	50.4	41.5	41.3	49.9	38.0	25.0	49.9	32.9	33.0
Incr Delay (d2), s/veh	20.6	5.4	1.0	43.2	3.3	8.6	8.3	3.1	1.2	57.2	0.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	10.7	5.0	7.9	8.5	8.2	4.7	10.4	8.0	9.2	6.3	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.3	45.7	36.9	93.5	44.8	49.9	58.2	41.1	26.2	107.1	33.3	34.4
LnGrp LOS	E	D	D	F	D	D	E	D	C	F	C	C
Approach Vol, veh/h		1766			1568			2196			1528	
Approach Delay, s/veh		50.3			57.6			40.9			54.4	
Approach LOS		D			E			D			D	

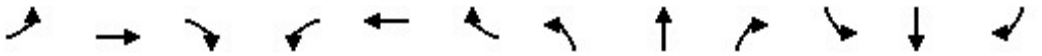
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	39.4	20.0	36.0	18.9	41.5	23.7	32.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	29.0	17.3	27.7	13.8	19.3	19.1	22.5
Green Ext Time (p_c), s	0.0	5.9	0.0	3.8	0.6	6.1	0.1	3.9

Intersection Summary	
HCM 6th Ctrl Delay	49.9
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.925	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2971	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2971	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			125			186			276		199	328
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



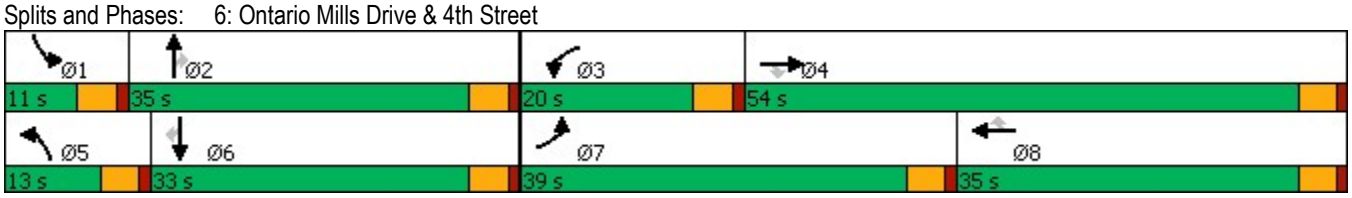
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	919	1216	115	217	954	300	136	298	338	75	300	604
Future Volume (vph)	919	1216	115	217	954	300	136	298	338	75	300	604
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	999	1322	125	236	1037	326	148	324	367	82	326	657
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	999	1322	125	236	1037	326	148	324	367	82	655	328

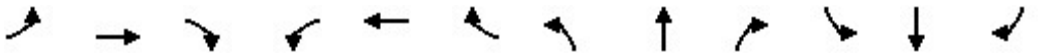
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	919	1216	115	217	954	300	136	298	338	75	300	604
Future Volume (vph)	919	1216	115	217	954	300	136	298	338	75	300	604
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.6	50.7	50.7	13.7	29.9	29.9	8.5	27.1	27.1	6.5	25.1	25.1
Actuated g/C Ratio	0.30	0.44	0.44	0.12	0.26	0.26	0.07	0.23	0.23	0.06	0.22	0.22
v/c Ratio	1.16	0.63	0.17	0.69	0.84	0.62	1.28	0.41	0.65	0.93	0.82	0.59
Control Delay	122.7	27.8	4.4	60.7	48.3	22.1	218.8	39.4	16.4	133.8	39.2	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.7	27.8	4.4	60.7	48.3	22.1	218.8	39.4	16.4	133.8	39.2	8.9
LOS	F	C	A	E	D	C	F	D	B	F	D	A
Approach Delay		65.4			44.8			61.0			37.2	
Approach LOS		E			D			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.1	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.28	
Intersection Signal Delay: 54.2	Intersection LOS: D
Intersection Capacity Utilization 89.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



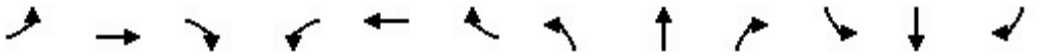


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	999	1322	125	236	1037	326	148	324	367	82	655	328
v/c Ratio	1.16	0.63	0.17	0.69	0.84	0.62	1.28	0.41	0.65	0.93	0.82	0.59
Control Delay	122.7	27.8	4.4	60.7	48.3	22.1	218.8	39.4	16.4	133.8	39.2	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.7	27.8	4.4	60.7	48.3	22.1	218.8	39.4	16.4	133.8	39.2	8.9
Queue Length 50th (ft)	~481	294	0	90	279	93	~147	109	56	64	185	0
Queue Length 95th (ft)	#614	352	37	134	337	197	#284	153	163	#169	260	87
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	861	2104	725	386	1268	531	116	883	598	88	881	583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.16	0.63	0.17	0.61	0.82	0.61	1.28	0.37	0.61	0.93	0.74	0.56

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



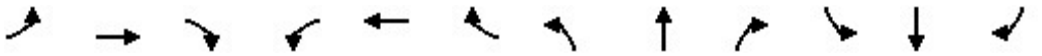
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	919	1216	115	217	954	300	136	298	338	75	300	604
Future Volume (veh/h)	919	1216	115	217	954	300	136	298	338	75	300	604
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	999	1322	125	236	1037	326	148	324	367	82	326	657
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	845	2121	658	287	1195	371	114	864	385	87	425	720
Arrive On Green	0.29	0.44	0.44	0.10	0.25	0.25	0.07	0.26	0.26	0.05	0.24	0.24
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	999	1322	125	236	1037	326	148	324	367	82	326	657
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	34.5	25.1	6.1	9.5	24.4	24.8	8.5	9.4	28.6	6.1	20.4	25.3
Cycle Q Clear(g_c), s	34.5	25.1	6.1	9.5	24.4	24.8	8.5	9.4	28.6	6.1	20.4	25.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	845	2121	658	287	1195	371	114	864	385	87	425	720
V/C Ratio(X)	1.18	0.62	0.19	0.82	0.87	0.88	1.30	0.38	0.95	0.94	0.77	0.91
Avail Cap(c_a), veh/h	845	2121	658	379	1241	385	114	864	385	87	425	720
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	25.8	20.4	52.5	42.9	43.0	55.2	36.3	43.5	56.0	42.1	44.0
Incr Delay (d2), s/veh	94.3	0.6	0.1	10.4	6.6	19.6	184.4	0.3	33.7	76.8	8.2	16.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.3	9.6	2.2	3.9	10.4	11.2	9.2	3.9	14.1	4.3	9.8	10.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	136.5	26.4	20.6	62.9	49.5	62.7	239.6	36.6	77.1	132.7	50.3	60.0
LnGrp LOS	F	C	C	E	D	E	F	D	E	F	D	E
Approach Vol, veh/h		2446			1599			839			1065	
Approach Delay, s/veh		71.0			54.2			90.1			62.6	
Approach LOS		E			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	16.2	56.6	13.0	33.0	39.0	33.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.1	30.6	11.5	27.1	10.5	27.3	36.5	26.8
Green Ext Time (p_c), s	0.0	0.0	0.3	10.9	0.0	0.6	0.0	2.5

Intersection Summary	
HCM 6th Ctrl Delay	67.7
HCM 6th LOS	E

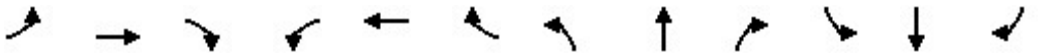
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.973			0.936				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	2891	4818	1500	1583	4688	0	1583	3138	0	1504	1646	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	2891	4818	1500	1583	4688	0	1583	3138	0	1504	1646	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			97		38			58				310
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



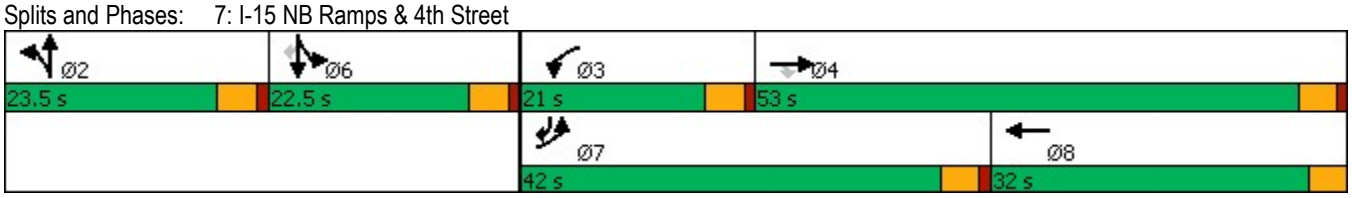
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	829	698	93	76	743	164	114	74	56	138	65	601
Future Volume (vph)	829	698	93	76	743	164	114	74	56	138	65	601
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	864	727	97	79	774	171	119	77	58	144	68	626
Shared Lane Traffic (%)										28%		
Lane Group Flow (vph)	864	727	97	79	945	0	119	135	0	104	108	626

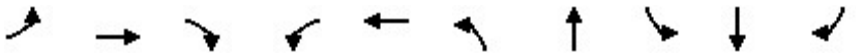
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	829	698	93	76	743	114	74	138	65	601
Future Volume (vph)	829	698	93	76	743	114	74	138	65	601
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	36.2	53.5	53.5	10.7	26.3	13.2	13.2	12.5	12.5	53.3
Actuated g/C Ratio	0.34	0.51	0.51	0.10	0.25	0.13	0.13	0.12	0.12	0.51
v/c Ratio	0.87	0.30	0.12	0.49	0.79	0.60	0.30	0.58	0.55	0.42
Control Delay	45.0	17.9	4.6	58.0	42.1	58.7	27.6	59.6	57.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	17.9	4.6	58.0	42.1	58.7	27.6	59.6	57.0	9.0
LOS	D	B	A	E	D	E	C	E	E	A
Approach Delay		31.0			43.3		42.2		21.5	
Approach LOS		C			D		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 105.5	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 33.0	Intersection LOS: C
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	864	727	97	79	945	119	135	104	108	626
v/c Ratio	0.87	0.30	0.12	0.49	0.79	0.60	0.30	0.58	0.55	0.42
Control Delay	45.0	17.9	4.6	58.0	42.1	58.7	27.6	59.6	57.0	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	17.9	4.6	58.0	42.1	58.7	27.6	59.6	57.0	9.0
Queue Length 50th (ft)	290	106	0	53	215	80	25	73	76	69
Queue Length 95th (ft)	#469	176	33	107	301	147	57	140	143	126
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1045	2441	808	251	1316	290	622	260	285	1530
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.30	0.12	0.31	0.72	0.41	0.22	0.40	0.38	0.41

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	829	698	93	76	743	164	114	74	56	138	65	601
Future Volume (veh/h)	829	698	93	76	743	164	114	74	56	138	65	601
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	864	727	97	79	774	171	119	77	58	106	121	626
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	942	2426	753	99	952	209	158	189	130	260	289	1462
Arrive On Green	0.32	0.50	0.50	0.06	0.24	0.24	0.10	0.10	0.10	0.16	0.16	0.16
Sat Flow, veh/h	2910	4837	1502	1594	3971	869	1594	1908	1312	1594	1772	3003
Grp Volume(v), veh/h	864	727	97	79	627	318	119	67	68	106	121	626
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1615	1594	1683	1536	1594	1772	1502
Q Serve(g_s), s	29.5	9.1	3.6	5.0	18.9	19.2	7.5	3.9	4.3	6.2	6.3	14.0
Cycle Q Clear(g_c), s	29.5	9.1	3.6	5.0	18.9	19.2	7.5	3.9	4.3	6.2	6.3	14.0
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.85	1.00		1.00
Lane Grp Cap(c), veh/h	942	2426	753	99	774	387	158	167	152	260	289	1462
V/C Ratio(X)	0.92	0.30	0.13	0.80	0.81	0.82	0.75	0.40	0.45	0.41	0.42	0.43
Avail Cap(c_a), veh/h	1057	2426	753	255	890	446	293	310	283	278	309	1496
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.6	15.1	13.7	47.8	37.0	37.1	45.3	43.6	43.8	38.7	38.8	17.2
Incr Delay (d2), s/veh	11.5	0.1	0.1	13.6	5.1	10.3	7.1	1.6	2.0	1.0	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.7	3.3	1.2	2.4	7.9	8.6	3.3	1.7	1.7	2.5	2.8	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	15.2	13.8	61.3	42.1	47.4	52.4	45.2	45.9	39.8	39.8	17.4
LnGrp LOS	D	B	B	E	D	D	D	D	D	D	D	B
Approach Vol, veh/h		1688			1024			254			853	
Approach Delay, s/veh		30.4			45.2			48.7			23.3	
Approach LOS		C			D			D			C	

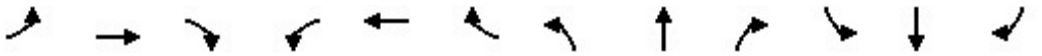
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		14.7	10.9	56.3		21.3	37.9	29.3				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		9.5	7.0	11.1		16.0	31.5	21.2				
Green Ext Time (p_c), s		0.7	0.1	6.3		0.9	1.9	3.5				

Intersection Summary	
HCM 6th Ctrl Delay	34.0
HCM 6th LOS	C

Notes

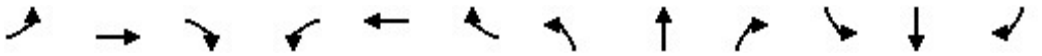
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



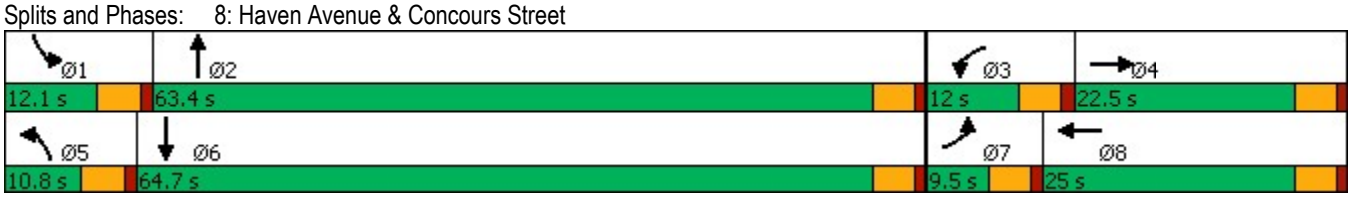
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	25	38	62	171	91	93	46	2275	206	42	1870	27
Future Volume (vph)	25	38	62	171	91	93	46	2275	206	42	1870	27
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	26	39	63	174	93	95	47	2321	210	43	1908	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	102	0	174	93	95	47	2321	210	43	1908	28

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	25	38	171	91	93	46	2275	206	42	1870	27
Future Volume (vph)	25	38	171	91	93	46	2275	206	42	1870	27
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	6.9	7.5	13.0	90.9	6.2	58.8	90.9	6.7	59.3	90.9
Actuated g/C Ratio	0.06	0.08	0.08	0.14	1.00	0.07	0.65	1.00	0.07	0.65	1.00
v/c Ratio	0.16	0.35	0.53	0.19	0.06	0.24	0.59	0.14	0.20	0.48	0.02
Control Delay	47.6	23.6	49.1	38.6	0.1	47.1	11.6	0.2	45.3	9.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	23.6	49.1	38.6	0.1	47.1	11.6	0.2	45.3	9.8	0.0
LOS	D	C	D	D	A	D	B	A	D	A	A
Approach Delay		28.5		33.5			11.3			10.4	
Approach LOS		C		C			B			B	

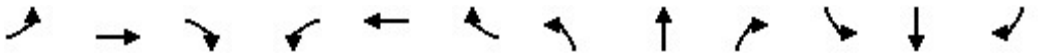
Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 90.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 53.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	26	102	174	93	95	47	2321	210	43	1908	28
v/c Ratio	0.16	0.35	0.53	0.19	0.06	0.24	0.59	0.14	0.20	0.48	0.02
Control Delay	47.6	23.6	49.1	38.6	0.1	47.1	11.6	0.2	45.3	9.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	23.6	49.1	38.6	0.1	47.1	11.6	0.2	45.3	9.8	0.0
Queue Length 50th (ft)	8	12	37	25	0	14	251	0	13	182	0
Queue Length 95th (ft)	22	38	63	54	0	34	315	0	30	227	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	161	662	330	769	1500	203	4003	1500	246	4091	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.15	0.53	0.12	0.06	0.23	0.58	0.14	0.17	0.47	0.02

Intersection Summary



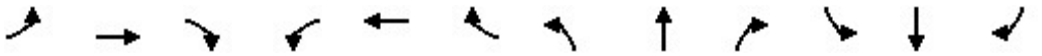
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	38	62	171	91	93	46	2275	206	42	1870	27
Future Volume (veh/h)	25	38	62	171	91	93	46	2275	206	42	1870	27
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	26	39	63	174	93	0	47	2321	0	43	1908	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	79	117	104	267	368		117	3679		111	3667	
Arrive On Green	0.03	0.07	0.07	0.07	0.11	0.00	0.04	0.60	0.00	0.04	0.60	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	26	39	63	174	93	0	47	2321	0	43	1908	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.7	1.8	3.3	3.5	2.1	0.0	1.3	19.8	0.0	1.2	14.8	0.0
Cycle Q Clear(g_c), s	0.7	1.8	3.3	3.5	2.1	0.0	1.3	19.8	0.0	1.2	14.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	79	117	104	267	368		117	3679		111	3667	
V/C Ratio(X)	0.33	0.33	0.61	0.65	0.25		0.40	0.63		0.39	0.52	
Avail Cap(c_a), veh/h	179	373	333	366	849		226	4419		272	4516	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.8	36.0	36.7	37.0	33.1	0.0	38.0	10.3	0.0	38.1	9.4	0.0
Incr Delay (d2), s/veh	2.4	1.7	5.6	2.7	0.4	0.0	2.2	0.2	0.0	2.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	1.4	1.2	0.8	0.0	0.5	5.7	0.0	0.4	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.1	37.7	42.3	39.6	33.5	0.0	40.2	10.5	0.0	40.3	9.5	0.0
LnGrp LOS	D	D	D	D	C		D	B		D	A	
Approach Vol, veh/h		128			267	A		2368	A		1951	A
Approach Delay, s/veh		40.7			37.5			11.1			10.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.6	53.5	10.0	10.1	7.8	53.4	6.7	13.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	3.2	21.8	5.5	5.3	3.3	16.8	2.7	4.1
Green Ext Time (p_c), s	0.0	27.2	0.1	0.4	0.0	23.4	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

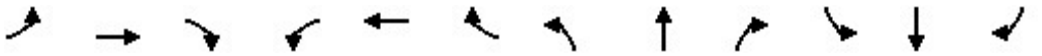
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.979			0.949						0.980	
Flt Protected	0.950	0.959			0.970		0.950			0.950		
Satd. Flow (prot)	1593	1574	0	0	1624	0	1676	4818	0	1676	4721	0
Flt Permitted	0.950	0.959					0.950			0.950		
Satd. Flow (perm)	1593	1574	0	0	1675	0	1676	4818	0	1676	4721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						34	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



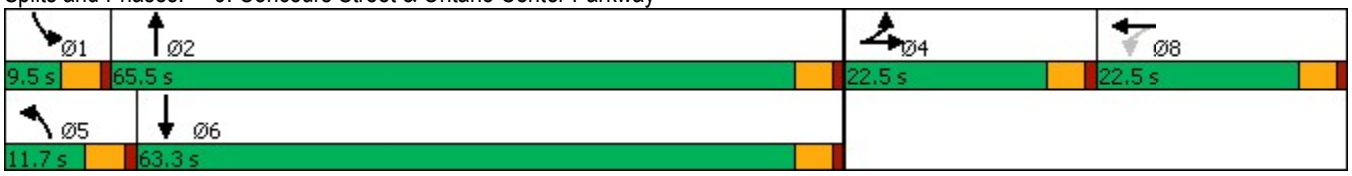
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	168	0	12	14	0	9	34	1731	5	1	1044	163
Future Volume (vph)	168	0	12	14	0	9	34	1731	5	1	1044	163
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	177	0	13	15	0	9	36	1822	5	1	1099	172
Shared Lane Traffic (%)	46%											
Lane Group Flow (vph)	96	94	0	0	24	0	36	1827	0	1	1271	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	168	0	14	0	34	1731	1	1044
Future Volume (vph)	168	0	14	0	34	1731	1	1044
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.8	10.8		5.8	6.9	49.9	5.3	44.9
Actuated g/C Ratio	0.14	0.14		0.08	0.09	0.67	0.07	0.60
v/c Ratio	0.42	0.30		0.11	0.23	0.57	0.01	0.45
Control Delay	39.3	11.4		1.0	42.7	9.1	44.0	10.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	11.4		1.0	42.7	9.1	44.0	10.5
LOS	D	B		A	D	A	D	B
Approach Delay		25.5		1.0		9.7		10.5
Approach LOS		C		A		A		B

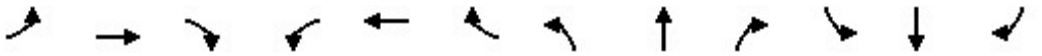
Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 74.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.57	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	94	24	36	1827	1	1271
v/c Ratio	0.42	0.30	0.11	0.23	0.57	0.01	0.45
Control Delay	39.3	11.4	1.0	42.7	9.1	44.0	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	11.4	1.0	42.7	9.1	44.0	10.5
Queue Length 50th (ft)	37	0	0	14	102	0	108
Queue Length 95th (ft)	116	46	0	57	339	7	212
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	406	472	497	170	4047	118	3896
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.20	0.05	0.21	0.45	0.01	0.33

Intersection Summary



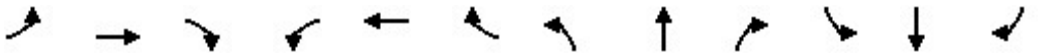
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	0	12	14	0	9	34	1731	5	1	1044	163
Future Volume (veh/h)	168	0	12	14	0	9	34	1731	5	1	1044	163
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	189	0	0	15	0	9	36	1822	5	1	1099	172
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	303	159	0	27	0	16	63	2965	8	3	2360	369
Arrive On Green	0.09	0.00	0.00	0.03	0.00	0.03	0.04	0.60	0.60	0.00	0.56	0.56
Sat Flow, veh/h	3375	1772	0	1008	0	605	1688	4981	14	1688	4218	660
Grp Volume(v), veh/h	189	0	0	24	0	0	36	1180	647	1	840	431
Grp Sat Flow(s),veh/h/ln	1688	1772	0	1613	0	0	1688	1612	1769	1688	1612	1653
Q Serve(g_s), s	3.4	0.0	0.0	0.9	0.0	0.0	1.3	14.7	14.7	0.0	9.8	9.8
Cycle Q Clear(g_c), s	3.4	0.0	0.0	0.9	0.0	0.0	1.3	14.7	14.7	0.0	9.8	9.8
Prop In Lane	1.00		0.00	0.62		0.37	1.00		0.01	1.00		0.40
Lane Grp Cap(c), veh/h	303	159	0	44	0	0	63	1920	1053	3	1804	925
V/C Ratio(X)	0.62	0.00	0.00	0.55	0.00	0.00	0.57	0.61	0.61	0.37	0.47	0.47
Avail Cap(c_a), veh/h	966	507	0	462	0	0	193	3129	1717	134	3016	1546
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.6	0.0	0.0	30.2	0.0	0.0	29.8	8.1	8.1	31.4	8.2	8.3
Incr Delay (d2), s/veh	2.1	0.0	0.0	10.2	0.0	0.0	8.1	0.3	0.6	69.1	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	0.0	0.0	0.5	0.0	0.0	0.7	4.0	4.5	0.1	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.7	0.0	0.0	40.4	0.0	0.0	37.8	8.4	8.7	100.5	8.4	8.6
LnGrp LOS	C	A	A	D	A	A	D	A	A	F	A	A
Approach Vol, veh/h		189			24			1863			1272	
Approach Delay, s/veh		29.7			40.4			9.1			8.6	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	41.9		10.1	6.8	39.7		6.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.0	16.7		5.4	3.3	11.8		2.9				
Green Ext Time (p_c), s	0.0	20.7		0.5	0.0	12.1		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		10.3	
HCM 6th LOS		B	

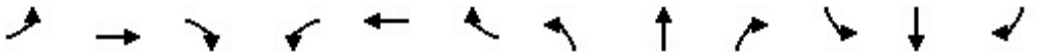
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			233			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



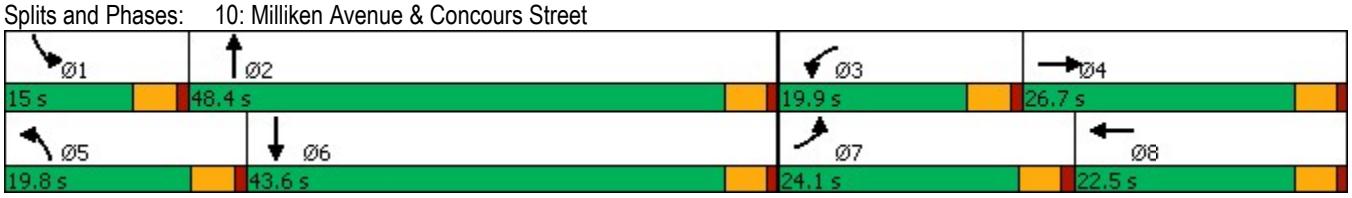
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	363	128	224	166	66	112	284	1599	125	177	1191	169
Future Volume (vph)	363	128	224	166	66	112	284	1599	125	177	1191	169
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	378	133	233	173	69	117	296	1666	130	184	1241	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	378	133	233	173	69	117	296	1666	130	184	1241	176

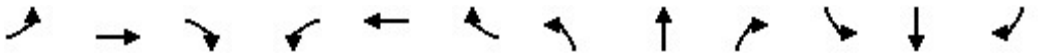
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	363	128	224	166	66	112	284	1599	125	177	1191	169
Future Volume (vph)	363	128	224	166	66	112	284	1599	125	177	1191	169
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.6	12.3	90.5	11.0	7.4	90.5	13.8	38.9	90.5	9.9	35.1	90.5
Actuated g/C Ratio	0.21	0.14	1.00	0.12	0.08	1.00	0.15	0.43	1.00	0.11	0.39	1.00
v/c Ratio	0.64	0.29	0.16	0.50	0.25	0.08	0.67	0.64	0.09	0.58	0.53	0.12
Control Delay	40.8	38.9	0.2	44.3	44.7	0.1	46.5	21.9	0.1	49.1	22.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	38.9	0.2	44.3	44.7	0.1	46.5	21.9	0.1	49.1	22.8	0.2
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		27.8			30.0			24.0			23.3	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 90.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 24.8	Intersection LOS: C
Intersection Capacity Utilization 61.9%	ICU Level of Service B
Analysis Period (min) 15	

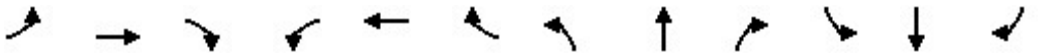
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	378	133	233	173	69	117	296	1666	130	184	1241	176
v/c Ratio	0.64	0.29	0.16	0.50	0.25	0.08	0.67	0.64	0.09	0.58	0.53	0.12
Control Delay	40.8	38.9	0.2	44.3	44.7	0.1	46.5	21.9	0.1	49.1	22.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	38.9	0.2	44.3	44.7	0.1	46.5	21.9	0.1	49.1	22.8	0.2
Queue Length 50th (ft)	113	38	0	52	21	0	89	221	0	56	165	0
Queue Length 95th (ft)	168	70	0	87	44	0	140	278	0	95	211	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	641	842	1500	504	683	1500	500	3017	1500	343	2688	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.16	0.16	0.34	0.10	0.08	0.59	0.55	0.09	0.54	0.46	0.12

Intersection Summary



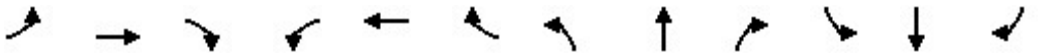
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	363	128	224	166	66	112	284	1599	125	177	1191	169
Future Volume (veh/h)	363	128	224	166	66	112	284	1599	125	177	1191	169
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	378	133	0	173	69	0	296	1666	0	184	1241	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	477	486		253	226		384	2667		259	2405	
Arrive On Green	0.16	0.14	0.00	0.09	0.07	0.00	0.13	0.44	0.00	0.09	0.39	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	378	133	0	173	69	0	296	1666	0	184	1241	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	9.3	2.6	0.0	4.3	1.4	0.0	7.3	15.7	0.0	4.6	11.5	0.0
Cycle Q Clear(g_c), s	9.3	2.6	0.0	4.3	1.4	0.0	7.3	15.7	0.0	4.6	11.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	477	486		253	226		384	2667		259	2405	
V/C Ratio(X)	0.79	0.27		0.68	0.30		0.77	0.62		0.71	0.52	
Avail Cap(c_a), veh/h	768	1006		603	816		599	3602		411	3208	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.9	28.3	0.0	32.9	33.0	0.0	31.2	16.2	0.0	32.9	17.1	0.0
Incr Delay (d2), s/veh	3.0	0.3	0.0	3.3	0.8	0.0	3.3	0.2	0.0	3.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	1.0	0.0	1.6	0.6	0.0	2.7	5.0	0.0	1.7	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	28.6	0.0	36.2	33.7	0.0	34.4	16.4	0.0	36.5	17.3	0.0
LnGrp LOS	C	C		D	C		C	B		D	B	
Approach Vol, veh/h		511	A		242	A		1962	A		1425	A
Approach Delay, s/veh		31.8			35.5			19.1			19.7	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	37.0	10.9	15.2	14.3	33.8	16.7	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	6.6	17.7	6.3	4.6	9.3	13.5	11.3	3.4
Green Ext Time (p_c), s	0.2	14.8	0.3	0.6	0.5	10.3	0.9	0.2

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

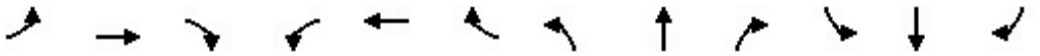
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			236			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



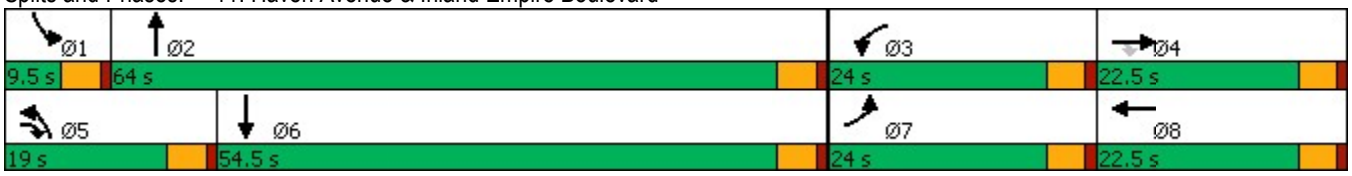
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	163	210	464	613	151	39	338	1860	418	40	2159	44
Future Volume (vph)	163	210	464	613	151	39	338	1860	418	40	2159	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	175	226	499	659	162	42	363	2000	449	43	2322	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	175	226	499	659	162	42	363	2000	449	43	2322	47

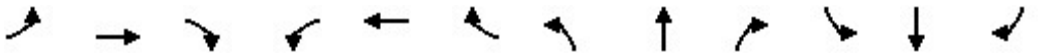
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	163	210	464	613	151	39	338	1860	418	40	2159	44
Future Volume (vph)	163	210	464	613	151	39	338	1860	418	40	2159	44
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	12.2	13.0	32.0	19.5	20.3	115.1	14.5	61.5	115.1	5.0	50.0	115.1
Actuated g/C Ratio	0.11	0.11	0.28	0.17	0.18	1.00	0.13	0.53	1.00	0.04	0.43	1.00
v/c Ratio	0.57	0.60	1.09	0.99	0.27	0.03	1.00	0.62	0.30	0.34	0.88	0.03
Control Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.4	0.5	62.1	34.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.4	0.5	62.1	34.9	0.0
LOS	E	E	F	F	D	A	F	C	A	E	C	A
Approach Delay		83.0			69.2			27.1			34.7	
Approach LOS		F			E			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115.1	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 42.2	Intersection LOS: D
Intersection Capacity Utilization 89.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard



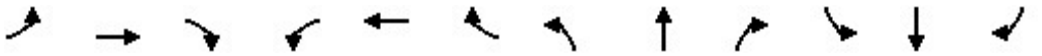


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	175	226	499	659	162	42	363	2000	449	43	2322	47
v/c Ratio	0.57	0.60	1.09	0.99	0.27	0.03	1.00	0.62	0.30	0.34	0.88	0.03
Control Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.4	0.5	62.1	34.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.3	104.9	80.0	43.0	0.0	97.5	20.4	0.5	62.1	34.9	0.0
Queue Length 50th (ft)	64	85	~387	174	55	0	140	298	0	16	447	0
Queue Length 95th (ft)	101	126	#587	#271	91	0	#251	363	0	36	533	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	490	524	457	668	591	1500	364	3244	1500	125	2639	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.43	1.09	0.99	0.27	0.03	1.00	0.62	0.30	0.34	0.88	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



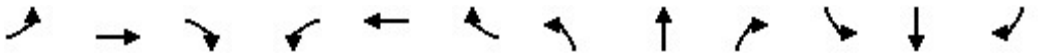
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	163	210	464	613	151	39	338	1860	418	40	2159	44
Future Volume (veh/h)	163	210	464	613	151	39	338	1860	418	40	2159	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	175	226	499	659	162	0	363	2000	0	43	2322	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	229	506	408	646	790		353	3074		92	2529	
Arrive On Green	0.08	0.15	0.15	0.16	0.23	0.00	0.12	0.50	0.00	0.03	0.41	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	175	226	499	659	162	0	363	2000	0	43	2322	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	7.1	7.3	18.0	19.5	4.6	0.0	14.5	29.0	0.0	1.7	43.1	0.0
Cycle Q Clear(g_c), s	7.1	7.3	18.0	19.5	4.6	0.0	14.5	29.0	0.0	1.7	43.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	506	408	646	790		353	3074		92	2529	
V/C Ratio(X)	0.76	0.45	1.22	1.02	0.20		1.03	0.65		0.46	0.92	
Avail Cap(c_a), veh/h	474	506	408	646	790		353	3074		122	2547	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	46.3	43.6	50.1	36.8	0.0	52.6	21.9	0.0	56.9	33.1	0.0
Incr Delay (d2), s/veh	5.3	0.6	120.7	40.4	0.1	0.0	55.7	0.5	0.0	3.6	5.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.1	25.6	8.8	1.9	0.0	8.0	10.2	0.0	0.7	16.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.3	46.9	164.2	90.5	36.9	0.0	108.2	22.4	0.0	60.5	39.0	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	D	
Approach Vol, veh/h		900			821	A		2363	A		2365	A
Approach Delay, s/veh		114.4			79.9			35.6			39.4	
Approach LOS		F			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.3	64.8	24.0	22.5	19.0	54.2	13.9	32.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	3.7	31.0	21.5	20.0	16.5	45.1	9.1	6.6
Green Ext Time (p_c), s	0.0	19.2	0.0	0.0	0.0	4.6	0.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	53.6
HCM 6th LOS	D

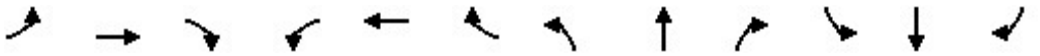
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			326			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



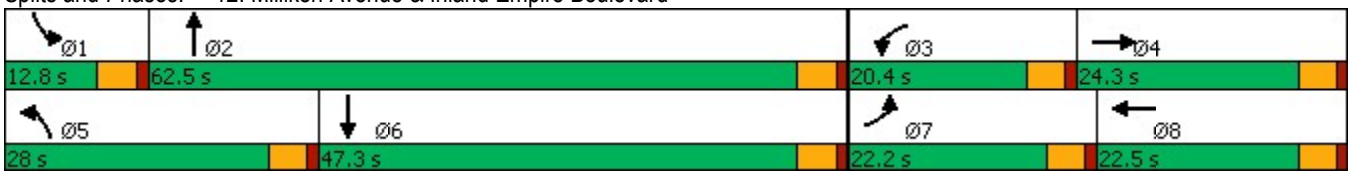
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	283	276	310	204	75	83	376	1618	351	93	1420	114
Future Volume (vph)	283	276	310	204	75	83	376	1618	351	93	1420	114
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	298	291	326	215	79	87	396	1703	369	98	1495	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	298	291	326	215	79	87	396	1703	369	98	1495	120

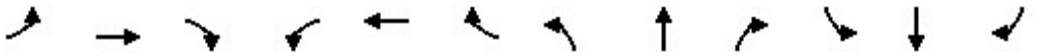
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	283	276	310	204	75	83	376	1618	351	93	1420	114
Future Volume (vph)	283	276	310	204	75	83	376	1618	351	93	1420	114
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.5	14.6	102.5	12.9	11.8	102.5	19.1	51.6	102.5	7.9	37.5	102.5
Actuated g/C Ratio	0.18	0.14	1.00	0.13	0.12	1.00	0.19	0.50	1.00	0.08	0.37	1.00
v/c Ratio	0.57	0.61	0.22	0.59	0.21	0.06	0.74	0.56	0.25	0.44	0.67	0.08
Control Delay	47.5	49.1	0.3	52.0	45.2	0.1	49.9	19.5	0.4	56.4	29.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	49.1	0.3	52.0	45.2	0.1	49.9	19.5	0.4	56.4	29.9	0.1
LOS	D	D	A	D	D	A	D	B	A	E	C	A
Approach Delay		31.2			38.7			21.5			29.3	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 102.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 26.8	Intersection LOS: C
Intersection Capacity Utilization 64.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	298	291	326	215	79	87	396	1703	369	98	1495	120
v/c Ratio	0.57	0.61	0.22	0.59	0.21	0.06	0.74	0.56	0.25	0.44	0.67	0.08
Control Delay	47.5	49.1	0.3	52.0	45.2	0.1	49.9	19.5	0.4	56.4	29.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	49.1	0.3	52.0	45.2	0.1	49.9	19.5	0.4	56.4	29.9	0.1
Queue Length 50th (ft)	100	100	0	72	26	0	132	232	0	33	241	0
Queue Length 95th (ft)	164	156	0	122	52	0	204	305	0	67	328	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	552	666	1500	461	606	1500	682	3536	1500	240	2609	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.44	0.22	0.47	0.13	0.06	0.58	0.48	0.25	0.41	0.57	0.08

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	283	276	310	204	75	83	376	1618	351	93	1420	114
Future Volume (veh/h)	283	276	310	204	75	83	376	1618	351	93	1420	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	298	291	0	215	79	0	396	1703	0	98	1495	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	383	418		294	315		493	3025		160	2329	
Arrive On Green	0.13	0.12	0.00	0.10	0.09	0.00	0.17	0.50	0.00	0.06	0.38	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	298	291	0	215	79	0	396	1703	0	98	1495	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	8.0	6.7	0.0	5.8	1.8	0.0	10.5	15.7	0.0	2.7	16.2	0.0
Cycle Q Clear(g_c), s	8.0	6.7	0.0	5.8	1.8	0.0	10.5	15.7	0.0	2.7	16.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	383	418		294	315		493	3025		160	2329	
V/C Ratio(X)	0.78	0.70		0.73	0.25		0.80	0.56		0.61	0.64	
Avail Cap(c_a), veh/h	639	828		574	752		849	4389		300	3239	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.8	33.8	0.0	35.1	33.9	0.0	32.2	14.2	0.0	37.2	20.4	0.0
Incr Delay (d2), s/veh	3.4	2.1	0.0	3.5	0.4	0.0	3.1	0.2	0.0	3.7	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.8	0.0	2.1	0.7	0.0	3.8	5.0	0.0	1.0	5.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.3	35.9	0.0	38.6	34.3	0.0	35.3	14.4	0.0	40.9	20.7	0.0
LnGrp LOS	D	D		D	C		D	B		D	C	
Approach Vol, veh/h		589	A		294	A		2099	A		1593	A
Approach Delay, s/veh		36.6			37.5			18.3			21.9	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	44.5	12.6	14.5	18.1	35.3	15.1	12.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	4.7	17.7	7.8	8.7	12.5	18.2	10.0	3.8
Green Ext Time (p_c), s	0.1	19.0	0.4	1.3	1.1	12.6	0.6	0.3

Intersection Summary	
HCM 6th Ctrl Delay	23.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.983	0.850				
Flt Protected	0.957					
Satd. Flow (prot)	3042	1365	6071	0	0	6071
Flt Permitted	0.957					
Satd. Flow (perm)	3042	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	4	4				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	479	302	2186	0	0	2178
Future Volume (vph)	479	302	2186	0	0	2178
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	499	315	2277	0	0	2269
Shared Lane Traffic (%)		20%				
Lane Group Flow (vph)	562	252	2277	0	0	2269

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	479	302	2186	2178
Future Volume (vph)	479	302	2186	2178
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	16.2	16.2	36.6	36.6
Actuated g/C Ratio	0.26	0.26	0.59	0.59
v/c Ratio	0.70	0.70	0.63	0.63
Control Delay	25.6	31.4	9.7	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	25.6	31.4	9.7	9.7
LOS	C	C	A	A
Approach Delay	27.4		9.7	9.7
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 61.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	562	252	2277	2269
v/c Ratio	0.70	0.70	0.63	0.63
Control Delay	25.6	31.4	9.7	9.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	25.6	31.4	9.7	9.7
Queue Length 50th (ft)	96	91	149	148
Queue Length 95th (ft)	144	169	203	202
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	965	434	3597	3597
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.58	0.63	0.63

Intersection Summary

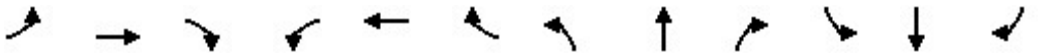
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	479	302	2186	0	0	2178
Future Volume (veh/h)	479	302	2186	0	0	2178
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	540	271	2277	0	0	2269
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	772	364	3617	0	0	3617
Arrive On Green	0.24	0.24	0.59	0.00	0.00	0.59
Sat Flow, veh/h	3188	1502	6592	0	0	6592
Grp Volume(v), veh/h	540	271	2277	0	0	2269
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	8.5	9.1	13.3	0.0	0.0	13.2
Cycle Q Clear(g_c), s	8.5	9.1	13.3	0.0	0.0	13.2
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	772	364	3617	0	0	3617
V/C Ratio(X)	0.70	0.75	0.63	0.00	0.00	0.63
Avail Cap(c_a), veh/h	1135	535	4064	0	0	4064
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	19.2	7.2	0.0	0.0	7.2
Incr Delay (d2), s/veh	1.2	3.2	0.3	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	3.2	3.1	0.0	0.0	3.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.1	22.4	7.5	0.0	0.0	7.5
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	811		2277			2269
Approach Delay, s/veh	20.9		7.5			7.5
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		37.0			37.0	17.8
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		15.3			15.2	11.1
Green Ext Time (p_c), s		17.2			17.2	2.1

Intersection Summary	
HCM 6th Ctrl Delay	9.5
HCM 6th LOS	A

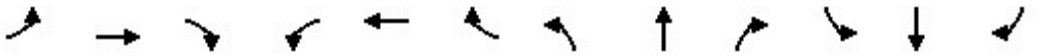
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147			136			294			60
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



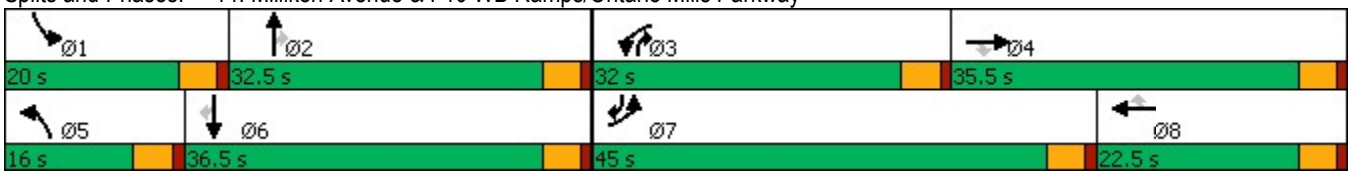
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	822	189	228	243	289	61	231	993	435	319	1101	460
Future Volume (vph)	822	189	228	243	289	61	231	993	435	319	1101	460
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	856	197	238	253	301	64	241	1034	453	332	1147	479
Shared Lane Traffic (%)												
Lane Group Flow (vph)	856	197	238	253	301	64	241	1034	453	332	1147	479

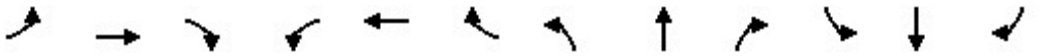
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	822	189	228	243	289	61	231	993	435	319	1101	460
Future Volume (vph)	822	189	228	243	289	61	231	993	435	319	1101	460
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	37.1	36.5	36.5	15.5	15.0	15.0	11.5	26.0	46.1	15.2	29.7	71.4
Actuated g/C Ratio	0.33	0.33	0.33	0.14	0.13	0.13	0.10	0.23	0.41	0.14	0.27	0.64
v/c Ratio	0.89	0.34	0.40	0.63	0.67	0.20	0.81	0.73	0.57	0.84	0.71	0.49
Control Delay	48.4	31.5	14.2	53.4	54.7	1.4	72.1	43.6	11.3	68.4	40.3	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	31.5	14.2	53.4	54.7	1.4	72.1	43.6	11.3	68.4	40.3	11.1
LOS	D	C	B	D	D	A	E	D	B	E	D	B
Approach Delay		39.5			48.6			39.1			37.9	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 39.8	Intersection LOS: D
Intersection Capacity Utilization 77.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	856	197	238	253	301	64	241	1034	453	332	1147	479
v/c Ratio	0.89	0.34	0.40	0.63	0.67	0.20	0.81	0.73	0.57	0.84	0.71	0.49
Control Delay	48.4	31.5	14.2	53.4	54.7	1.4	72.1	43.6	11.3	68.4	40.3	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	31.5	14.2	53.4	54.7	1.4	72.1	43.6	11.3	68.4	40.3	11.1
Queue Length 50th (ft)	310	110	48	95	115	0	94	211	83	129	227	145
Queue Length 95th (ft)	#431	186	124	135	164	0	#170	257	176	#215	275	233
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1062	588	598	721	547	358	301	1542	925	406	1763	1032
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.34	0.40	0.35	0.55	0.18	0.80	0.67	0.49	0.82	0.65	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	822	189	228	243	289	61	231	993	435	319	1101	460
Future Volume (veh/h)	822	189	228	243	289	61	231	993	435	319	1101	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	856	197	238	253	301	64	241	1034	453	332	1147	479
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	939	582	493	321	391	174	292	1592	558	385	1785	924
Arrive On Green	0.32	0.33	0.33	0.11	0.12	0.12	0.10	0.26	0.26	0.13	0.29	0.29
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	856	197	238	253	301	64	241	1034	453	332	1147	479
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	30.3	9.0	13.6	9.1	9.3	4.2	8.7	16.2	28.0	12.0	17.6	19.3
Cycle Q Clear(g_c), s	30.3	9.0	13.6	9.1	9.3	4.2	8.7	16.2	28.0	12.0	17.6	19.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	939	582	493	321	391	174	292	1592	558	385	1785	924
V/C Ratio(X)	0.91	0.34	0.48	0.79	0.77	0.37	0.82	0.65	0.81	0.86	0.64	0.52
Avail Cap(c_a), veh/h	1099	582	493	746	565	252	312	1592	558	421	1819	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.8	27.2	28.7	46.5	46.0	43.8	47.3	35.3	30.3	45.6	33.0	11.6
Incr Delay (d2), s/veh	10.3	0.3	0.7	4.3	4.0	1.3	15.5	0.9	8.9	15.7	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.8	3.9	4.9	3.5	4.1	1.6	3.8	6.1	11.6	5.1	6.5	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	27.6	29.5	50.8	50.0	45.0	62.8	36.2	39.2	61.3	33.8	12.1
LnGrp LOS	D	C	C	D	D	D	E	D	D	E	C	B
Approach Vol, veh/h		1291			618			1728			1958	
Approach Delay, s/veh		39.5			49.8			40.7			33.1	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.7	32.5	16.3	39.7	15.3	35.9	39.1	16.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	14.0	30.0	11.1	15.6	10.7	21.3	32.3	11.3
Green Ext Time (p_c), s	0.2	0.0	0.8	1.7	0.1	6.9	2.3	1.1

Intersection Summary	
HCM 6th Ctrl Delay	38.8
HCM 6th LOS	D

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6	16				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

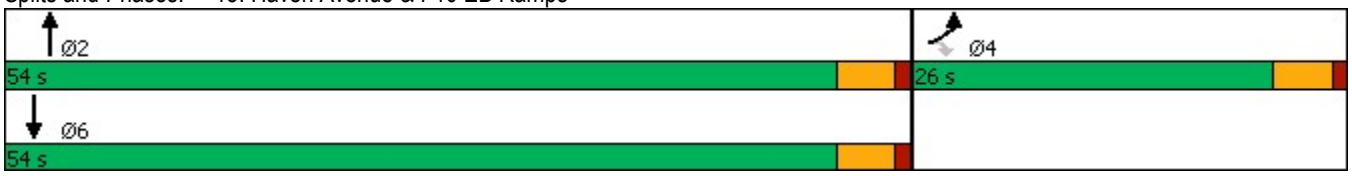
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	524	237	0	2369	1826	0
Future Volume (vph)	524	237	0	2369	1826	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	546	247	0	2468	1902	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	571	222	0	2468	1902	0

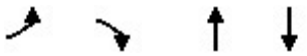
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	524	237	2369	1826
Future Volume (vph)	524	237	2369	1826
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	18.6	18.6	49.1	49.1
Actuated g/C Ratio	0.24	0.24	0.64	0.64
v/c Ratio	0.76	0.65	0.64	0.49
Control Delay	34.2	33.8	9.7	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	34.2	33.8	9.7	8.1
LOS	C	C	A	A
Approach Delay	34.1		9.7	8.1
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	571	222	2468	1902
v/c Ratio	0.76	0.65	0.64	0.49
Control Delay	34.2	33.8	9.7	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	34.2	33.8	9.7	8.1
Queue Length 50th (ft)	130	97	195	130
Queue Length 95th (ft)	185	176	243	163
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	864	394	3924	3924
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.66	0.56	0.63	0.48

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	524	237	0	2369	1826	0
Future Volume (veh/h)	524	237	0	2369	1826	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	546	247	0	2468	1902	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	707	333	0	3931	3931	0
Arrive On Green	0.22	0.22	0.00	0.64	0.64	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	546	247	0	2468	1902	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	10.9	10.3	0.0	16.3	10.9	0.0
Cycle Q Clear(g_c), s	10.9	10.3	0.0	16.3	10.9	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	707	333	0	3931	3931	0
V/C Ratio(X)	0.77	0.74	0.00	0.63	0.48	0.00
Avail Cap(c_a), veh/h	1015	478	0	4469	4469	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.7	24.5	0.0	7.2	6.2	0.0
Incr Delay (d2), s/veh	2.3	3.6	0.0	0.2	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.8	0.0	4.0	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.0	28.1	0.0	7.4	6.3	0.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	793			2468	1902	
Approach Delay, s/veh	27.3			7.4	6.3	
Approach LOS	C			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		48.0		19.5		48.0
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		18.3		12.9		12.9
Green Ext Time (p_c), s		25.2		2.1		21.2

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		11				92
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	493	194	313	1172	988	600
Future Volume (vph)	493	194	313	1172	988	600
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	508	200	323	1208	1019	619
Shared Lane Traffic (%)						
Lane Group Flow (vph)	508	200	323	1208	1019	619

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	493	194	313	1172	988	600
Future Volume (vph)	493	194	313	1172	988	600
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.0	29.3	9.7	30.6	16.3	35.8
Actuated g/C Ratio	0.27	0.54	0.18	0.56	0.30	0.65
v/c Ratio	0.64	0.25	0.63	0.36	0.56	0.61
Control Delay	22.0	7.6	28.2	7.3	18.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	7.6	28.2	7.3	18.1	7.5
LOS	C	A	C	A	B	A
Approach Delay	17.9			11.7	14.1	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 13.8	Intersection LOS: B
Intersection Capacity Utilization 57.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

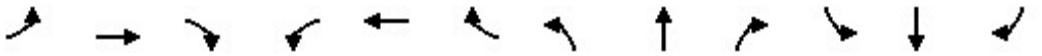
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	508	200	323	1208	1019	619
v/c Ratio	0.64	0.25	0.63	0.36	0.56	0.61
Control Delay	22.0	7.6	28.2	7.3	18.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	7.6	28.2	7.3	18.1	7.5
Queue Length 50th (ft)	79	32	55	60	86	77
Queue Length 95th (ft)	122	62	93	83	118	151
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	967	831	559	3724	2043	1099
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.24	0.58	0.32	0.50	0.56

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	493	194	313	1172	988	600
Future Volume (veh/h)	493	194	313	1172	988	600
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	508	200	323	1208	1019	619
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	685	579	438	3587	2132	879
Arrive On Green	0.24	0.24	0.15	0.59	0.35	0.35
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	508	200	323	1208	1019	619
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	8.3	4.8	5.4	5.2	6.7	14.9
Cycle Q Clear(g_c), s	8.3	4.8	5.4	5.2	6.7	14.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	685	579	438	3587	2132	879
V/C Ratio(X)	0.74	0.35	0.74	0.34	0.48	0.70
Avail Cap(c_a), veh/h	1026	755	593	3940	2161	886
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.1	11.1	20.7	5.4	13.0	7.5
Incr Delay (d2), s/veh	1.6	0.4	3.2	0.1	0.2	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	4.6	1.9	1.1	2.0	7.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.7	11.5	23.9	5.4	13.1	10.0
LnGrp LOS	B	B	C	A	B	B
Approach Vol, veh/h	708			1531	1638	
Approach Delay, s/veh	17.4			9.3	11.9	
Approach LOS	B			A	B	

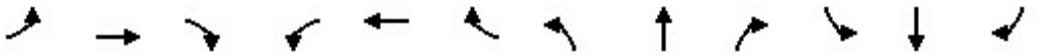
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		34.5		16.5	12.2	22.4
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		7.2		10.3	7.4	16.9
Green Ext Time (p_c), s		10.0		1.8	0.3	1.0

Intersection Summary	
HCM 6th Ctrl Delay	11.9
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.972				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				204			271		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



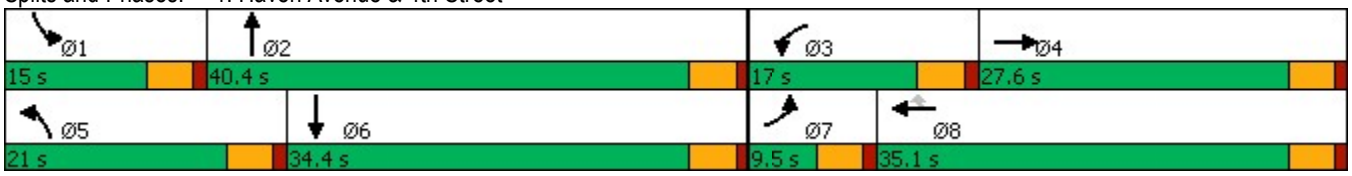
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	50	545	123	243	518	192	178	1103	362	199	1072	76
Future Volume (vph)	50	545	123	243	518	192	178	1103	362	199	1072	76
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	53	580	131	259	551	204	189	1173	385	212	1140	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	711	0	259	551	204	189	1173	385	212	1221	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	50	545	243	518	192	178	1103	362	199	1072
Future Volume (vph)	50	545	243	518	192	178	1103	362	199	1072
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	19.8	11.8	28.7	28.7	11.6	36.0	95.8	10.1	34.6
Actuated g/C Ratio	0.05	0.21	0.12	0.30	0.30	0.12	0.38	1.00	0.11	0.36
v/c Ratio	0.35	0.71	0.73	0.55	0.34	0.54	0.65	0.26	0.70	0.56
Control Delay	52.2	37.1	53.7	31.0	5.6	45.9	27.3	0.4	55.1	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	37.1	53.7	31.0	5.6	45.9	27.3	0.4	55.1	26.4
LOS	D	D	D	C	A	D	C	A	E	C
Approach Delay		38.2		31.7			23.4			30.7
Approach LOS		D		C			C			C

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 95.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 29.5	Intersection LOS: C
Intersection Capacity Utilization 66.5%	ICU Level of Service C
Analysis Period (min) 15	

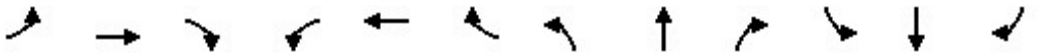
Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	53	711	259	551	204	189	1173	385	212	1221
v/c Ratio	0.35	0.71	0.73	0.55	0.34	0.54	0.65	0.26	0.70	0.56
Control Delay	52.2	37.1	53.7	31.0	5.6	45.9	27.3	0.4	55.1	26.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	37.1	53.7	31.0	5.6	45.9	27.3	0.4	55.1	26.4
Queue Length 50th (ft)	16	139	80	152	0	57	219	0	66	173
Queue Length 95th (ft)	37	183	#134	206	51	91	280	0	#115	231
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	151	1169	378	1074	619	499	1811	1500	317	2177
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.61	0.69	0.51	0.33	0.38	0.65	0.26	0.67	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



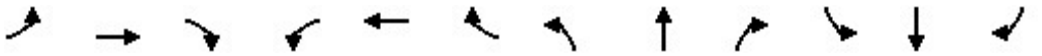
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	545	123	243	518	192	178	1103	362	199	1072	76
Future Volume (veh/h)	50	545	123	243	518	192	178	1103	362	199	1072	76
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	53	580	131	259	551	204	189	1173	0	212	1140	81
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	119	777	172	324	898	401	259	1927		275	2364	167
Arrive On Green	0.04	0.20	0.20	0.11	0.27	0.27	0.09	0.40	0.00	0.09	0.40	0.40
Sat Flow, veh/h	2910	3961	878	2910	3367	1502	2910	4837	1502	2910	5855	414
Grp Volume(v), veh/h	53	470	241	259	551	204	189	1173	0	212	889	332
Grp Sat Flow(s),veh/h/ln	1455	1612	1614	1455	1683	1502	1455	1612	1502	1455	1524	1697
Q Serve(g_s), s	1.6	12.4	12.7	7.8	12.9	10.4	5.7	17.4	0.0	6.4	13.0	13.1
Cycle Q Clear(g_c), s	1.6	12.4	12.7	7.8	12.9	10.4	5.7	17.4	0.0	6.4	13.0	13.1
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	119	632	317	324	898	401	259	1927		275	1846	685
V/C Ratio(X)	0.45	0.74	0.76	0.80	0.61	0.51	0.73	0.61		0.77	0.48	0.48
Avail Cap(c_a), veh/h	161	827	414	404	1143	510	533	1927		339	1846	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	34.1	34.2	39.1	29.0	28.0	40.0	21.5	0.0	39.9	19.9	19.9
Incr Delay (d2), s/veh	2.6	2.6	5.9	8.8	0.7	1.0	3.9	1.4	0.0	8.4	0.9	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.0	5.4	3.1	5.2	3.8	2.2	6.5	0.0	2.6	4.6	5.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.9	36.7	40.2	47.9	29.7	29.0	44.0	23.0	0.0	48.3	20.8	22.4
LnGrp LOS	D	D	D	D	C	C	D	C		D	C	C
Approach Vol, veh/h		764			1014			1362	A		1433	
Approach Delay, s/veh		38.4			34.2			25.9			25.2	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.0	40.4	14.5	22.2	12.5	40.9	8.2	28.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	8.4	19.4	9.8	14.7	7.7	15.1	3.6	14.9
Green Ext Time (p_c), s	0.1	7.7	0.2	3.0	0.4	7.3	0.0	4.0

Intersection Summary	
HCM 6th Ctrl Delay	29.6
HCM 6th LOS	C

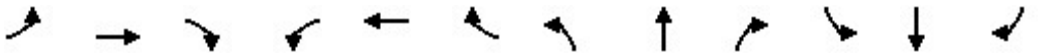
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.992				0.850			0.850		0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1667	6022	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1667	6022	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16				153			387		272	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



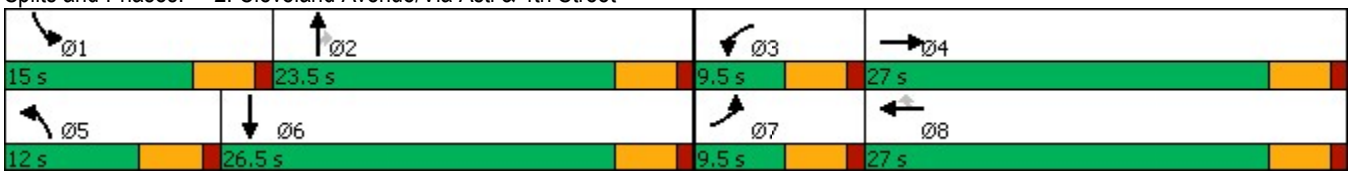
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1125	64	3	906	4	59	0	4	3	0	1
Future Volume (vph)	0	1125	64	3	906	4	59	0	4	3	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1160	66	3	934	4	61	0	4	3	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1226	0	3	934	4	61	0	4	3	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1125	3	906	4	59	4	3	0	
Future Volume (vph)	1125	3	906	4	59	4	3	0	
Turn Type	NA	Prot	NA	Perm	Prot	Perm	Prot	NA	
Protected Phases	4	3	8		5		1	6	7
Permitted Phases				8		2			
Detector Phase	4	3	8	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	12.0	23.5	15.0	26.5	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	16.0%	31.3%	20.0%	35.3%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	18.9	5.5	20.2	20.2	7.1	10.4	6.1	6.0	
Actuated g/C Ratio	0.45	0.13	0.48	0.48	0.17	0.25	0.15	0.14	
v/c Ratio	0.45	0.01	0.40	0.00	0.23	0.01	0.01	0.00	
Control Delay	9.7	22.7	8.0	0.0	22.2	0.0	22.0	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.7	22.7	8.0	0.0	22.2	0.0	22.0	0.0	
LOS	A	C	A	A	C	A	C	A	
Approach Delay	9.7		8.0					16.5	
Approach LOS	A		A					B	

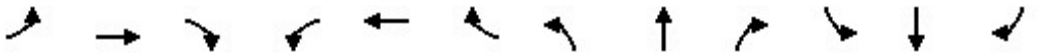
Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 42	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 37.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	1226	3	934	4	61	4	3	1
v/c Ratio	0.45	0.01	0.40	0.00	0.23	0.01	0.01	0.00
Control Delay	9.7	22.7	8.0	0.0	22.2	0.0	22.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	22.7	8.0	0.0	22.2	0.0	22.0	0.0
Queue Length 50th (ft)	61	1	59	0	14	0	1	0
Queue Length 95th (ft)	120	8	83	0	50	0	8	0
Internal Link Dist (ft)	2546		362					358
Turn Bay Length (ft)		130		145	165	165	50	
Base Capacity (vph)	3531	206	2976	985	308	937	432	1747
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.01	0.31	0.00	0.20	0.00	0.01	0.00

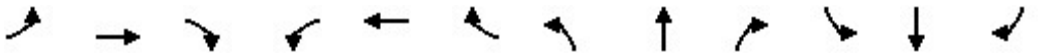
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1125	64	3	906	4	59	0	4	3	0	1
Future Volume (veh/h)	0	1125	64	3	906	4	59	0	4	3	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	0	1160	66	3	934	4	61	0	4	3	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	2224	126	7	2360	733	97	317	269	7	205	183
Arrive On Green	0.00	0.37	0.37	0.00	0.49	0.49	0.06	0.00	0.18	0.00	0.00	0.12
Sat Flow, veh/h	1594	5946	337	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	0	891	335	3	934	4	61	0	4	3	0	1
Grp Sat Flow(s),veh/h/ln	1594	1524	1711	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.0	6.2	6.3	0.1	5.0	0.1	1.5	0.0	0.1	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.2	6.3	0.1	5.0	0.1	1.5	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.20	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	4	1710	640	7	2360	733	97	317	269	7	205	183
V/C Ratio(X)	0.00	0.52	0.52	0.46	0.40	0.01	0.63	0.00	0.01	0.46	0.00	0.01
Avail Cap(c_a), veh/h	194	2508	939	194	2653	824	291	821	696	408	903	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.0	10.0	20.4	6.7	5.4	18.8	0.0	13.9	20.4	0.0	15.8
Incr Delay (d2), s/veh	0.0	0.2	0.7	43.0	0.1	0.0	6.5	0.0	0.0	43.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.6	1.9	0.1	1.2	0.0	0.7	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.2	10.7	63.4	6.8	5.4	25.3	0.0	13.9	63.4	0.0	15.8
LnGrp LOS	A	B	B	E	A	A	C	A	B	E	A	B
Approach Vol, veh/h		1226			941			65			4	
Approach Delay, s/veh		10.3			6.9			24.6			51.5	
Approach LOS		B			A			C			D	

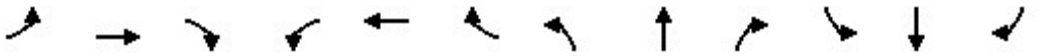
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.7	11.8	4.7	19.8	7.0	9.5	0.0	24.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	2.1	2.1	2.1	8.3	3.5	2.0	0.0	7.0
Green Ext Time (p_c), s	0.0	0.0	0.0	7.1	0.0	0.0	0.0	5.9

Intersection Summary	
HCM 6th Ctrl Delay	9.4
HCM 6th LOS	A



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.993				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4784	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.726				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4784	0	1210	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			15				226			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



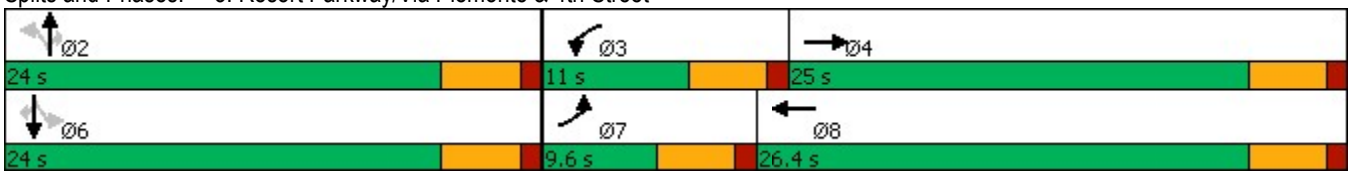
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	1106	8	65	850	45	32	0	37	45	1	15
Future Volume (vph)	11	1106	8	65	850	45	32	0	37	45	1	15
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	1140	8	67	876	46	33	0	38	46	1	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1148	0	67	922	0	33	0	38	0	47	15

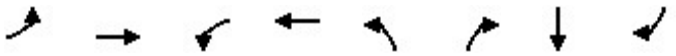
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	11	1106	65	850	32	37	45	1	15
Future Volume (vph)	11	1106	65	850	32	37	45	1	15
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.5	17.1	6.6	21.0	7.3	7.3		7.3	7.3
Actuated g/C Ratio	0.14	0.43	0.17	0.53	0.18	0.18		0.18	0.18
v/c Ratio	0.03	0.44	0.25	0.36	0.15	0.08		0.20	0.04
Control Delay	19.9	9.3	21.2	6.1	18.8	0.4		19.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	19.9	9.3	21.2	6.1	18.8	0.4		19.3	0.2
LOS	B	A	C	A	B	A		B	A
Approach Delay		9.4		7.1				14.7	
Approach LOS		A		A				B	

Intersection Summary			
Cycle Length: 60			
Actuated Cycle Length: 39.6			
Natural Cycle: 55			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 43.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	11	1148	67	922	33	38	47	15
v/c Ratio	0.03	0.44	0.25	0.36	0.15	0.08	0.20	0.04
Control Delay	19.9	9.3	21.2	6.1	18.8	0.4	19.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	9.3	21.2	6.1	18.8	0.4	19.3	0.2
Queue Length 50th (ft)	1	59	16	28	8	0	11	0
Queue Length 95th (ft)	7	90	47	89	27	0	34	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	402	3398	281	3214	644	904	687	850
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.34	0.24	0.29	0.05	0.04	0.07	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1106	8	65	850	45	32	0	37	45	1	15
Future Volume (veh/h)	11	1106	8	65	850	45	32	0	37	45	1	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	11	1140	8	67	876	46	33	0	38	46	1	15
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	2432	17	110	2075	109	367	261	221	406	7	221
Arrive On Green	0.01	0.39	0.39	0.07	0.44	0.44	0.15	0.00	0.15	0.15	0.15	0.15
Sat Flow, veh/h	2910	6291	44	1594	4706	247	1320	1772	1502	1335	44	1502
Grp Volume(v), veh/h	11	828	320	67	600	322	33	0	38	47	0	15
Grp Sat Flow(s),veh/h/ln	1455	1524	1764	1594	1612	1728	1320	1772	1502	1380	0	1502
Q Serve(g_s), s	0.1	4.6	4.6	1.4	4.3	4.4	0.8	0.0	0.8	1.0	0.0	0.3
Cycle Q Clear(g_c), s	0.1	4.6	4.6	1.4	4.3	4.4	1.8	0.0	0.8	1.0	0.0	0.3
Prop In Lane	1.00		0.03	1.00		0.14	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	42	1767	682	110	1422	762	367	261	221	413	0	221
V/C Ratio(X)	0.26	0.47	0.47	0.61	0.42	0.42	0.09	0.00	0.17	0.11	0.00	0.07
Avail Cap(c_a), veh/h	437	2758	1064	305	2079	1114	930	1017	862	1000	0	862
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.6	7.8	7.8	15.4	6.5	6.5	13.6	0.0	12.7	12.8	0.0	12.5
Incr Delay (d2), s/veh	3.2	0.2	0.5	5.4	0.2	0.4	0.1	0.0	0.4	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.0	1.2	0.6	0.9	1.0	0.2	0.0	0.2	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	8.0	8.3	20.7	6.7	6.9	13.7	0.0	13.0	12.9	0.0	12.6
LnGrp LOS	B	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1159			989			71			62	
Approach Delay, s/veh		8.2			7.7			13.3			12.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	6.8	17.6		9.5	5.0	19.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		3.8	3.4	6.6		3.0	2.1	6.4				
Green Ext Time (p_c), s		0.1	0.0	6.5		0.2	0.0	5.5				

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	4774	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4774	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1116	72	0	980	0	44
Future Volume (vph)	1116	72	0	980	0	44
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1175	76	0	1032	0	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1251	0	0	1032	0	46

Intersection Summary

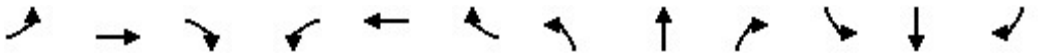
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1116	72	0	980	0	44
Future Vol, veh/h	1116	72	0	980	0	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1175	76	0	1032	0	46

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	626
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	366
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	366
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

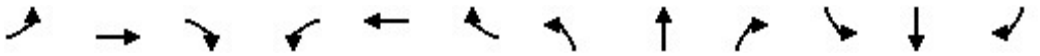
Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	366	-	-	-
HCM Lane V/C Ratio	0.127	-	-	-
HCM Control Delay (s)	16.3	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			257			281			95		36	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



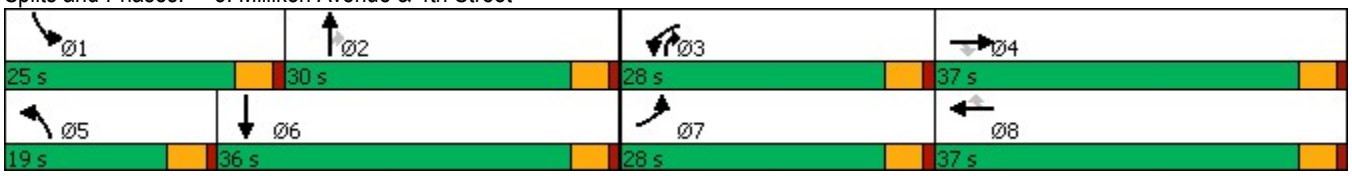
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	263	941	272	522	696	267	199	849	365	375	823	146
Future Volume (vph)	263	941	272	522	696	267	199	849	365	375	823	146
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	277	991	286	549	733	281	209	894	384	395	866	154
Shared Lane Traffic (%)												
Lane Group Flow (vph)	277	991	286	549	733	281	209	894	384	395	1020	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	263	941	272	522	696	267	199	849	365	375	823
Future Volume (vph)	263	941	272	522	696	267	199	849	365	375	823
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	16.3	30.6	30.6	23.5	37.8	37.8	12.7	23.5	51.5	19.0	29.8
Actuated g/C Ratio	0.14	0.27	0.27	0.20	0.33	0.33	0.11	0.20	0.45	0.17	0.26
v/c Ratio	0.67	0.77	0.49	0.93	0.46	0.41	0.65	0.72	0.53	0.83	0.65
Control Delay	55.7	43.9	9.2	69.2	32.7	5.7	59.8	46.6	20.3	62.3	39.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	43.9	9.2	69.2	32.7	5.7	59.8	46.6	20.3	62.3	39.0
LOS	E	D	A	E	C	A	E	D	C	E	D
Approach Delay		39.6			40.7			41.7			45.5
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 41.8	Intersection LOS: D
Intersection Capacity Utilization 77.6%	ICU Level of Service D
Analysis Period (min) 15	

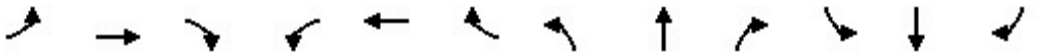
Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	277	991	286	549	733	281	209	894	384	395	1020
v/c Ratio	0.67	0.77	0.49	0.93	0.46	0.41	0.65	0.72	0.53	0.83	0.65
Control Delay	55.7	43.9	9.2	69.2	32.7	5.7	59.8	46.6	20.3	62.3	39.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	43.9	9.2	69.2	32.7	5.7	59.8	46.6	20.3	62.3	39.0
Queue Length 50th (ft)	106	258	17	219	164	0	80	187	158	153	196
Queue Length 95th (ft)	146	312	91	#332	217	65	121	226	254	#224	236
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	595	1372	611	595	1587	682	367	1357	727	519	1670
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.72	0.47	0.92	0.46	0.41	0.57	0.66	0.53	0.76	0.61

Intersection Summary

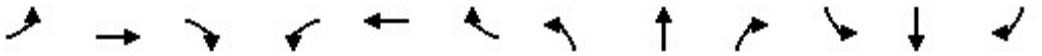
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	941	272	522	696	267	199	849	365	375	823	146
Future Volume (veh/h)	263	941	272	522	696	267	199	849	365	375	823	146
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	277	991	286	549	733	281	209	894	384	395	866	154
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	341	1234	383	596	1658	515	264	1365	644	452	1518	265
Arrive On Green	0.12	0.26	0.26	0.20	0.34	0.34	0.09	0.22	0.22	0.16	0.29	0.29
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5260	918
Grp Volume(v), veh/h	277	991	286	549	733	281	209	894	384	395	751	269
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1607
Q Serve(g_s), s	10.4	21.5	19.6	20.7	13.1	16.9	7.9	14.9	22.0	14.8	15.6	16.0
Cycle Q Clear(g_c), s	10.4	21.5	19.6	20.7	13.1	16.9	7.9	14.9	22.0	14.8	15.6	16.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	341	1234	383	596	1658	515	264	1365	644	452	1319	464
V/C Ratio(X)	0.81	0.80	0.75	0.92	0.44	0.55	0.79	0.66	0.60	0.87	0.57	0.58
Avail Cap(c_a), veh/h	611	1406	436	611	1658	515	377	1390	650	533	1319	464
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	39.0	38.3	43.6	28.5	29.7	49.8	39.5	24.5	46.2	33.9	34.0
Incr Delay (d2), s/veh	4.7	3.1	6.0	19.3	0.2	1.2	7.3	1.1	1.5	13.3	0.6	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	8.8	7.8	9.0	5.1	6.2	3.1	5.7	7.9	6.2	5.8	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.9	42.1	44.4	62.9	28.7	30.9	57.1	40.6	26.0	59.4	34.4	35.8
LnGrp LOS	D	D	D	E	C	C	E	D	C	E	C	D
Approach Vol, veh/h		1554			1563			1487			1415	
Approach Delay, s/veh		44.4			41.1			39.1			41.7	
Approach LOS		D			D			D			D	

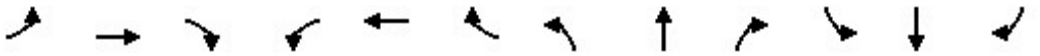
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.9	29.5	27.4	33.0	14.6	36.8	17.6	42.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	16.8	24.0	22.7	23.5	9.9	18.0	12.4	18.9
Green Ext Time (p_c), s	0.5	1.1	0.2	5.1	0.3	5.8	0.7	5.2

Intersection Summary	
HCM 6th Ctrl Delay	41.6
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.945	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3035	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3035	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			156			270			374		91	403
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



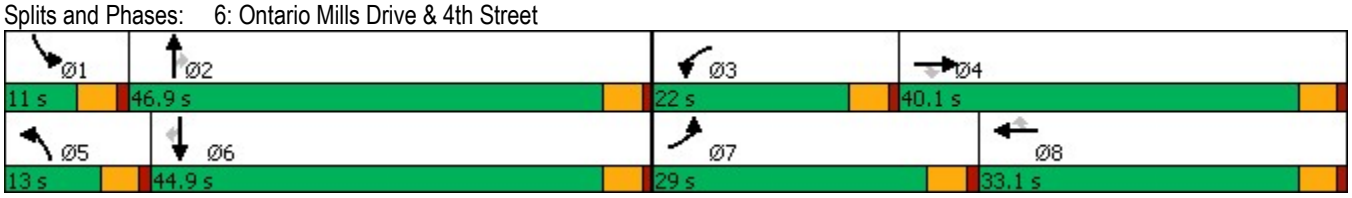
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	702	1087	150	394	871	404	175	306	469	65	607	782
Future Volume (vph)	702	1087	150	394	871	404	175	306	469	65	607	782
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	731	1132	156	410	907	421	182	319	489	68	632	815
Shared Lane Traffic (%)												45%
Lane Group Flow (vph)	731	1132	156	410	907	421	182	319	489	68	999	448

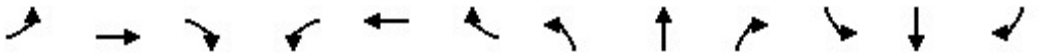
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	702	1087	150	394	871	404	175	306	469	65	607	782
Future Volume (vph)	702	1087	150	394	871	404	175	306	469	65	607	782
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	34.8	34.8	17.5	27.8	27.8	8.5	41.7	41.7	6.5	39.7	39.7
Actuated g/C Ratio	0.21	0.29	0.29	0.15	0.23	0.23	0.07	0.35	0.35	0.05	0.33	0.33
v/c Ratio	1.22	0.80	0.28	0.96	0.80	0.75	1.61	0.27	0.64	0.79	0.93	0.62
Control Delay	155.5	43.8	6.3	85.8	49.1	24.3	344.8	28.4	11.7	107.5	49.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	155.5	43.8	6.3	85.8	49.1	24.3	344.8	28.4	11.7	107.5	49.8	8.8
LOS	F	D	A	F	D	C	F	C	B	F	D	A
Approach Delay		81.3			51.7			78.3			40.3	
Approach LOS		F			D			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.6	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.61	
Intersection Signal Delay: 62.7	Intersection LOS: E
Intersection Capacity Utilization 93.9%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



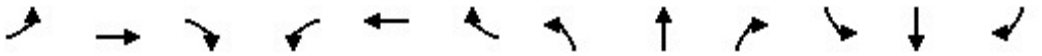


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	731	1132	156	410	907	421	182	319	489	68	999	448
v/c Ratio	1.22	0.80	0.28	0.96	0.80	0.75	1.61	0.27	0.64	0.79	0.93	0.62
Control Delay	155.5	43.8	6.3	85.8	49.1	24.3	344.8	28.4	11.7	107.5	49.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	155.5	43.8	6.3	85.8	49.1	24.3	344.8	28.4	11.7	107.5	49.8	8.8
Queue Length 50th (ft)	~362	295	0	164	242	109	~203	92	62	53	376	26
Queue Length 95th (ft)	#484	352	50	#267	295	239	#351	130	181	#137	#518	135
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	597	1447	559	426	1162	567	113	1199	776	86	1094	730
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.78	0.28	0.96	0.78	0.74	1.61	0.27	0.63	0.79	0.91	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



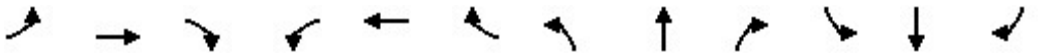
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	702	1087	150	394	871	404	175	306	469	65	607	782
Future Volume (veh/h)	702	1087	150	394	871	404	175	306	469	65	607	782
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	731	1132	156	410	907	421	182	319	489	68	632	815
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	1435	445	424	1153	358	113	1194	533	84	597	1011
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	731	1132	156	410	907	421	182	319	489	68	632	815
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	24.5	25.8	9.8	16.8	21.1	28.6	8.5	8.1	37.4	5.1	40.4	29.6
Cycle Q Clear(g_c), s	24.5	25.8	9.8	16.8	21.1	28.6	8.5	8.1	37.4	5.1	40.4	29.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	1435	445	424	1153	358	113	1194	533	84	597	1011
V/C Ratio(X)	1.23	0.79	0.35	0.97	0.79	1.18	1.61	0.27	0.92	0.81	1.06	0.81
Avail Cap(c_a), veh/h	594	1435	445	424	1153	358	113	1194	533	86	597	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	38.7	33.1	51.0	42.8	45.7	55.8	27.6	37.0	56.2	39.8	36.2
Incr Delay (d2), s/veh	117.9	3.0	0.5	34.8	3.7	104.8	312.5	0.1	21.0	40.9	53.6	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.5	10.5	3.6	8.2	8.8	21.0	13.2	3.3	16.6	3.0	26.2	11.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	165.6	41.8	33.6	85.8	46.5	150.5	368.2	27.7	58.1	97.1	93.4	41.1
LnGrp LOS	F	D	C	F	D	F	F	C	E	F	F	D
Approach Vol, veh/h		2019			1738			990			1515	
Approach Delay, s/veh		86.0			81.0			105.3			65.4	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.8	47.1	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	7.1	39.4	18.8	27.8	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	1.2	0.0	4.8	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	82.7
HCM 6th LOS	F

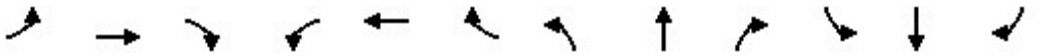
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.982			0.938				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (prot)	2891	4818	1500	1583	4731	0	1583	3145	0	1504	1670	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (perm)	2891	4818	1500	1583	4731	0	1583	3145	0	1504	1670	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95		17			48				442
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



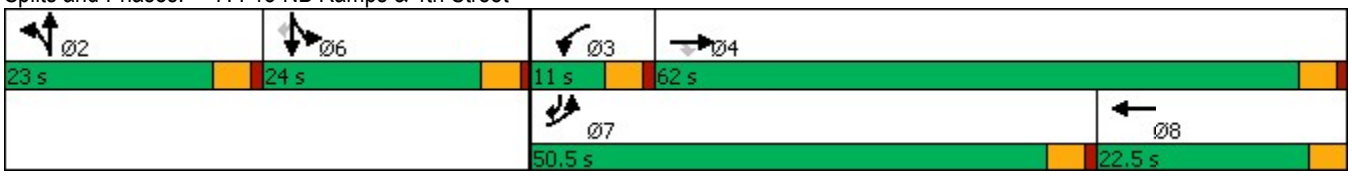
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1011	483	89	31	513	70	91	65	45	68	73	1090
Future Volume (vph)	1011	483	89	31	513	70	91	65	45	68	73	1090
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1076	514	95	33	546	74	97	69	48	72	78	1160
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	1076	514	95	33	620	0	97	117	0	65	85	1160

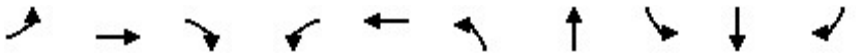
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1011	483	89	31	513	91	65	68	73	1090
Future Volume (vph)	1011	483	89	31	513	91	65	68	73	1090
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	44.7	59.7	59.7	6.3	17.6	11.6	11.6	10.6	10.6	59.9
Actuated g/C Ratio	0.44	0.59	0.59	0.06	0.17	0.11	0.11	0.10	0.10	0.59
v/c Ratio	0.85	0.18	0.10	0.34	0.75	0.54	0.29	0.42	0.49	0.67
Control Delay	34.5	11.7	3.3	59.3	46.1	55.5	28.2	53.0	54.8	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	11.7	3.3	59.3	46.1	55.5	28.2	53.0	54.8	10.7
LOS	C	B	A	E	D	E	C	D	D	B
Approach Delay		25.8			46.8		40.6		15.7	
Approach LOS		C			D		D		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 101.8	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 26.7	Intersection LOS: C
Intersection Capacity Utilization 69.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1076	514	95	33	620	97	117	65	85	1160
v/c Ratio	0.85	0.18	0.10	0.34	0.75	0.54	0.29	0.42	0.49	0.67
Control Delay	34.5	11.7	3.3	59.3	46.1	55.5	28.2	53.0	54.8	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	11.7	3.3	59.3	46.1	55.5	28.2	53.0	54.8	10.7
Queue Length 50th (ft)	321	59	0	22	139	62	22	43	57	169
Queue Length 95th (ft)	#523	98	27	57	203	120	51	92	114	278
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1322	2846	925	102	907	291	617	291	323	1774
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.18	0.10	0.32	0.68	0.33	0.19	0.22	0.26	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

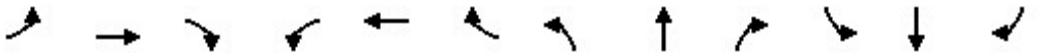
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1011	483	89	31	513	70	91	65	45	68	73	1090
Future Volume (veh/h)	1011	483	89	31	513	70	91	65	45	68	73	1090
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1076	514	95	33	546	74	97	69	48	72	78	1160
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1160	2547	791	47	680	91	135	166	106	298	331	1759
Arrive On Green	0.40	0.53	0.53	0.03	0.16	0.16	0.08	0.08	0.08	0.19	0.19	0.19
Sat Flow, veh/h	2910	4837	1502	1594	4316	577	1594	1973	1257	1594	1772	3003
Grp Volume(v), veh/h	1076	514	95	33	406	214	97	58	59	72	78	1160
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1668	1594	1683	1546	1594	1772	1502
Q Serve(g_s), s	36.8	5.9	3.3	2.1	12.7	12.9	6.2	3.4	3.8	4.0	3.9	19.5
Cycle Q Clear(g_c), s	36.8	5.9	3.3	2.1	12.7	12.9	6.2	3.4	3.8	4.0	3.9	19.5
Prop In Lane	1.00		1.00	1.00		0.35	1.00		0.81	1.00		1.00
Lane Grp Cap(c), veh/h	1160	2547	791	47	508	263	135	142	130	298	331	1759
V/C Ratio(X)	0.93	0.20	0.12	0.70	0.80	0.82	0.72	0.41	0.45	0.24	0.24	0.66
Avail Cap(c_a), veh/h	1283	2667	828	99	587	304	283	299	274	298	331	1759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	13.1	12.5	50.2	42.4	42.5	46.6	45.3	45.5	36.1	36.1	14.6
Incr Delay (d2), s/veh	11.1	0.0	0.1	17.2	6.8	13.9	7.1	1.9	2.4	0.4	0.4	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.2	2.1	1.1	1.1	5.5	6.3	2.7	1.5	1.5	1.6	1.7	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	13.1	12.5	67.4	49.1	56.4	53.6	47.1	47.9	36.5	36.4	15.5
LnGrp LOS	D	B	B	E	D	E	D	D	D	D	D	B
Approach Vol, veh/h		1685			653			214			1310	
Approach Delay, s/veh		30.9			52.4			50.3			17.9	
Approach LOS		C			D			D			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.3	7.6	59.4		24.0	46.1	20.9				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.5	6.5	57.5		19.5	46.0	* 19				
Max Q Clear Time (g_c+I1), s		8.2	4.1	7.9		21.5	38.8	14.9				
Green Ext Time (p_c), s		0.6	0.0	4.4		0.0	2.8	1.5				

Intersection Summary	
HCM 6th Ctrl Delay	31.2
HCM 6th LOS	C

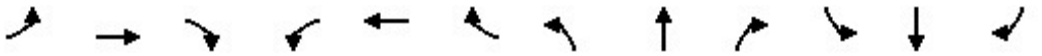
Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



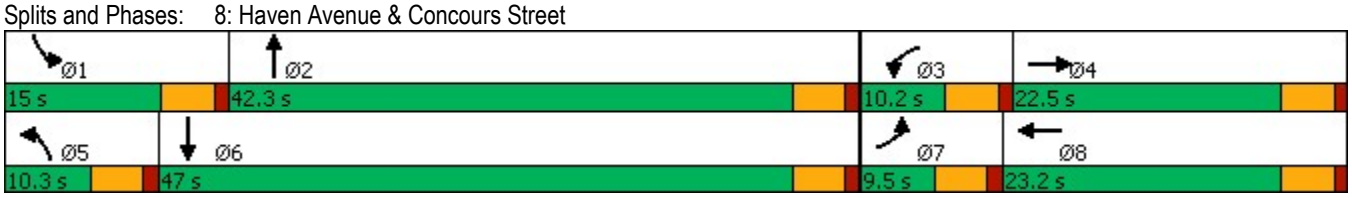
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	12	24	45	121	52	58	43	1538	222	41	1460	30
Future Volume (vph)	12	24	45	121	52	58	43	1538	222	41	1460	30
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	26	48	129	55	62	46	1636	236	44	1553	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	74	0	129	55	62	46	1636	236	44	1553	32

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	12	24	121	52	58	43	1538	222	41	1460	30
Future Volume (vph)	12	24	121	52	58	43	1538	222	41	1460	30
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.4	6.7	6.2	12.8	63.0	6.2	37.9	63.0	6.9	38.6	63.0
Actuated g/C Ratio	0.09	0.11	0.10	0.20	1.00	0.10	0.60	1.00	0.11	0.61	1.00
v/c Ratio	0.05	0.20	0.34	0.08	0.04	0.16	0.45	0.16	0.14	0.42	0.02
Control Delay	34.5	17.7	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	17.7	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.1	0.0
LOS	C	B	C	C	A	C	B	A	C	B	A
Approach Delay		20.2		24.2			10.2			10.5	
Approach LOS		C		C			B			B	

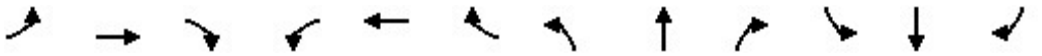
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 40.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	74	129	55	62	46	1636	236	44	1553	32
v/c Ratio	0.05	0.20	0.34	0.08	0.04	0.16	0.45	0.16	0.14	0.42	0.02
Control Delay	34.5	17.7	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	17.7	34.8	26.4	0.1	34.0	11.0	0.2	32.2	10.1	0.0
Queue Length 50th (ft)	2	5	19	10	0	9	136	0	9	125	0
Queue Length 95th (ft)	11	25	40	30	0	27	184	0	25	161	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	248	969	385	1077	1500	288	3977	1500	521	4280	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.08	0.34	0.05	0.04	0.16	0.41	0.16	0.08	0.36	0.02

Intersection Summary



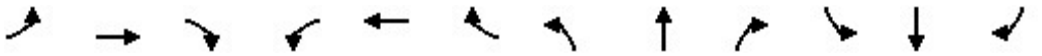
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	24	45	121	52	58	43	1538	222	41	1460	30
Future Volume (veh/h)	12	24	45	121	52	58	43	1538	222	41	1460	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	13	26	48	129	55	0	46	1636	0	44	1553	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	48	134	119	306	472		133	2917		129	2908	
Arrive On Green	0.02	0.08	0.08	0.08	0.14	0.00	0.05	0.48	0.00	0.04	0.48	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	13	26	48	129	55	0	46	1636	0	44	1553	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.2	0.8	1.7	1.7	0.8	0.0	0.9	10.7	0.0	0.8	10.0	0.0
Cycle Q Clear(g_c), s	0.2	0.8	1.7	1.7	0.8	0.0	0.9	10.7	0.0	0.8	10.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	48	134	119	306	472		133	2917		129	2908	
V/C Ratio(X)	0.27	0.19	0.40	0.42	0.12		0.35	0.56		0.34	0.53	
Avail Cap(c_a), veh/h	259	540	482	403	1122		301	4105		544	4616	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.3	24.2	24.6	24.7	21.1	0.0	26.0	10.4	0.0	26.0	10.3	0.0
Incr Delay (d2), s/veh	3.0	0.7	2.2	0.9	0.1	0.0	1.5	0.2	0.0	1.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	0.6	0.5	0.3	0.0	0.3	3.0	0.0	0.3	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.3	24.9	26.8	25.6	21.2	0.0	27.5	10.6	0.0	27.6	10.4	0.0
LnGrp LOS	C	C	C	C	C		C	B		C	B	
Approach Vol, veh/h		87			184	A		1682	A		1597	A
Approach Delay, s/veh		26.7			24.3			11.1			10.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	31.4	8.8	9.0	7.1	31.3	5.4	12.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	2.8	12.7	3.7	3.7	2.9	12.0	2.2	2.8
Green Ext Time (p_c), s	0.0	14.1	0.1	0.2	0.0	14.7	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

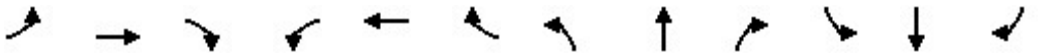
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.995									0.935	
Flt Protected	0.950	0.954					0.950					
Satd. Flow (prot)	1593	1591	0	0	1765	0	1676	4818	0	1765	4505	0
Flt Permitted	0.950	0.954					0.950					
Satd. Flow (perm)	1593	1591	0	0	1765	0	1676	4818	0	1765	4505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143						1			183	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



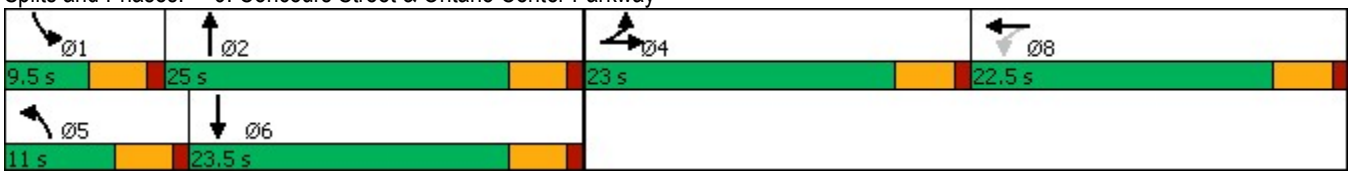
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	157	0	3	0	0	0	35	291	1	0	217	165
Future Volume (vph)	157	0	3	0	0	0	35	291	1	0	217	165
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	174	0	3	0	0	0	39	323	1	0	241	183
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	89	88	0	0	0	0	39	324	0	0	424	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	157	0	35	291	217		
Future Volume (vph)	157	0	35	291	217		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	7.6	7.6	6.3	16.2	14.5		
Actuated g/C Ratio	0.26	0.26	0.21	0.55	0.49		
v/c Ratio	0.22	0.17	0.11	0.12	0.18		
Control Delay	11.0	2.2	12.0	5.0	4.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	11.0	2.2	12.0	5.0	4.9		
LOS	B	A	B	A	A		
Approach Delay		6.7		5.8	4.9		
Approach LOS		A		A	A		

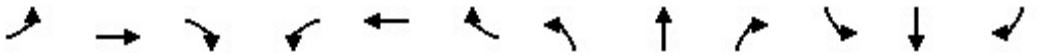
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 29.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.22	
Intersection Signal Delay: 5.6	Intersection LOS: A
Intersection Capacity Utilization 28.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	89	88	39	324	424
v/c Ratio	0.22	0.17	0.11	0.12	0.18
Control Delay	11.0	2.2	12.0	5.0	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	2.2	12.0	5.0	4.9
Queue Length 50th (ft)	8	0	4	9	6
Queue Length 95th (ft)	43	12	25	19	32
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	1027	1077	380	3643	3259
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.08	0.10	0.09	0.13

Intersection Summary



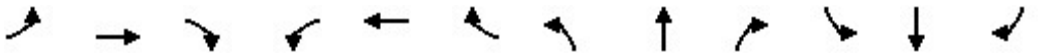
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	0	3	0	0	0	35	291	1	0	217	165
Future Volume (veh/h)	157	0	3	0	0	0	35	291	1	0	217	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	177	0	0	0	0	0	39	323	1	0	241	183
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	477	250	0	0	7	0	80	2491	8	7	883	411
Arrive On Green	0.14	0.00	0.00	0.00	0.00	0.00	0.05	0.50	0.50	0.00	0.27	0.27
Sat Flow, veh/h	3375	1772	0	0	1772	0	1688	4979	15	1688	3225	1502
Grp Volume(v), veh/h	177	0	0	0	0	0	39	209	115	0	241	183
Grp Sat Flow(s),veh/h/ln	1688	1772	0	0	1772	0	1688	1612	1769	1688	1612	1502
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.9	0.0	1.5	2.5
Cycle Q Clear(g_c), s	1.2	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.9	0.0	1.5	2.5
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	477	250	0	0	7	0	80	1614	885	7	883	411
V/C Ratio(X)	0.37	0.00	0.00	0.00	0.00	0.00	0.49	0.13	0.13	0.00	0.27	0.45
Avail Cap(c_a), veh/h	2487	1305	0	0	1270	0	437	2633	1444	336	2440	1136
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.8	0.0	0.0	0.0	0.0	0.0	11.7	3.4	3.4	0.0	7.2	7.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.1	0.0	0.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.3	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.3	0.0	0.0	0.0	0.0	0.0	16.2	3.4	3.4	0.0	7.3	8.3
LnGrp LOS	B	A	A	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		177			0			363			424	
Approach Delay, s/veh		10.3			0.0			4.8			7.7	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	17.1		8.0	5.7	11.4		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	2.9		3.2	2.6	4.5		0.0				
Green Ext Time (p_c), s	0.0	1.8		0.5	0.0	2.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		7.1
HCM 6th LOS		A

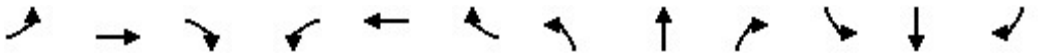
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			297			182			215			285
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



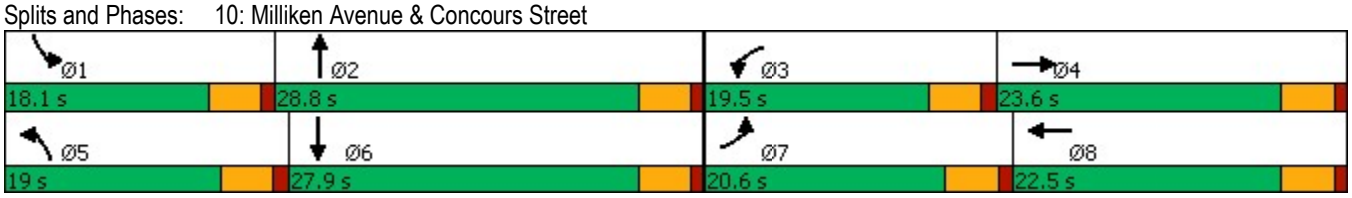
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	334	150	276	251	98	155	319	961	234	270	965	271
Future Volume (vph)	334	150	276	251	98	155	319	961	234	270	965	271
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	359	161	297	270	105	167	343	1033	252	290	1038	291
Shared Lane Traffic (%)												
Lane Group Flow (vph)	359	161	297	270	105	167	343	1033	252	290	1038	291

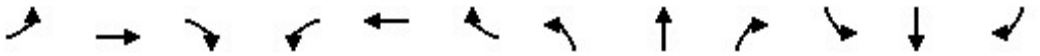
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	334	150	276	251	98	155	319	961	234	270	965	271
Future Volume (vph)	334	150	276	251	98	155	319	961	234	270	965	271
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	16.2	9.5	73.8	12.0	7.9	73.8	13.1	22.0	73.8	12.0	20.8	73.8
Actuated g/C Ratio	0.22	0.13	1.00	0.16	0.11	1.00	0.18	0.30	1.00	0.16	0.28	1.00
v/c Ratio	0.56	0.37	0.20	0.57	0.29	0.11	0.67	0.57	0.17	0.62	0.61	0.19
Control Delay	32.0	33.6	0.3	34.8	34.6	0.1	36.7	23.9	0.2	36.4	25.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	33.6	0.3	34.8	34.6	0.1	36.7	23.9	0.2	36.4	25.2	0.3
LOS	C	C	A	C	C	A	D	C	A	D	C	A
Approach Delay		20.8			24.1			23.0			22.7	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.8	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 22.6	Intersection LOS: C
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	359	161	297	270	105	167	343	1033	252	290	1038	291
v/c Ratio	0.56	0.37	0.20	0.57	0.29	0.11	0.67	0.57	0.17	0.62	0.61	0.19
Control Delay	32.0	33.6	0.3	34.8	34.6	0.1	36.7	23.9	0.2	36.4	25.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	33.6	0.3	34.8	34.6	0.1	36.7	23.9	0.2	36.4	25.2	0.3
Queue Length 50th (ft)	83	38	0	63	25	0	79	120	0	68	124	0
Queue Length 95th (ft)	134	69	0	103	49	0	130	165	0	113	169	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	673	882	1500	597	831	1500	577	2033	1500	542	1957	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.18	0.20	0.45	0.13	0.11	0.59	0.51	0.17	0.54	0.53	0.19

Intersection Summary

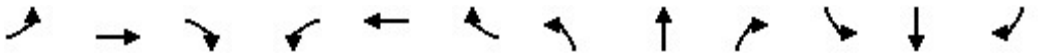
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	334	150	276	251	98	155	319	961	234	270	965	271
Future Volume (veh/h)	334	150	276	251	98	155	319	961	234	270	965	271
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	359	161	0	270	105	0	343	1033	0	290	1038	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	479	402		382	289		458	1844		400	1723	
Arrive On Green	0.16	0.12	0.00	0.13	0.09	0.00	0.16	0.30	0.00	0.14	0.28	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	359	161	0	270	105	0	343	1033	0	290	1038	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	6.8	2.6	0.0	5.2	1.7	0.0	6.6	8.3	0.0	5.6	8.6	0.0
Cycle Q Clear(g_c), s	6.8	2.6	0.0	5.2	1.7	0.0	6.6	8.3	0.0	5.6	8.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	479	402		382	289		458	1844		400	1723	
V/C Ratio(X)	0.75	0.40		0.71	0.36		0.75	0.56		0.72	0.60	
Avail Cap(c_a), veh/h	805	1105		750	1041		725	2545		680	2451	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.2	23.7	0.0	24.2	25.1	0.0	23.4	17.0	0.0	24.0	18.0	0.0
Incr Delay (d2), s/veh	2.4	0.6	0.0	2.4	0.8	0.0	2.5	0.3	0.0	2.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	1.0	0.0	1.8	0.7	0.0	2.2	2.6	0.0	1.9	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.5	24.3	0.0	26.6	25.9	0.0	25.9	17.3	0.0	26.5	18.4	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		520	A		375	A		1376	A		1328	A
Approach Delay, s/veh		25.2			26.4			19.5			20.2	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	22.1	12.1	11.4	13.7	21.0	14.1	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	7.6	10.3	7.2	4.6	8.6	10.6	8.8	3.7
Green Ext Time (p_c), s	0.5	6.2	0.6	0.7	0.6	5.9	0.8	0.4

Intersection Summary	
HCM 6th Ctrl Delay	21.3
HCM 6th LOS	C

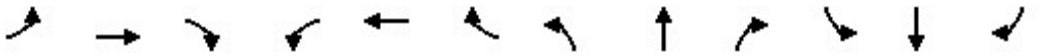
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			463			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



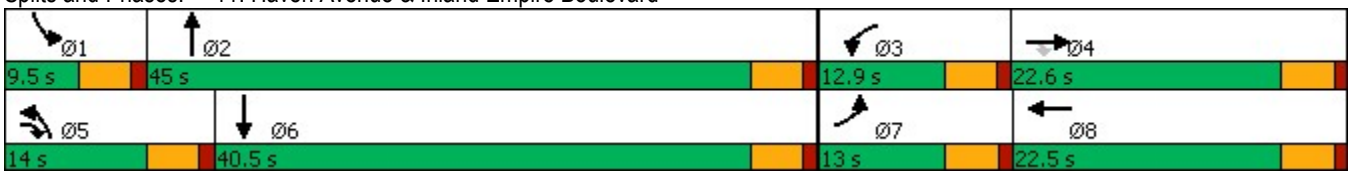
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	69	121	252	182	119	68	163	1662	548	53	1463	45
Future Volume (vph)	69	121	252	182	119	68	163	1662	548	53	1463	45
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	71	125	260	188	123	70	168	1713	565	55	1508	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	125	260	188	123	70	168	1713	565	55	1508	46

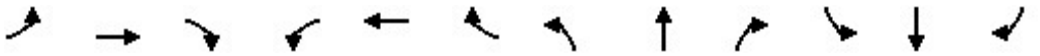
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	121	252	182	119	68	163	1662	548	53	1463	45
Future Volume (vph)	69	121	252	182	119	68	163	1662	548	53	1463	45
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	7.2	8.3	18.8	8.2	9.1	72.6	8.9	40.1	72.6	5.2	31.7	72.6
Actuated g/C Ratio	0.10	0.11	0.26	0.11	0.13	1.00	0.12	0.55	1.00	0.07	0.44	1.00
v/c Ratio	0.25	0.32	0.59	0.43	0.29	0.05	0.48	0.51	0.38	0.27	0.57	0.03
Control Delay	35.8	34.9	22.8	36.2	34.0	0.1	37.5	12.5	0.7	39.5	16.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	34.9	22.8	36.2	34.0	0.1	37.5	12.5	0.7	39.5	16.9	0.0
LOS	D	C	C	D	C	A	D	B	A	D	B	A
Approach Delay		28.2			28.8			11.5			17.2	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 54.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	71	125	260	188	123	70	168	1713	565	55	1508	46
v/c Ratio	0.25	0.32	0.59	0.43	0.29	0.05	0.48	0.51	0.38	0.27	0.57	0.03
Control Delay	35.8	34.9	22.8	36.2	34.0	0.1	37.5	12.5	0.7	39.5	16.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	34.9	22.8	36.2	34.0	0.1	37.5	12.5	0.7	39.5	16.9	0.0
Queue Length 50th (ft)	17	30	76	31	29	0	40	162	0	13	154	0
Queue Length 95th (ft)	37	56	152	54	56	0	73	208	0	32	199	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	351	867	461	473	862	1500	392	3539	1500	206	3123	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.14	0.56	0.40	0.14	0.05	0.43	0.48	0.38	0.27	0.48	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	69	121	252	182	119	68	163	1662	548	53	1463	45
Future Volume (veh/h)	69	121	252	182	119	68	163	1662	548	53	1463	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	71	125	260	188	123	0	168	1713	0	55	1508	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	153	642	411	295	715		242	2680		135	2456	
Arrive On Green	0.05	0.19	0.19	0.07	0.21	0.00	0.08	0.44	0.00	0.05	0.40	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	71	125	260	188	123	0	168	1713	0	55	1508	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.7	2.3	11.0	3.3	2.2	0.0	4.1	15.8	0.0	1.3	14.2	0.0
Cycle Q Clear(g_c), s	1.7	2.3	11.0	3.3	2.2	0.0	4.1	15.8	0.0	1.3	14.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	642	411	295	715		242	2680		135	2456	
V/C Ratio(X)	0.46	0.19	0.63	0.64	0.17		0.69	0.64		0.41	0.61	
Avail Cap(c_a), veh/h	342	843	501	461	838		383	3416		201	3036	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.3	24.6	23.1	32.5	23.3	0.0	32.2	15.8	0.0	33.5	17.1	0.0
Incr Delay (d2), s/veh	2.2	0.1	1.8	2.3	0.1	0.0	3.6	0.3	0.0	2.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.9	3.9	1.1	0.8	0.0	1.5	5.0	0.0	0.5	4.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.4	24.7	24.9	34.8	23.4	0.0	35.8	16.0	0.0	35.5	17.4	0.0
LnGrp LOS	D	C	C	C	C		D	B		D	B	
Approach Vol, veh/h		456			311	A		1881	A		1563	A
Approach Delay, s/veh		26.5			30.3			17.8			18.0	
Approach LOS		C			C			B			B	

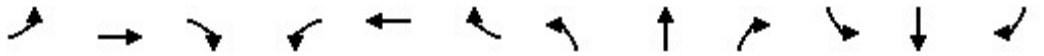
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.8	36.3	9.9	18.3	10.5	33.6	8.3	19.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	3.3	17.8	5.3	13.0	6.1	16.2	3.7	4.2
Green Ext Time (p_c), s	0.0	14.0	0.2	0.8	0.2	11.2	0.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	19.7
HCM 6th LOS	B

Notes

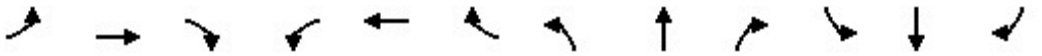
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			270			193			551			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



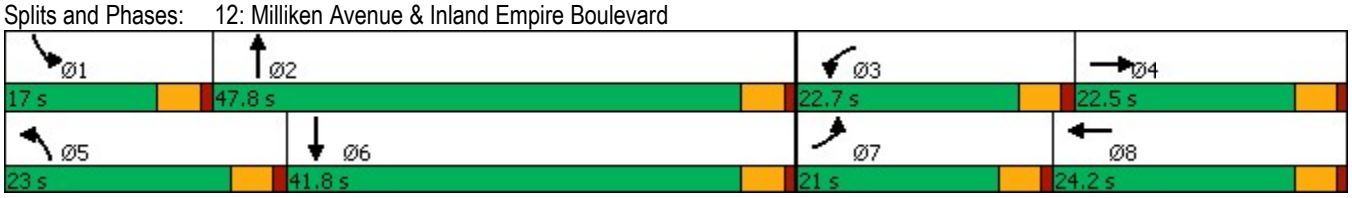
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	172	286	262	346	134	131	335	1155	763	137	1364	108
Future Volume (vph)	172	286	262	346	134	131	335	1155	763	137	1364	108
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	177	295	270	357	138	135	345	1191	787	141	1406	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	177	295	270	357	138	135	345	1191	787	141	1406	111

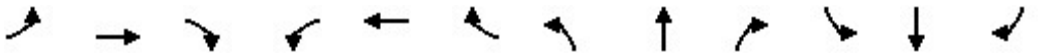
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	286	262	346	134	131	335	1155	763	137	1364	108
Future Volume (vph)	172	286	262	346	134	131	335	1155	763	137	1364	108
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	11.5	14.0	98.0	16.2	18.7	98.0	16.0	39.4	98.0	10.1	33.4	98.0
Actuated g/C Ratio	0.12	0.14	1.00	0.17	0.19	1.00	0.16	0.40	1.00	0.10	0.34	1.00
v/c Ratio	0.52	0.62	0.18	0.75	0.22	0.09	0.73	0.49	0.52	0.48	0.68	0.07
Control Delay	48.4	47.0	0.3	51.1	36.6	0.1	50.4	23.1	1.3	49.5	30.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	47.0	0.3	51.1	36.6	0.1	50.4	23.1	1.3	49.5	30.2	0.1
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		30.3			37.0			19.8			29.8	
Approach LOS		C			D			B			C	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 98		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.75		
Intersection Signal Delay: 26.4	Intersection LOS: C	
Intersection Capacity Utilization 67.3%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	177	295	270	357	138	135	345	1191	787	141	1406	111
v/c Ratio	0.52	0.62	0.18	0.75	0.22	0.09	0.73	0.49	0.52	0.48	0.68	0.07
Control Delay	48.4	47.0	0.3	51.1	36.6	0.1	50.4	23.1	1.3	49.5	30.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	47.0	0.3	51.1	36.6	0.1	50.4	23.1	1.3	49.5	30.2	0.1
Queue Length 50th (ft)	59	100	0	118	41	0	114	165	0	47	230	0
Queue Length 95th (ft)	94	147	0	#179	73	0	171	215	0	80	288	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	497	629	1500	549	711	1500	557	2758	1500	376	2362	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.47	0.18	0.65	0.19	0.09	0.62	0.43	0.52	0.38	0.60	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	172	286	262	346	134	131	335	1155	763	137	1364	108
Future Volume (veh/h)	172	286	262	346	134	131	335	1155	763	137	1364	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	177	295	0	357	138	0	345	1191	0	141	1406	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	418		444	639		433	2601		208	2131	
Arrive On Green	0.09	0.12	0.00	0.15	0.19	0.00	0.15	0.43	0.00	0.07	0.35	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	177	295	0	357	138	0	345	1191	0	141	1406	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	4.7	6.7	0.0	9.5	2.8	0.0	9.2	11.1	0.0	3.8	15.6	0.0
Cycle Q Clear(g_c), s	4.7	6.7	0.0	9.5	2.8	0.0	9.2	11.1	0.0	3.8	15.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	253	418		444	639		433	2601		208	2131	
V/C Ratio(X)	0.70	0.71		0.80	0.22		0.80	0.46		0.68	0.66	
Avail Cap(c_a), veh/h	600	757		662	829		673	3299		455	2842	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.5	33.6	0.0	32.7	27.4	0.0	32.9	16.3	0.0	36.2	22.0	0.0
Incr Delay (d2), s/veh	3.5	2.2	0.0	4.4	0.2	0.0	3.7	0.1	0.0	3.8	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.8	0.0	3.5	1.1	0.0	3.4	3.7	0.0	1.4	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.0	35.8	0.0	37.1	27.6	0.0	36.6	16.5	0.0	40.0	22.4	0.0
LnGrp LOS	D	D		D	C		D	B		D	C	
Approach Vol, veh/h		472	A		495	A		1536	A		1547	A
Approach Delay, s/veh		37.0			34.5			21.0			24.0	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	38.6	16.7	14.4	16.4	32.5	11.5	19.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	5.8	13.1	11.5	8.7	11.2	17.6	6.7	4.8
Green Ext Time (p_c), s	0.2	10.4	0.7	1.2	0.7	10.4	0.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	25.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.925	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	2919	1365	6071	0	0	6071
Flt Permitted	0.976					
Satd. Flow (perm)	2919	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	7	7				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	233	465	1871	0	0	1247
Future Volume (vph)	233	465	1871	0	0	1247
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	238	474	1909	0	0	1272
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	475	237	1909	0	0	1272

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	233	465	1871	1247
Future Volume (vph)	233	465	1871	1247
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	14.5	14.5	30.1	30.1
Actuated g/C Ratio	0.27	0.27	0.56	0.56
v/c Ratio	0.60	0.63	0.56	0.37
Control Delay	20.4	25.4	8.9	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.4	25.4	8.9	7.4
LOS	C	C	A	A
Approach Delay	22.0		8.9	7.4
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 53.8	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 10.8	Intersection LOS: B
Intersection Capacity Utilization 67.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	475	237	1909	1272
v/c Ratio	0.60	0.63	0.56	0.37
Control Delay	20.4	25.4	8.9	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.4	25.4	8.9	7.4
Queue Length 50th (ft)	69	72	102	59
Queue Length 95th (ft)	107	140	159	94
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1078	506	3608	3608
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.44	0.47	0.53	0.35

Intersection Summary

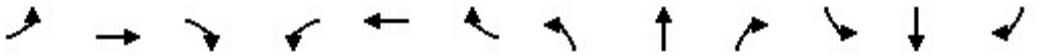
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	233	465	1871	0	0	1247
Future Volume (veh/h)	233	465	1871	0	0	1247
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	237	475	1909	0	0	1272
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	377	710	3439	0	0	3439
Arrive On Green	0.24	0.24	0.56	0.00	0.00	0.56
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	237	475	1909	0	0	1272
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	6.0	6.5	9.0	0.0	0.0	5.2
Cycle Q Clear(g_c), s	6.0	6.5	9.0	0.0	0.0	5.2
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	377	710	3439	0	0	3439
V/C Ratio(X)	0.63	0.67	0.56	0.00	0.00	0.37
Avail Cap(c_a), veh/h	689	1298	4256	0	0	4256
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	15.5	15.6	6.2	0.0	0.0	5.4
Incr Delay (d2), s/veh	1.7	1.1	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	2.0	1.8	0.0	0.0	1.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.2	16.7	6.4	0.0	0.0	5.5
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	712		1909			1272
Approach Delay, s/veh	16.9		6.4			5.5
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		29.9			29.9	15.2
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s		11.0			7.2	8.5
Green Ext Time (p_c), s		14.5			10.3	2.2

Intersection Summary	
HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

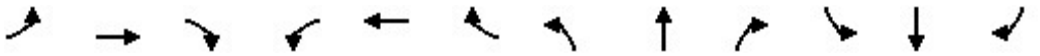
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			230			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



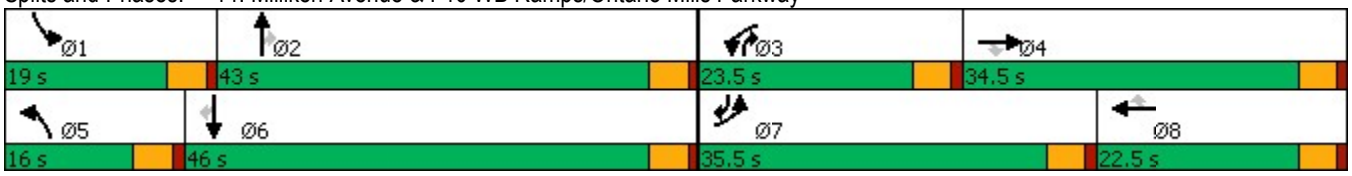
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	669	220	125	266	332	99	202	1313	404	293	1049	767
Future Volume (vph)	669	220	125	266	332	99	202	1313	404	293	1049	767
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	719	237	134	286	357	106	217	1412	434	315	1128	825
Shared Lane Traffic (%)												
Lane Group Flow (vph)	719	237	134	286	357	106	217	1412	434	315	1128	825

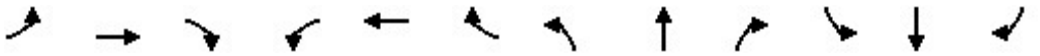
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	669	220	125	266	332	99	202	1313	404	293	1049	767
Future Volume (vph)	669	220	125	266	332	99	202	1313	404	293	1049	767
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	30.8	30.8	30.8	16.3	16.3	16.3	11.2	36.1	56.9	14.4	39.3	74.7
Actuated g/C Ratio	0.27	0.27	0.27	0.14	0.14	0.14	0.10	0.31	0.49	0.12	0.34	0.65
v/c Ratio	0.93	0.50	0.29	0.70	0.76	0.32	0.78	0.75	0.51	0.88	0.55	0.84
Control Delay	62.4	41.7	14.3	57.6	59.2	6.2	71.1	38.6	10.6	75.9	32.3	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.4	41.7	14.3	57.6	59.2	6.2	71.1	38.6	10.6	75.9	32.3	24.5
LOS	E	D	B	E	E	A	E	D	B	E	C	C
Approach Delay		52.0			51.1			36.1			35.5	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 40.5	Intersection LOS: D
Intersection Capacity Utilization 77.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

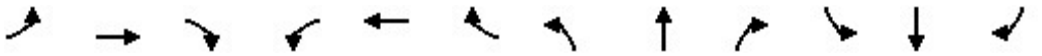




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	719	237	134	286	357	106	217	1412	434	315	1128	825
v/c Ratio	0.93	0.50	0.29	0.70	0.76	0.32	0.78	0.75	0.51	0.88	0.55	0.84
Control Delay	62.4	41.7	14.3	57.6	59.2	6.2	71.1	38.6	10.6	75.9	32.3	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.4	41.7	14.3	57.6	59.2	6.2	71.1	38.6	10.6	75.9	32.3	24.5
Queue Length 50th (ft)	284	158	23	108	140	0	86	279	92	125	202	434
Queue Length 95th (ft)	#408	244	76	155	193	30	#146	324	175	#210	239	671
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	776	470	469	476	522	348	288	2025	885	363	2183	990
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.50	0.29	0.60	0.68	0.30	0.75	0.70	0.49	0.87	0.52	0.83

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	669	220	125	266	332	99	202	1313	404	293	1049	767
Future Volume (veh/h)	669	220	125	266	332	99	202	1313	404	293	1049	767
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	719	237	134	286	357	106	217	1412	434	315	1128	825
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	765	486	412	343	436	194	265	1996	669	361	2196	936
Arrive On Green	0.26	0.27	0.27	0.12	0.13	0.13	0.09	0.33	0.33	0.12	0.36	0.36
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	719	237	134	286	357	106	217	1412	434	315	1128	825
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	27.9	12.9	8.2	11.1	11.9	7.6	8.4	23.3	26.0	12.2	16.7	41.5
Cycle Q Clear(g_c), s	27.9	12.9	8.2	11.1	11.9	7.6	8.4	23.3	26.0	12.2	16.7	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	765	486	412	343	436	194	265	1996	669	361	2196	936
V/C Ratio(X)	0.94	0.49	0.33	0.83	0.82	0.55	0.82	0.71	0.65	0.87	0.51	0.88
Avail Cap(c_a), veh/h	783	486	412	480	526	235	291	2038	679	366	2196	936
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.6	35.0	33.3	49.7	48.8	47.0	51.4	33.9	24.9	49.6	28.9	18.2
Incr Delay (d2), s/veh	18.9	0.8	0.5	8.6	8.4	2.4	15.4	1.1	2.1	19.9	0.2	9.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.9	5.7	3.0	4.4	5.5	3.0	3.6	8.7	9.5	5.4	6.1	19.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.5	35.8	33.8	58.3	57.2	49.3	66.8	35.0	27.0	69.4	29.1	28.0
LnGrp LOS	E	D	C	E	E	D	E	D	C	E	C	C
Approach Vol, veh/h		1090			749			2063			2268	
Approach Delay, s/veh		51.8			56.5			36.7			34.3	
Approach LOS		D			E			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.8	42.2	18.1	36.1	15.0	46.0	34.8	19.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	14.2	28.0	13.1	14.9	10.4	43.5	29.9	13.9
Green Ext Time (p_c), s	0.0	7.6	0.5	1.6	0.1	0.0	0.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	40.9
HCM 6th LOS	D

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3066	1365	0	6071	6071	0
Flt Permitted	0.955					
Satd. Flow (perm)	3066	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11	11				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

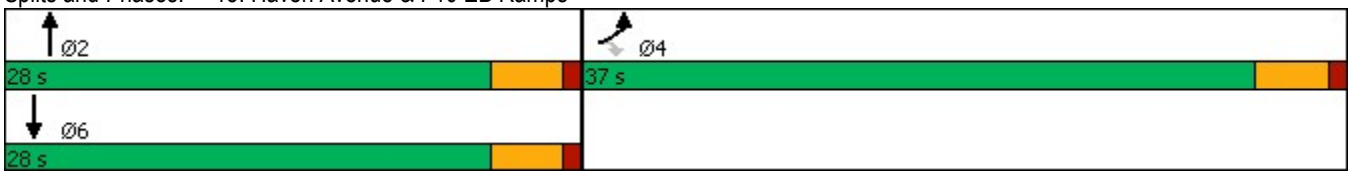
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	998	516	0	1427	1170	0
Future Volume (vph)	998	516	0	1427	1170	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1029	532	0	1471	1206	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1082	479	0	1471	1206	0

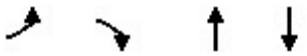
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	998	516	1427	1170
Future Volume (vph)	998	516	1427	1170
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	26.9	26.9	22.6	22.6
Actuated g/C Ratio	0.46	0.46	0.39	0.39
v/c Ratio	0.77	0.76	0.63	0.52
Control Delay	17.3	21.9	16.8	15.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.3	21.9	16.8	15.5
LOS	B	C	B	B
Approach Delay	18.7		16.8	15.5
Approach LOS	B		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 58.6	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 67.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1082	479	1471	1206
v/c Ratio	0.77	0.76	0.63	0.52
Control Delay	17.3	21.9	16.8	15.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.3	21.9	16.8	15.5
Queue Length 50th (ft)	156	145	122	95
Queue Length 95th (ft)	223	262	175	138
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1736	776	2479	2479
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.62	0.59	0.49

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	998	516	0	1427	1170	0
Future Volume (veh/h)	998	516	0	1427	1170	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1040	520	0	1471	1206	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1426	672	0	2310	2310	0
Arrive On Green	0.45	0.45	0.00	0.38	0.38	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1040	520	0	1471	1206	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	13.9	15.2	0.0	10.2	7.9	0.0
Cycle Q Clear(g_c), s	13.9	15.2	0.0	10.2	7.9	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1426	672	0	2310	2310	0
V/C Ratio(X)	0.73	0.77	0.00	0.64	0.52	0.00
Avail Cap(c_a), veh/h	2000	942	0	2766	2766	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	11.7	12.1	0.0	13.2	12.5	0.0
Incr Delay (d2), s/veh	0.8	2.7	0.0	0.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	4.5	0.0	3.0	2.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.6	14.8	0.0	13.5	12.6	0.0
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	1560			1471	1206	
Approach Delay, s/veh	13.3			13.5	12.6	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		24.1		27.7		24.1
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		12.2		17.2		9.9
Green Ext Time (p_c), s		7.4		6.0		7.1

Intersection Summary		
HCM 6th Ctrl Delay	13.2	
HCM 6th LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		13				138
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

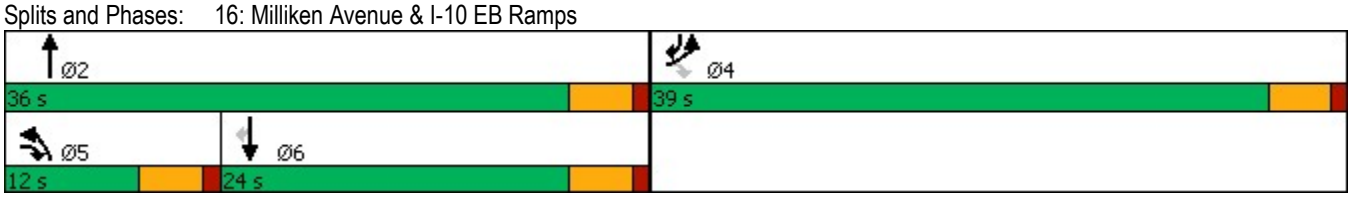
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	853	213	152	1114	816	649
Future Volume (vph)	853	213	152	1114	816	649
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	879	220	157	1148	841	669
Shared Lane Traffic (%)						
Lane Group Flow (vph)	879	220	157	1148	841	669

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	853	213	152	1114	816	649
Future Volume (vph)	853	213	152	1114	816	649
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	26.6	38.6	7.4	28.0	16.0	47.3
Actuated g/C Ratio	0.42	0.60	0.12	0.44	0.25	0.74
v/c Ratio	0.73	0.24	0.47	0.43	0.55	0.58
Control Delay	19.8	6.5	34.6	13.8	23.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	6.5	34.6	13.8	23.1	5.0
LOS	B	A	C	B	C	A
Approach Delay	17.1			16.3	15.1	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 63.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 16.1	Intersection LOS: B
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	879	220	157	1148	841	669
v/c Ratio	0.73	0.24	0.47	0.43	0.55	0.58
Control Delay	19.8	6.5	34.6	13.8	23.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	6.5	34.6	13.8	23.1	5.0
Queue Length 50th (ft)	143	33	30	87	83	60
Queue Length 95th (ft)	217	68	65	135	127	114
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1605	920	349	3078	1905	1321
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.24	0.45	0.37	0.44	0.51

Intersection Summary

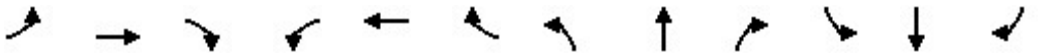
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	853	213	152	1114	816	649
Future Volume (veh/h)	853	213	152	1114	816	649
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	879	220	157	1148	841	669
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1088	684	237	2889	1930	1037
Arrive On Green	0.37	0.37	0.08	0.47	0.32	0.32
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	879	220	157	1148	841	669
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	16.0	5.5	3.1	7.2	6.5	14.7
Cycle Q Clear(g_c), s	16.0	5.5	3.1	7.2	6.5	14.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1088	684	237	2889	1930	1037
V/C Ratio(X)	0.81	0.32	0.66	0.40	0.44	0.65
Avail Cap(c_a), veh/h	1696	997	369	3244	2008	1056
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	10.3	26.4	10.1	16.0	5.1
Incr Delay (d2), s/veh	1.7	0.3	3.2	0.1	0.2	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	5.6	1.1	2.1	2.1	9.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.3	10.6	29.6	10.2	16.2	6.4
LnGrp LOS	B	B	C	B	B	A
Approach Vol, veh/h	1099			1305	1510	
Approach Delay, s/veh	16.7			12.5	11.9	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		32.6		26.6	9.3	23.2
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		9.2		18.0	5.1	16.7
Green Ext Time (p_c), s		8.8		4.1	0.1	2.0

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

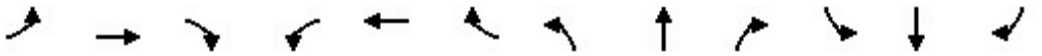
Appendix D

Intersection LOS Analysis Sheets
Opening Year Without Related Projects Without Project Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.962				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66				149			238		9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



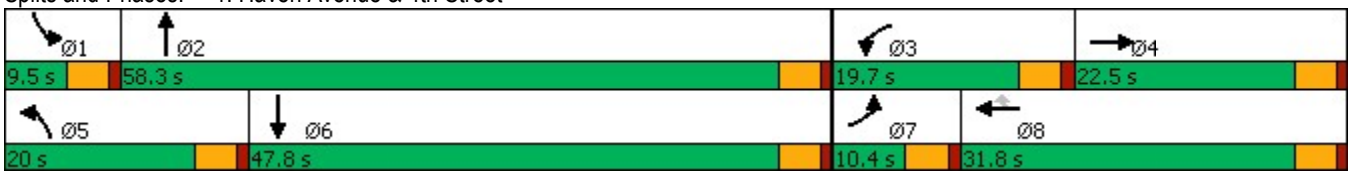
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	93	300	102	244	522	132	209	1539	483	88	1234	55
Future Volume (vph)	93	300	102	244	522	132	209	1539	483	88	1234	55
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	102	330	112	268	574	145	230	1691	531	97	1356	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	102	442	0	268	574	145	230	1691	531	97	1416	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	93	300	244	522	132	209	1539	483	88	1234
Future Volume (vph)	93	300	244	522	132	209	1539	483	88	1234
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	15.6	13.8	23.5	23.5	13.2	53.9	106.3	5.0	45.7
Actuated g/C Ratio	0.06	0.15	0.13	0.22	0.22	0.12	0.51	1.00	0.05	0.43
v/c Ratio	0.64	0.60	0.72	0.78	0.32	0.64	0.69	0.35	0.71	0.54
Control Delay	68.5	39.6	56.1	46.7	7.2	53.3	22.3	0.7	79.1	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.5	39.6	56.1	46.7	7.2	53.3	22.3	0.7	79.1	24.2
LOS	E	D	E	D	A	D	C	A	E	C
Approach Delay		45.0		43.5			20.5			27.7
Approach LOS		D		D			C			C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 106.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 29.0	Intersection LOS: C
Intersection Capacity Utilization 70.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	102	442	268	574	145	230	1691	531	97	1416
v/c Ratio	0.64	0.60	0.72	0.78	0.32	0.64	0.69	0.35	0.71	0.54
Control Delay	68.5	39.6	56.1	46.7	7.2	53.3	22.3	0.7	79.1	24.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.5	39.6	56.1	46.7	7.2	53.3	22.3	0.7	79.1	24.2
Queue Length 50th (ft)	36	89	91	194	0	78	317	0	34	210
Queue Length 95th (ft)	#75	126	139	256	47	120	390	0	#79	263
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	160	840	414	862	496	422	2441	1500	136	2601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.53	0.65	0.67	0.29	0.55	0.69	0.35	0.71	0.54

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

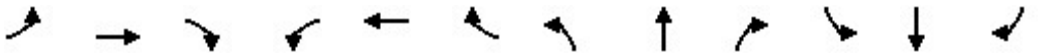
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	300	102	244	522	132	209	1539	483	88	1234	55
Future Volume (veh/h)	93	300	102	244	522	132	209	1539	483	88	1234	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	102	330	112	268	574	145	230	1691	0	97	1356	60
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	534	172	327	704	314	291	2508		140	2814	124
Arrive On Green	0.05	0.15	0.15	0.11	0.21	0.21	0.10	0.52	0.00	0.05	0.47	0.47
Sat Flow, veh/h	2910	3621	1166	2910	3367	1502	2910	4837	1502	2910	6029	266
Grp Volume(v), veh/h	102	292	150	268	574	145	230	1691	0	97	1028	388
Grp Sat Flow(s),veh/h/ln	1455	1612	1562	1455	1683	1502	1455	1612	1502	1455	1524	1724
Q Serve(g_s), s	3.6	8.8	9.4	9.3	16.9	8.8	8.0	26.9	0.0	3.4	16.0	16.1
Cycle Q Clear(g_c), s	3.6	8.8	9.4	9.3	16.9	8.8	8.0	26.9	0.0	3.4	16.0	16.1
Prop In Lane	1.00		0.75	1.00		1.00	1.00		1.00	1.00		0.15
Lane Grp Cap(c), veh/h	148	476	230	327	704	314	291	2508		140	2134	805
V/C Ratio(X)	0.69	0.61	0.65	0.82	0.82	0.46	0.79	0.67		0.69	0.48	0.48
Avail Cap(c_a), veh/h	165	559	271	426	886	395	435	2508		140	2134	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.4	41.5	41.7	45.0	39.1	35.9	45.7	18.5	0.0	48.6	19.0	19.0
Incr Delay (d2), s/veh	9.9	1.5	4.3	9.3	4.8	1.1	5.8	1.5	0.0	13.6	0.8	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	3.6	3.9	3.8	7.4	3.3	3.1	9.9	0.0	1.5	5.7	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.4	43.0	46.0	54.3	43.9	37.0	51.5	20.0	0.0	62.2	19.8	21.1
LnGrp LOS	E	D	D	D	D	D	D	B		E	B	C
Approach Vol, veh/h		544			987			1921	A		1513	
Approach Delay, s/veh		46.7			45.7			23.7			22.9	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	58.3	16.2	19.8	14.9	52.9	9.8	26.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	5.4	28.9	11.3	11.4	10.0	18.1	5.6	18.9
Green Ext Time (p_c), s	0.0	14.6	0.3	1.5	0.4	11.3	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	30.4
HCM 6th LOS	C

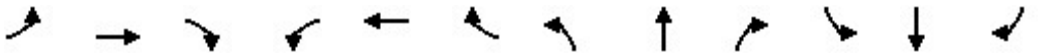
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.994				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	6034	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1583	6034	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				164			164		434	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	38	495	21	1	683	56	3	1	1	0	0	3
Future Volume (vph)	38	495	21	1	683	56	3	1	1	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	42	550	23	1	759	62	3	1	1	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	573	0	1	759	62	3	1	1	0	3	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT	Ø1
Lane Configurations										
Traffic Volume (vph)	38	495	1	683	56	3	1	1	0	
Future Volume (vph)	38	495	1	683	56	3	1	1	0	
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	NA	
Protected Phases	7	4	3	8		5	2		6	1
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	6	
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	22.5	9.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	26.7	15.0
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	38.1%	21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min	None
Act Effct Green (s)	5.5	13.3	5.5	13.3	13.3	6.1	7.3	7.3	6.0	
Actuated g/C Ratio	0.17	0.42	0.17	0.42	0.42	0.19	0.23	0.23	0.19	
v/c Ratio	0.15	0.22	0.00	0.37	0.09	0.01	0.00	0.00	0.00	
Control Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0	
LOS	B	A	B	A	A	B	B	A	A	
Approach Delay		7.7		7.3			12.2			
Approach LOS		A		A			B			

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 31.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 7.5	Intersection LOS: A
Intersection Capacity Utilization 33.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

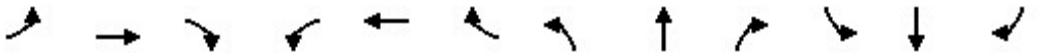
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	42	573	1	759	62	3	1	1	3
v/c Ratio	0.15	0.22	0.00	0.37	0.09	0.01	0.00	0.00	0.00
Control Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	6.9	17.0	7.9	0.2	16.3	12.0	0.0	0.0
Queue Length 50th (ft)	5	10	0	19	0	0	0	0	0
Queue Length 95th (ft)	36	52	4	93	0	7	3	0	0
Internal Link Dist (ft)		2546		362			269		358
Turn Bay Length (ft)	130		130		145	165		165	
Base Capacity (vph)	273	3754	273	2994	994	371	1127	1017	2286
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.15	0.00	0.25	0.06	0.01	0.00	0.00	0.00

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	495	21	1	683	56	3	1	1	0	0	3
Future Volume (veh/h)	38	495	21	1	683	56	3	1	1	0	0	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	42	550	23	1	759	62	3	1	1	0	0	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	76	2111	87	4	1464	455	7	480	406	4	236	211
Arrive On Green	0.05	0.35	0.35	0.00	0.30	0.30	0.00	0.27	0.27	0.00	0.00	0.14
Sat Flow, veh/h	1594	6048	250	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	42	414	159	1	759	62	3	1	1	0	0	3
Grp Sat Flow(s),veh/h/ln	1594	1524	1727	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.9	2.3	2.3	0.0	4.6	1.1	0.1	0.0	0.0	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.9	2.3	2.3	0.0	4.6	1.1	0.1	0.0	0.0	0.0	0.0	0.1
Prop In Lane	1.00		0.15	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	76	1596	603	4	1464	455	7	480	406	4	236	211
V/C Ratio(X)	0.55	0.26	0.26	0.22	0.52	0.14	0.46	0.00	0.00	0.00	0.00	0.01
Avail Cap(c_a), veh/h	224	2309	872	224	2443	758	304	920	780	470	1049	935
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	16.6	8.3	8.3	17.8	10.3	9.0	17.7	9.5	9.5	0.0	0.0	13.2
Incr Delay (d2), s/veh	6.1	0.1	0.2	23.5	0.3	0.1	42.8	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.5	0.7	0.0	1.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	8.4	8.5	41.2	10.6	9.2	60.5	9.5	9.5	0.0	0.0	13.2
LnGrp LOS	C	A	A	D	B	A	E	A	A	A	A	B
Approach Vol, veh/h		615			822			5			3	
Approach Delay, s/veh		9.4			10.5			40.1			13.2	
Approach LOS		A			B			D			B	

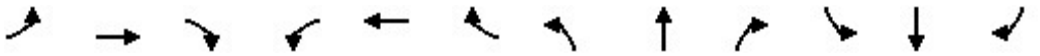
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	14.1	4.5	16.9	4.6	9.5	6.2	15.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	0.0	2.0	2.0	4.3	2.1	2.1	2.9	6.6
Green Ext Time (p_c), s	0.0	0.0	0.0	3.1	0.0	0.0	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	2891	6065	0	1583	4798	0	1583	1765	1500	0	1687	1500
Flt Permitted	0.950			0.950			0.731				0.740	
Satd. Flow (perm)	2891	6065	0	1583	4798	0	1218	1765	1500	0	1306	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			8				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



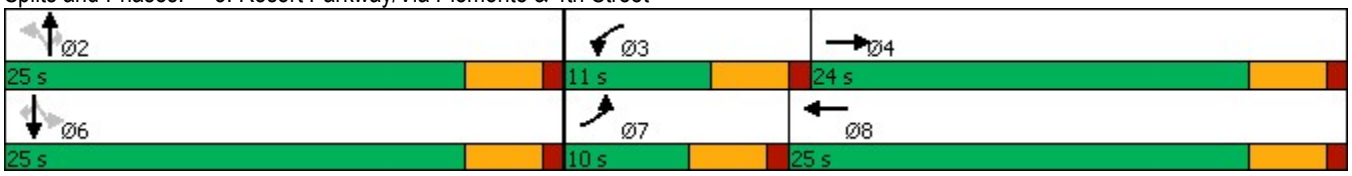
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	15	491	4	16	702	20	8	3	11	34	3	17
Future Volume (vph)	15	491	4	16	702	20	8	3	11	34	3	17
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	16	528	4	17	755	22	9	3	12	37	3	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	532	0	17	777	0	9	3	12	0	40	18

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	15	491	16	702	8	3	11	34	3	17
Future Volume (vph)	15	491	16	702	8	3	11	34	3	17
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.8	12.3	6.2	12.4	6.8	6.8	6.8		6.8	6.8
Actuated g/C Ratio	0.19	0.41	0.21	0.41	0.23	0.23	0.23		0.23	0.23
v/c Ratio	0.03	0.21	0.05	0.39	0.03	0.01	0.03		0.14	0.04
Control Delay	14.3	6.5	14.0	7.2	12.9	12.7	0.1		13.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	14.3	6.5	14.0	7.2	12.9	12.7	0.1		13.5	0.2
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		6.8		7.4		6.5			9.3	
Approach LOS		A		A		A			A	

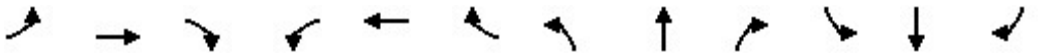
Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 30	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 7.2	Intersection LOS: A
Intersection Capacity Utilization 34.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	16	532	17	777	9	3	12	40	18
v/c Ratio	0.03	0.21	0.05	0.39	0.03	0.01	0.03	0.14	0.04
Control Delay	14.3	6.5	14.0	7.2	12.9	12.7	0.1	13.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	6.5	14.0	7.2	12.9	12.7	0.1	13.5	0.2
Queue Length 50th (ft)	1	10	2	21	1	0	0	4	0
Queue Length 95th (ft)	8	40	17	74	11	6	0	29	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	563	4190	364	3487	884	1282	1119	948	1119
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.13	0.05	0.22	0.01	0.00	0.01	0.04	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	491	4	16	702	20	8	3	11	34	3	17
Future Volume (veh/h)	15	491	4	16	702	20	8	3	11	34	3	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	16	528	4	17	755	22	9	3	12	37	3	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	2156	16	35	1662	48	443	304	258	456	28	258
Arrive On Green	0.02	0.34	0.34	0.02	0.34	0.34	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	2910	6287	48	1594	4831	140	1314	1772	1502	1272	161	1502
Grp Volume(v), veh/h	16	384	148	17	503	274	9	3	12	40	0	18
Grp Sat Flow(s),veh/h/ln	1455	1524	1763	1594	1612	1747	1314	1772	1502	1432	0	1502
Q Serve(g_s), s	0.2	1.8	1.8	0.3	3.5	3.5	0.2	0.0	0.2	0.5	0.0	0.3
Cycle Q Clear(g_c), s	0.2	1.8	1.8	0.3	3.5	3.5	0.8	0.0	0.2	0.7	0.0	0.3
Prop In Lane	1.00		0.03	1.00		0.08	1.00		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	61	1567	605	35	1110	601	443	304	258	484	0	258
V/C Ratio(X)	0.26	0.24	0.25	0.48	0.45	0.46	0.02	0.01	0.05	0.08	0.00	0.07
Avail Cap(c_a), veh/h	549	3060	1180	356	2269	1229	1142	1247	1057	1240	0	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	6.9	6.9	14.1	7.4	7.4	10.6	10.0	10.1	10.3	0.0	10.1
Incr Delay (d2), s/veh	2.3	0.1	0.2	9.9	0.3	0.5	0.0	0.0	0.1	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.4	0.2	0.8	0.9	0.0	0.0	0.1	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	6.9	7.1	24.0	7.7	8.0	10.6	10.0	10.1	10.3	0.0	10.2
LnGrp LOS	B	A	A	C	A	A	B	B	B	B	A	B
Approach Vol, veh/h		548			794			24			58	
Approach Delay, s/veh		7.3			8.2			10.3			10.3	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.1	14.5		9.5	5.1	14.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		2.8	2.3	3.8		2.7	2.2	5.5				
Green Ext Time (p_c), s		0.0	0.0	3.1		0.2	0.0	4.5				

Intersection Summary												
HCM 6th Ctrl Delay			7.9									
HCM 6th LOS			A									

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.994					0.865
Flt Protected						
Satd. Flow (prot)	4789	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4789	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	529	21	0	695	0	3
Future Volume (vph)	529	21	0	695	0	3
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	575	23	0	755	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	598	0	0	755	0	3

Intersection Summary

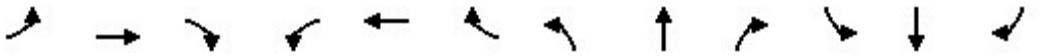
Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	529	21	0	695	0	3
Future Vol, veh/h	529	21	0	695	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	575	23	0	755	0	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	299
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	595
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	595
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

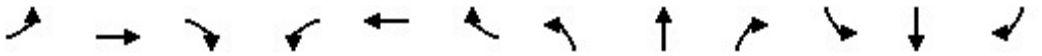
Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	595	-	-	-
HCM Lane V/C Ratio	0.005	-	-	-
HCM Control Delay (s)	11.1	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5973	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5973	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			287			73		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



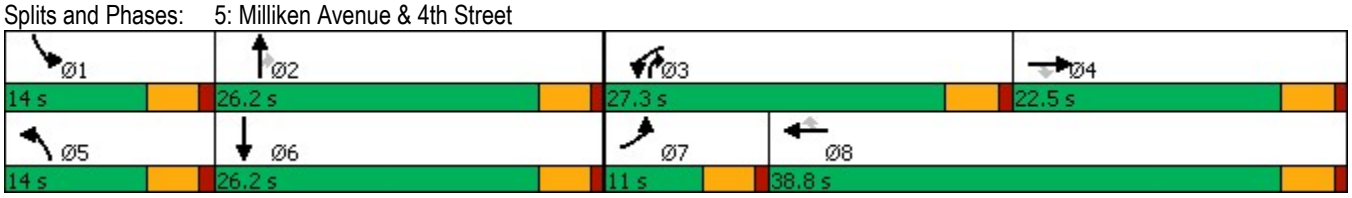
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	147	380	102	461	1178	392	199	933	146	198	817	95
Future Volume (vph)	147	380	102	461	1178	392	199	933	146	198	817	95
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	158	409	110	496	1267	422	214	1003	157	213	878	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	409	110	496	1267	422	214	1003	157	213	980	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	147	380	102	461	1178	392	199	933	146	198	817
Future Volume (vph)	147	380	102	461	1178	392	199	933	146	198	817
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	19.6	19.6	19.4	32.5	32.5	9.2	20.5	44.5	9.2	20.5
Actuated g/C Ratio	0.07	0.23	0.23	0.22	0.37	0.37	0.11	0.24	0.51	0.11	0.24
v/c Ratio	0.73	0.38	0.23	0.77	0.70	0.57	0.70	0.70	0.20	0.69	0.68
Control Delay	61.3	30.7	1.8	40.4	25.7	10.3	51.6	33.6	6.6	51.4	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	30.7	1.8	40.4	25.7	10.3	51.6	33.6	6.6	51.4	32.3
LOS	E	C	A	D	C	B	D	C	A	D	C
Approach Delay		33.1			26.1			33.3			35.7
Approach LOS		C			C			C			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86.9	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 30.9	Intersection LOS: C
Intersection Capacity Utilization 65.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	158	409	110	496	1267	422	214	1003	157	213	980
v/c Ratio	0.73	0.38	0.23	0.77	0.70	0.57	0.70	0.70	0.20	0.69	0.68
Control Delay	61.3	30.7	1.8	40.4	25.7	10.3	51.6	33.6	6.6	51.4	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	30.7	1.8	40.4	25.7	10.3	51.6	33.6	6.6	51.4	32.3
Queue Length 50th (ft)	46	72	0	136	217	51	61	151	23	61	142
Queue Length 95th (ft)	#95	105	7	185	268	140	#108	188	51	#108	179
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	217	1087	479	762	1911	768	317	1523	860	317	1521
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.38	0.23	0.65	0.66	0.55	0.68	0.66	0.18	0.67	0.64

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

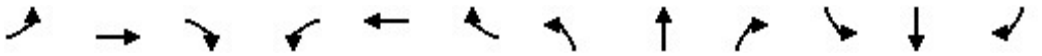
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	380	102	461	1178	392	199	933	146	198	817	95
Future Volume (veh/h)	147	380	102	461	1178	392	199	933	146	198	817	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	158	409	110	496	1267	422	214	1003	157	213	878	102
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	221	1183	367	592	1801	559	283	1401	651	282	1282	147
Arrive On Green	0.08	0.24	0.24	0.20	0.37	0.37	0.10	0.23	0.23	0.10	0.23	0.23
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5588	641
Grp Volume(v), veh/h	158	409	110	496	1267	422	214	1003	157	213	716	264
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1657
Q Serve(g_s), s	4.2	5.6	4.8	13.1	17.8	19.6	5.7	12.1	5.3	5.7	11.5	11.7
Cycle Q Clear(g_c), s	4.2	5.6	4.8	13.1	17.8	19.6	5.7	12.1	5.3	5.7	11.5	11.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	221	1183	367	592	1801	559	283	1401	651	282	1049	380
V/C Ratio(X)	0.72	0.35	0.30	0.84	0.70	0.75	0.76	0.72	0.24	0.75	0.68	0.69
Avail Cap(c_a), veh/h	236	1183	367	829	2074	644	346	1654	713	346	1240	449
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.1	24.9	24.6	30.6	21.4	21.9	35.2	28.4	14.3	35.2	28.2	28.2
Incr Delay (d2), s/veh	9.2	0.2	0.5	5.4	0.9	4.4	7.4	1.2	0.2	7.3	1.2	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.1	1.7	4.9	6.5	7.2	2.3	4.4	1.7	2.3	4.2	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.3	25.1	25.1	36.0	22.3	26.3	42.6	29.6	14.5	42.5	29.4	31.9
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	C	C
Approach Vol, veh/h		677			2185			1374			1193	
Approach Delay, s/veh		29.8			26.2			29.9			32.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	22.9	20.8	24.1	12.3	22.9	10.6	34.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	7.7	14.1	15.1	7.6	7.7	13.7	6.2	21.6
Green Ext Time (p_c), s	0.1	4.2	1.2	2.3	0.1	3.9	0.0	8.2

Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.901	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2894	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2894	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		215	215
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



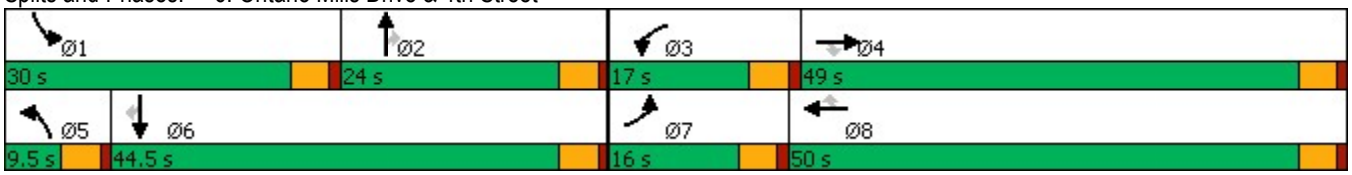
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	286	333	59	110	1293	131	72	71	78	147	223	866
Future Volume (vph)	286	333	59	110	1293	131	72	71	78	147	223	866
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	329	383	68	126	1486	151	83	82	90	169	256	995
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	329	383	68	126	1486	151	83	82	90	169	754	497

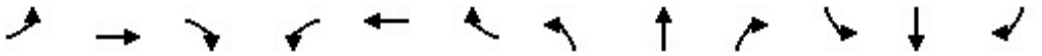
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	286	333	59	110	1293	131	72	71	78	147	223	866
Future Volume (vph)	286	333	59	110	1293	131	72	71	78	147	223	866
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.7	44.5	44.5	10.1	42.9	42.9	5.1	21.9	21.9	17.3	34.2	34.2
Actuated g/C Ratio	0.10	0.40	0.40	0.09	0.38	0.38	0.05	0.20	0.20	0.15	0.31	0.31
v/c Ratio	1.10	0.20	0.10	0.48	0.81	0.23	1.17	0.13	0.22	0.69	0.85dr	0.88
Control Delay	127.9	23.7	0.3	57.0	35.5	6.3	209.8	40.1	3.3	60.8	28.9	38.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.9	23.7	0.3	57.0	35.5	6.3	209.8	40.1	3.3	60.8	28.9	38.7
LOS	F	C	A	E	D	A	F	D	A	E	C	D
Approach Delay		65.6			34.6			82.4			36.2	
Approach LOS		E			C			F			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 43.7	Intersection LOS: D
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 6: Ontario Mills Drive & 4th Street





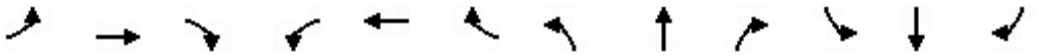
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	329	383	68	126	1486	151	83	82	90	169	754	497
v/c Ratio	1.10	0.20	0.10	0.48	0.81	0.23	1.17	0.13	0.22	0.69	0.85dr	0.88
Control Delay	127.9	23.7	0.3	57.0	35.5	6.3	209.8	40.1	3.3	60.8	28.9	38.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	127.9	23.7	0.3	57.0	35.5	6.3	209.8	40.1	3.3	60.8	28.9	38.7
Queue Length 50th (ft)	~158	71	0	48	374	7	~81	26	0	126	199	235
Queue Length 95th (ft)	#240	95	0	76	415	47	#179	51	11	183	257	#395
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	300	1986	698	327	1982	697	71	683	414	365	1184	630
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.19	0.10	0.39	0.75	0.22	1.17	0.12	0.22	0.46	0.64	0.79

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.



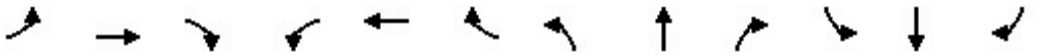
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	286	333	59	110	1293	131	72	71	78	147	223	866
Future Volume (veh/h)	286	333	59	110	1293	131	72	71	78	147	223	866
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	329	383	68	126	1486	151	83	82	90	169	256	995
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	1939	602	174	1753	544	68	881	393	197	607	1028
Arrive On Green	0.10	0.40	0.40	0.06	0.36	0.36	0.04	0.26	0.26	0.12	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	329	383	68	126	1486	151	83	82	90	169	256	995
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	11.5	6.0	3.3	5.0	33.0	8.3	5.0	2.2	5.5	12.1	13.0	38.1
Cycle Q Clear(g_c), s	11.5	6.0	3.3	5.0	33.0	8.3	5.0	2.2	5.5	12.1	13.0	38.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	286	1939	602	174	1753	544	68	881	393	197	607	1028
V/C Ratio(X)	1.15	0.20	0.11	0.72	0.85	0.28	1.22	0.09	0.23	0.86	0.42	0.97
Avail Cap(c_a), veh/h	286	1939	602	311	1884	585	68	881	393	348	607	1028
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.7	22.8	22.0	54.0	34.3	26.4	55.9	32.6	33.9	50.2	29.5	37.8
Incr Delay (d2), s/veh	99.5	0.0	0.1	5.5	3.6	0.3	178.6	0.0	0.3	10.4	0.5	20.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	2.3	1.2	2.0	13.3	3.0	5.4	0.9	2.0	5.4	5.6	16.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	152.2	22.8	22.0	59.5	37.9	26.7	234.5	32.7	34.2	60.6	30.0	58.4
LnGrp LOS	F	C	C	E	D	C	F	C	C	E	C	E
Approach Vol, veh/h		780			1763			255			1420	
Approach Delay, s/veh		77.3			38.5			98.9			53.5	
Approach LOS		E			D			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.9	35.1	11.5	51.3	9.5	44.5	16.0	46.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	14.1	7.5	7.0	8.0	7.0	40.1	13.5	35.0
Green Ext Time (p_c), s	0.3	0.5	0.2	3.1	0.0	0.0	0.0	7.3

Intersection Summary	
HCM 6th Ctrl Delay	54.4
HCM 6th LOS	D

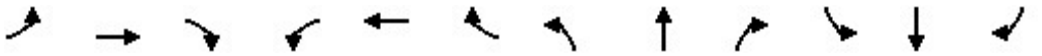
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.983			0.892				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (prot)	2891	4818	1500	1583	4736	0	1583	2991	0	1504	1619	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (perm)	2891	4818	1500	1583	4736	0	1583	2991	0	1504	1619	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		24			60				503
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



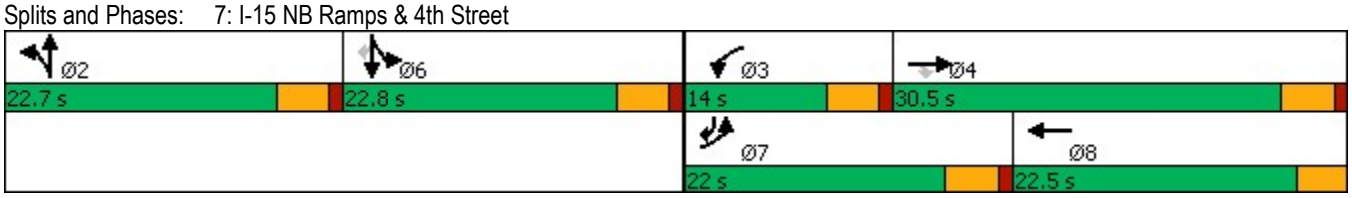
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	182	327	77	45	468	62	110	22	57	370	66	961
Future Volume (vph)	182	327	77	45	468	62	110	22	57	370	66	961
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	192	344	81	47	493	65	116	23	60	389	69	1012
Shared Lane Traffic (%)										42%		
Lane Group Flow (vph)	192	344	81	47	558	0	116	83	0	226	232	1012

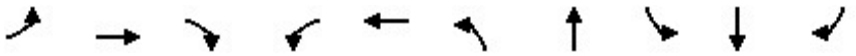
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	182	327	77	45	468	110	22	370	66	961
Future Volume (vph)	182	327	77	45	468	110	22	370	66	961
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	22.0	30.5	30.5	14.0	22.5	22.7	22.7	22.8	22.8	22.0
Total Split (%)	24.4%	33.9%	33.9%	15.6%	25.0%	25.2%	25.2%	25.3%	25.3%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	12.4	23.4	23.4	7.6	14.4	10.8	10.8	15.2	15.2	32.3
Actuated g/C Ratio	0.18	0.33	0.33	0.11	0.20	0.15	0.15	0.22	0.22	0.46
v/c Ratio	0.38	0.21	0.14	0.28	0.57	0.48	0.16	0.70	0.66	0.68
Control Delay	30.0	20.2	2.1	37.6	27.8	37.0	13.4	40.8	38.1	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	20.2	2.1	37.6	27.8	37.0	13.4	40.8	38.1	10.2
LOS	C	C	A	D	C	D	B	D	D	B
Approach Delay		20.9			28.5		27.2		19.3	
Approach LOS		C			C		C		B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 22.1	Intersection LOS: C
Intersection Capacity Utilization 64.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street

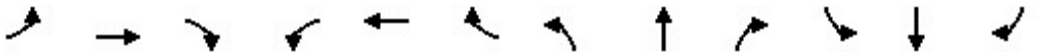




Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	192	344	81	47	558	116	83	226	232	1012
v/c Ratio	0.38	0.21	0.14	0.28	0.57	0.48	0.16	0.70	0.66	0.68
Control Delay	30.0	20.2	2.1	37.6	27.8	37.0	13.4	40.8	38.1	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.0	20.2	2.1	37.6	27.8	37.0	13.4	40.8	38.1	10.2
Queue Length 50th (ft)	38	44	0	19	77	47	4	93	95	83
Queue Length 95th (ft)	78	76	12	58	132	108	25	#233	#228	194
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	747	1859	656	222	1346	425	847	406	437	1658
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.19	0.12	0.21	0.41	0.27	0.10	0.56	0.53	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	182	327	77	45	468	62	110	22	57	370	66	961
Future Volume (veh/h)	182	327	77	45	468	62	110	22	57	370	66	961
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	192	344	81	47	493	65	116	23	60	438	0	1012
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	292	1155	358	72	796	103	179	189	169	970	0	1215
Arrive On Green	0.10	0.24	0.24	0.05	0.18	0.18	0.11	0.11	0.11	0.30	0.00	0.30
Sat Flow, veh/h	2910	4837	1502	1594	4334	562	1594	1683	1502	3188	0	3003
Grp Volume(v), veh/h	192	344	81	47	365	193	116	23	60	438	0	1012
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1671	1594	1683	1502	1594	0	1502
Q Serve(g_s), s	3.8	3.5	2.6	1.7	6.3	6.4	4.2	0.7	2.2	6.7	0.0	18.2
Cycle Q Clear(g_c), s	3.8	3.5	2.6	1.7	6.3	6.4	4.2	0.7	2.2	6.7	0.0	18.2
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	292	1155	358	72	592	307	179	189	169	970	0	1215
V/C Ratio(X)	0.66	0.30	0.23	0.65	0.62	0.63	0.65	0.12	0.36	0.45	0.00	0.83
Avail Cap(c_a), veh/h	847	2091	649	252	1019	528	482	509	454	970	0	1215
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.1	18.8	18.4	28.2	22.6	22.7	25.5	24.0	24.7	16.9	0.0	16.1
Incr Delay (d2), s/veh	2.5	0.1	0.3	9.5	1.0	2.1	3.9	0.3	1.3	0.3	0.0	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	1.2	0.9	0.8	2.3	2.5	1.7	0.3	0.8	2.3	0.0	6.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	18.9	18.7	37.8	23.6	24.8	29.4	24.3	25.9	17.2	0.0	21.2
LnGrp LOS	C	B	B	D	C	C	C	C	C	B	A	C
Approach Vol, veh/h		617			605			199			1450	
Approach Delay, s/veh		21.9			25.1			27.8			20.0	
Approach LOS		C			C			C			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.3	7.2	18.9		22.8	10.5	15.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	17.5	* 19				
Max Q Clear Time (g_c+I1), s		6.2	3.7	5.5		20.2	5.8	8.4				
Green Ext Time (p_c), s		0.6	0.0	2.5		0.0	0.5	2.6				

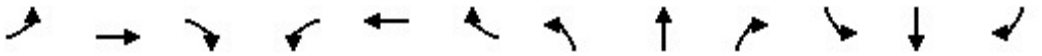
Intersection Summary	
HCM 6th Ctrl Delay	22.0
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

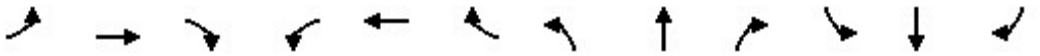
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.904				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



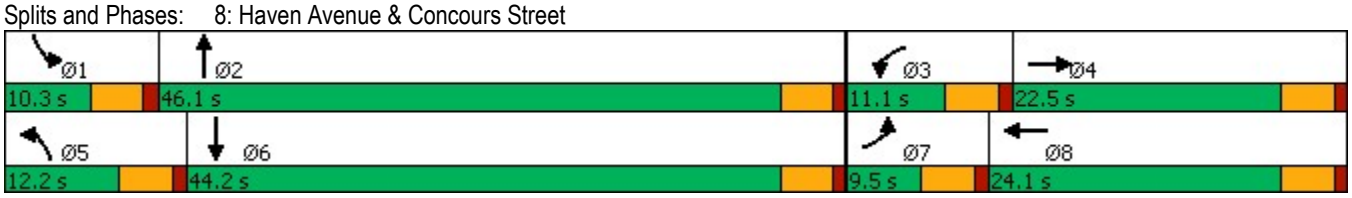
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	21	45	81	163	59	18	71	1807	136	97	1375	44
Future Volume (vph)	21	45	81	163	59	18	71	1807	136	97	1375	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	23	50	90	181	66	20	79	2008	151	108	1528	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	140	0	181	66	20	79	2008	151	108	1528	49

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	21	45	163	59	18	71	1807	136	97	1375	44
Future Volume (vph)	21	45	163	59	18	71	1807	136	97	1375	44
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	7.0	6.7	14.7	75.3	7.0	40.1	75.3	5.9	38.9	75.3
Actuated g/C Ratio	0.07	0.09	0.09	0.20	1.00	0.09	0.53	1.00	0.08	0.52	1.00
v/c Ratio	0.12	0.39	0.52	0.10	0.01	0.29	0.62	0.10	0.48	0.49	0.03
Control Delay	37.1	17.9	40.3	29.7	0.0	36.8	13.8	0.1	43.2	13.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	17.9	40.3	29.7	0.0	36.8	13.8	0.1	43.2	13.0	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.6		34.7			13.7			14.6	
Approach LOS		C		C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 75.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 15.6	Intersection LOS: B
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	23	140	181	66	20	79	2008	151	108	1528	49
v/c Ratio	0.12	0.39	0.52	0.10	0.01	0.29	0.62	0.10	0.48	0.49	0.03
Control Delay	37.1	17.9	40.3	29.7	0.0	36.8	13.8	0.1	43.2	13.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	17.9	40.3	29.7	0.0	36.8	13.8	0.1	43.2	13.0	0.0
Queue Length 50th (ft)	5	12	30	13	0	19	188	0	26	135	0
Queue Length 95th (ft)	17	38	53	34	0	40	243	0	53	178	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	194	803	350	885	1500	299	3403	1500	226	3266	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.17	0.52	0.07	0.01	0.26	0.59	0.10	0.48	0.47	0.03

Intersection Summary

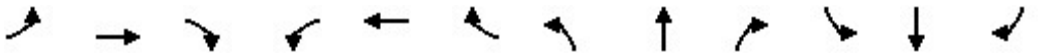
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	45	81	163	59	18	71	1807	136	97	1375	44
Future Volume (veh/h)	21	45	81	163	59	18	71	1807	136	97	1375	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	23	50	90	181	66	0	79	2008	0	108	1528	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	157	140	287	471		165	3106		184	3148	
Arrive On Green	0.03	0.09	0.09	0.07	0.14	0.00	0.06	0.51	0.00	0.06	0.52	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	23	50	90	181	66	0	79	2008	0	108	1528	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.5	1.9	4.0	3.1	1.2	0.0	1.8	16.6	0.0	2.5	11.1	0.0
Cycle Q Clear(g_c), s	0.5	1.9	4.0	3.1	1.2	0.0	1.8	16.6	0.0	2.5	11.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	75	157	140	287	471		165	3106		184	3148	
V/C Ratio(X)	0.31	0.32	0.64	0.63	0.14		0.48	0.65		0.59	0.49	
Avail Cap(c_a), veh/h	211	440	392	380	958		325	3681		245	3513	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.9	29.2	30.1	31.1	26.0	0.0	31.5	12.4	0.0	31.4	10.7	0.0
Incr Delay (d2), s/veh	2.3	1.2	4.8	2.3	0.1	0.0	2.2	0.3	0.0	2.9	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.8	1.6	1.0	0.5	0.0	0.7	4.9	0.0	0.9	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.2	30.3	35.0	33.3	26.1	0.0	33.7	12.7	0.0	34.3	10.9	0.0
LnGrp LOS	D	C	C	C	C		C	B		C	B	
Approach Vol, veh/h		163			247	A		2087	A		1636	A
Approach Delay, s/veh		33.6			31.4			13.5			12.4	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	39.6	9.5	10.9	8.4	40.1	6.3	14.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	4.5	18.6	5.1	6.0	3.8	13.1	2.5	3.2
Green Ext Time (p_c), s	0.0	16.5	0.1	0.5	0.1	13.5	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

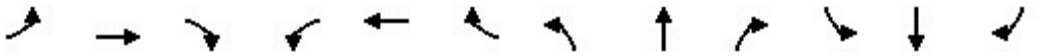
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.850			0.973			0.994			0.989	
Flt Protected					0.971		0.950			0.950		
Satd. Flow (prot)	1676	1425	0	0	1667	0	1676	4789	0	1676	4765	0
Flt Permitted							0.950			0.950		
Satd. Flow (perm)	1676	1425	0	0	1717	0	1676	4789	0	1676	4765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		574			1			8			16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



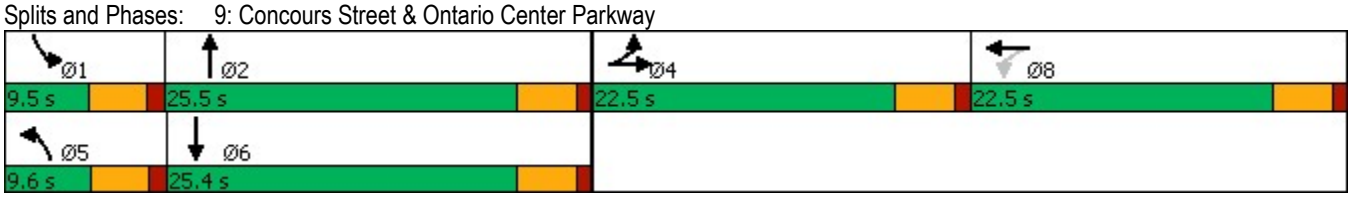
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	0	3	3	1	1	38	495	21	1	683	56
Future Volume (vph)	0	0	3	3	1	1	38	495	21	1	683	56
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	0	3	3	1	1	42	550	23	1	759	62
Shared Lane Traffic (%)	0%											
Lane Group Flow (vph)	0	3	0	0	5	0	42	573	0	1	821	0

Intersection Summary

Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	0	3	1	38	495	1	683
Future Volume (vph)	0	3	1	38	495	1	683
Turn Type	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4		8	5	2	1	6
Permitted Phases		8					
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.0		6.1	5.5	32.9	5.4	30.4
Actuated g/C Ratio	0.16		0.16	0.15	0.88	0.14	0.81
v/c Ratio	0.00		0.02	0.17	0.14	0.00	0.21
Control Delay	0.0		18.8	21.2	3.7	21.0	4.5
Queue Delay	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	0.0		18.8	21.2	3.7	21.0	4.5
LOS	A		B	C	A	C	A
Approach Delay			18.8		4.9		4.5
Approach LOS			B		A		A

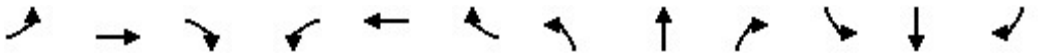
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 37.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.21	
Intersection Signal Delay: 4.7	Intersection LOS: A
Intersection Capacity Utilization 34.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	3	5	42	573	1	821
v/c Ratio	0.00	0.02	0.17	0.14	0.00	0.21
Control Delay	0.0	18.8	21.2	3.7	21.0	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.0	18.8	21.2	3.7	21.0	4.5
Queue Length 50th (ft)	0	1	6	0	0	0
Queue Length 95th (ft)	0	10	39	68	4	99
Internal Link Dist (ft)	319	68		111		176
Turn Bay Length (ft)			115		120	
Base Capacity (vph)	1018	897	248	4214	243	3877
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.01	0.17	0.14	0.00	0.21

Intersection Summary



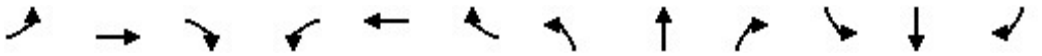
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	3	3	1	1	38	495	21	1	683	56
Future Volume (veh/h)	0	0	3	3	1	1	38	495	21	1	683	56
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	0	0	3	3	1	1	42	550	23	1	759	62
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	7	0	6	7	2	2	83	1902	79	6	1604	130
Arrive On Green	0.00	0.00	0.00	0.01	0.01	0.01	0.05	0.40	0.40	0.00	0.35	0.35
Sat Flow, veh/h	1688	0	1502	997	332	332	1688	4763	198	1688	4560	371
Grp Volume(v), veh/h	0	0	3	5	0	0	42	371	202	1	536	285
Grp Sat Flow(s),veh/h/ln	1688	0	1502	1662	0	0	1688	1612	1736	1688	1612	1705
Q Serve(g_s), s	0.0	0.0	0.1	0.1	0.0	0.0	0.7	2.4	2.4	0.0	4.0	4.0
Cycle Q Clear(g_c), s	0.0	0.0	0.1	0.1	0.0	0.0	0.7	2.4	2.4	0.0	4.0	4.0
Prop In Lane	1.00		1.00	0.60		0.20	1.00		0.11	1.00		0.22
Lane Grp Cap(c), veh/h	7	0	6	11	0	0	83	1288	693	6	1134	600
V/C Ratio(X)	0.00	0.00	0.49	0.44	0.00	0.00	0.51	0.29	0.29	0.18	0.47	0.48
Avail Cap(c_a), veh/h	993	0	883	978	0	0	281	2214	1192	276	2203	1165
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	15.2	15.1	0.0	0.0	14.2	6.2	6.2	15.2	7.7	7.7
Incr Delay (d2), s/veh	0.0	0.0	49.0	24.8	0.0	0.0	4.7	0.1	0.2	15.0	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.5	0.5	0.0	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.0	64.2	40.0	0.0	0.0	18.9	6.4	6.5	30.2	8.0	8.3
LnGrp LOS	A	A	E	D	A	A	B	A	A	C	A	A
Approach Vol, veh/h		3			5			615			822	
Approach Delay, s/veh		64.2			40.0			7.3			8.1	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	16.7		4.6	6.0	15.3		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	4.4		2.1	2.7	6.0		2.1				
Green Ext Time (p_c), s	0.0	3.4		0.0	0.0	4.8		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		8.0
HCM 6th LOS		A

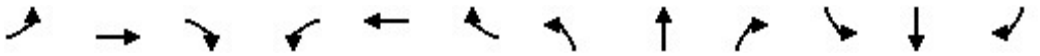
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			273
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



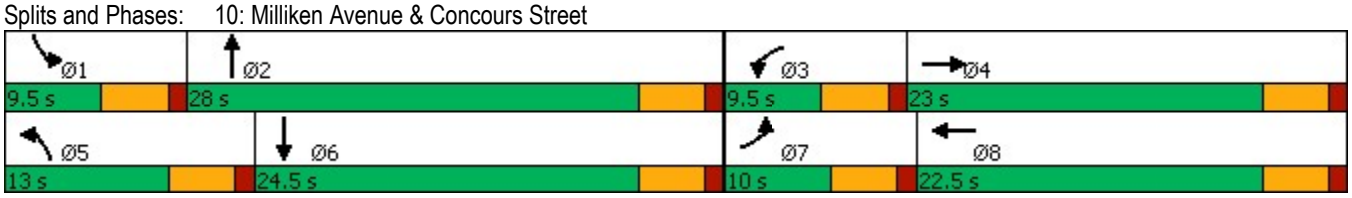
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	70	24	51	49	78	40	155	938	59	53	899	235
Future Volume (vph)	70	24	51	49	78	40	155	938	59	53	899	235
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	81	28	59	57	91	47	180	1091	69	62	1045	273
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	28	59	57	91	47	180	1091	69	62	1045	273

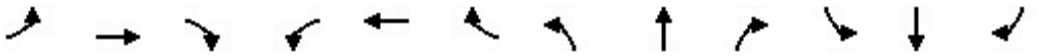
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	24	51	49	78	40	155	938	59	53	899	235
Future Volume (vph)	70	24	51	49	78	40	155	938	59	53	899	235
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.9	9.1	50.4	5.4	7.2	50.4	8.3	28.5	50.4	5.4	23.9	50.4
Actuated g/C Ratio	0.12	0.18	1.00	0.11	0.14	1.00	0.16	0.57	1.00	0.11	0.47	1.00
v/c Ratio	0.24	0.05	0.04	0.18	0.19	0.03	0.38	0.32	0.05	0.20	0.36	0.18
Control Delay	26.6	21.1	0.1	26.7	23.7	0.1	24.9	10.5	0.1	26.8	13.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	21.1	0.1	26.7	23.7	0.1	24.9	10.5	0.1	26.8	13.7	0.3
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		16.4			18.9			11.9			11.6	
Approach LOS		B			B			B			B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 50.4	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 12.5	Intersection LOS: B
Intersection Capacity Utilization 39.3%	ICU Level of Service A
Analysis Period (min) 15	

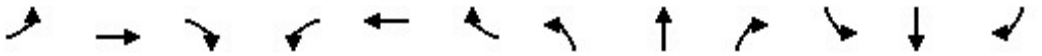
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	81	28	59	57	91	47	180	1091	69	62	1045	273
v/c Ratio	0.24	0.05	0.04	0.18	0.19	0.03	0.38	0.32	0.05	0.20	0.36	0.18
Control Delay	26.6	21.1	0.1	26.7	23.7	0.1	24.9	10.5	0.1	26.8	13.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	21.1	0.1	26.7	23.7	0.1	24.9	10.5	0.1	26.8	13.7	0.3
Queue Length 50th (ft)	13	3	0	9	15	0	29	79	0	10	84	0
Queue Length 95th (ft)	31	14	0	24	32	0	55	103	0	25	109	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	340	1326	1500	309	1290	1500	525	3451	1500	309	2987	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.02	0.04	0.18	0.07	0.03	0.34	0.32	0.05	0.20	0.35	0.18

Intersection Summary



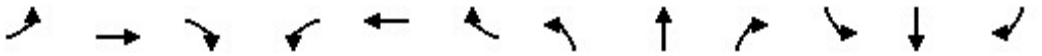
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	24	51	49	78	40	155	938	59	53	899	235
Future Volume (veh/h)	70	24	51	49	78	40	155	938	59	53	899	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	81	28	0	57	91	0	180	1091	0	62	1045	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	208	388		166	339		295	2173		176	1923	
Arrive On Green	0.07	0.12	0.00	0.06	0.10	0.00	0.10	0.36	0.00	0.06	0.32	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	81	28	0	57	91	0	180	1091	0	62	1045	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.2	0.3	0.0	0.8	1.1	0.0	2.6	6.1	0.0	0.9	6.2	0.0
Cycle Q Clear(g_c), s	1.2	0.3	0.0	0.8	1.1	0.0	2.6	6.1	0.0	0.9	6.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	208	388		166	339		295	2173		176	1923	
V/C Ratio(X)	0.39	0.07		0.34	0.27		0.61	0.50		0.35	0.54	
Avail Cap(c_a), veh/h	365	1422		332	1383		565	3270		332	2783	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.4	17.3	0.0	19.9	18.2	0.0	18.9	11.1	0.0	19.8	12.4	0.0
Incr Delay (d2), s/veh	1.2	0.1	0.0	1.2	0.4	0.0	2.0	0.2	0.0	1.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.1	0.0	0.3	0.4	0.0	0.9	1.7	0.0	0.3	1.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	17.4	0.0	21.1	18.6	0.0	20.9	11.2	0.0	21.0	12.6	0.0
LnGrp LOS	C	B		C	B		C	B		C	B	
Approach Vol, veh/h		109	A		148	A		1271	A		1107	A
Approach Delay, s/veh		19.8			19.6			12.6			13.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	20.1	7.0	9.5	8.9	18.3	7.6	8.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	2.9	8.1	2.8	2.3	4.6	8.2	3.2	3.1
Green Ext Time (p_c), s	0.0	6.9	0.0	0.1	0.2	5.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

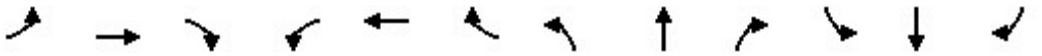
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			437			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



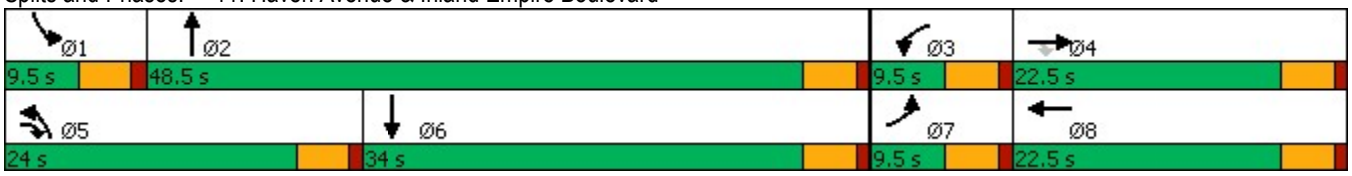
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	53	98	239	118	103	21	460	2080	647	52	1354	75
Future Volume (vph)	53	98	239	118	103	21	460	2080	647	52	1354	75
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	57	105	257	127	111	23	495	2237	696	56	1456	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	105	257	127	111	23	495	2237	696	56	1456	81

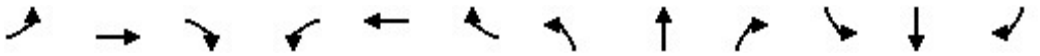
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	98	239	118	103	21	460	2080	647	52	1354	75
Future Volume (vph)	53	98	239	118	103	21	460	2080	647	52	1354	75
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.4	8.2	27.1	5.4	10.0	71.8	17.7	47.3	71.8	5.4	28.2	71.8
Actuated g/C Ratio	0.08	0.11	0.38	0.08	0.14	1.00	0.25	0.66	1.00	0.08	0.39	1.00
v/c Ratio	0.26	0.28	0.42	0.43	0.24	0.02	0.70	0.56	0.46	0.26	0.61	0.05
Control Delay	39.5	35.0	14.3	41.5	33.3	0.0	32.8	11.2	1.0	39.5	20.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	35.0	14.3	41.5	33.3	0.0	32.8	11.2	1.0	39.5	20.6	0.1
LOS	D	C	B	D	C	A	C	B	A	D	C	A
Approach Delay		22.9			34.4			12.2			20.2	
Approach LOS		C			C			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 57.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	57	105	257	127	111	23	495	2237	696	56	1456	81
v/c Ratio	0.26	0.28	0.42	0.43	0.24	0.02	0.70	0.56	0.46	0.26	0.61	0.05
Control Delay	39.5	35.0	14.3	41.5	33.3	0.0	32.8	11.2	1.0	39.5	20.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	35.0	14.3	41.5	33.3	0.0	32.8	11.2	1.0	39.5	20.6	0.1
Queue Length 50th (ft)	14	26	61	22	27	0	116	214	0	13	172	0
Queue Length 95th (ft)	32	50	120	41	52	0	174	271	0	32	219	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	216	903	675	294	903	1500	843	3996	1500	216	2679	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.12	0.38	0.43	0.12	0.02	0.59	0.56	0.46	0.26	0.54	0.05

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	98	239	118	103	21	460	2080	647	52	1354	75
Future Volume (veh/h)	53	98	239	118	103	21	460	2080	647	52	1354	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	57	105	257	127	111	0	495	2237	0	56	1456	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	557	548	233	604		580	3084		130	2141	
Arrive On Green	0.04	0.17	0.17	0.06	0.18	0.00	0.20	0.51	0.00	0.04	0.35	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	57	105	257	127	111	0	495	2237	0	56	1456	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.5	2.1	10.5	2.5	2.2	0.0	13.1	22.9	0.0	1.5	16.3	0.0
Cycle Q Clear(g_c), s	1.5	2.1	10.5	2.5	2.2	0.0	13.1	22.9	0.0	1.5	16.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	131	557	548	233	604		580	3084		130	2141	
V/C Ratio(X)	0.44	0.19	0.47	0.54	0.18		0.85	0.73		0.43	0.68	
Avail Cap(c_a), veh/h	182	758	637	248	758		710	3354		182	2249	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.2	28.7	19.5	36.6	27.8	0.0	30.9	15.4	0.0	37.2	22.1	0.0
Incr Delay (d2), s/veh	2.3	0.2	0.6	2.1	0.1	0.0	8.4	0.7	0.0	2.3	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.9	3.6	0.8	0.9	0.0	5.1	7.3	0.0	0.6	5.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.5	28.9	20.1	38.7	28.0	0.0	39.3	16.1	0.0	39.5	22.9	0.0
LnGrp LOS	D	C	C	D	C		D	B		D	C	
Approach Vol, veh/h		419			238	A		2732	A		1512	A
Approach Delay, s/veh		24.9			33.7			20.3			23.5	
Approach LOS		C			C			C			C	

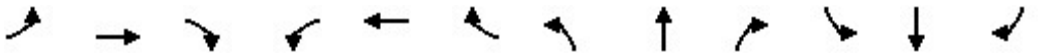
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	45.0	9.2	17.7	20.4	32.6	8.1	18.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.5	24.9	4.5	12.5	15.1	18.3	3.5	4.2
Green Ext Time (p_c), s	0.0	15.6	0.0	0.8	0.8	7.3	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes

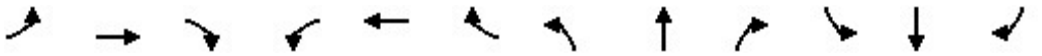
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



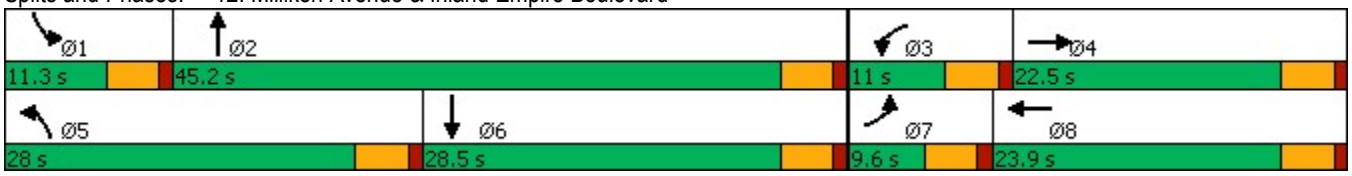
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	63	33	52	99	78	20	406	1050	110	32	824	130
Future Volume (vph)	63	33	52	99	78	20	406	1050	110	32	824	130
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	73	38	60	115	91	23	472	1221	128	37	958	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	38	60	115	91	23	472	1221	128	37	958	151

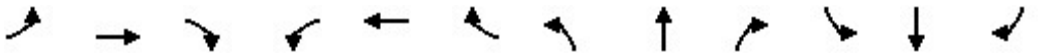
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	33	52	99	78	20	406	1050	110	32	824	130
Future Volume (vph)	63	33	52	99	78	20	406	1050	110	32	824	130
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	7.1	61.1	9.1	8.0	61.1	16.2	38.6	61.1	6.9	19.0	61.1
Actuated g/C Ratio	0.09	0.12	1.00	0.15	0.13	1.00	0.27	0.63	1.00	0.11	0.31	1.00
v/c Ratio	0.27	0.10	0.04	0.27	0.21	0.02	0.62	0.32	0.09	0.11	0.51	0.10
Control Delay	34.9	31.0	0.1	32.0	30.5	0.0	26.0	8.9	0.1	31.8	20.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	31.0	0.1	32.0	30.5	0.0	26.0	8.9	0.1	31.8	20.2	0.1
LOS	C	C	A	C	C	A	C	A	A	C	C	A
Approach Delay		21.8			28.2			12.7			17.9	
Approach LOS		C			C			B			B	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 61.1		
Natural Cycle: 70		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.62		
Intersection Signal Delay: 16.0	Intersection LOS: B	
Intersection Capacity Utilization 47.6%	ICU Level of Service A	
Analysis Period (min) 15		

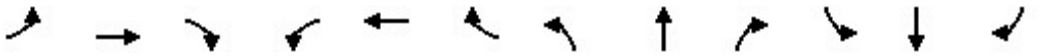
Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	73	38	60	115	91	23	472	1221	128	37	958	151
v/c Ratio	0.27	0.10	0.04	0.27	0.21	0.02	0.62	0.32	0.09	0.11	0.51	0.10
Control Delay	34.9	31.0	0.1	32.0	30.5	0.0	26.0	8.9	0.1	31.8	20.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	31.0	0.1	32.0	30.5	0.0	26.0	8.9	0.1	31.8	20.2	0.1
Queue Length 50th (ft)	14	7	0	23	17	0	88	62	0	7	94	0
Queue Length 95th (ft)	36	22	0	51	41	0	140	120	0	22	135	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	275	1129	1500	445	1218	1500	1272	4095	1500	368	2728	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.03	0.04	0.26	0.07	0.02	0.37	0.30	0.09	0.10	0.35	0.10

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	33	52	99	78	20	406	1050	110	32	824	130
Future Volume (veh/h)	63	33	52	99	78	20	406	1050	110	32	824	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	73	38	0	115	91	0	472	1221	0	37	958	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	180	299		223	348		630	2796		115	1717	
Arrive On Green	0.06	0.09	0.00	0.08	0.10	0.00	0.22	0.46	0.00	0.04	0.28	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	73	38	0	115	91	0	472	1221	0	37	958	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.3	0.6	0.0	2.0	1.3	0.0	8.1	7.3	0.0	0.7	7.2	0.0
Cycle Q Clear(g_c), s	1.3	0.6	0.0	2.0	1.3	0.0	8.1	7.3	0.0	0.7	7.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	180	299		223	348		630	2796		115	1717	
V/C Ratio(X)	0.41	0.13		0.52	0.26		0.75	0.44		0.32	0.56	
Avail Cap(c_a), veh/h	277	1133		354	1221		1278	4637		370	2734	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.1	22.5	0.0	23.8	22.1	0.0	19.6	9.8	0.0	25.0	16.4	0.0
Incr Delay (d2), s/veh	1.5	0.2	0.0	1.8	0.4	0.0	1.8	0.1	0.0	1.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.0	0.7	0.5	0.0	2.6	2.0	0.0	0.2	2.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.6	22.7	0.0	25.6	22.5	0.0	21.4	9.9	0.0	26.6	16.7	0.0
LnGrp LOS	C	C		C	C		C	A		C	B	
Approach Vol, veh/h		111	A		206	A		1693	A		995	A
Approach Delay, s/veh		24.6			24.2			13.1			17.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	29.0	8.6	9.3	16.1	19.6	7.8	10.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	2.7	9.3	4.0	2.6	10.1	9.2	3.3	3.3
Green Ext Time (p_c), s	0.0	10.9	0.1	0.1	1.5	5.9	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.943	0.850				
Flt Protected	0.970					
Satd. Flow (prot)	2958	1365	6071	0	0	6071
Flt Permitted	0.970					
Satd. Flow (perm)	2958	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

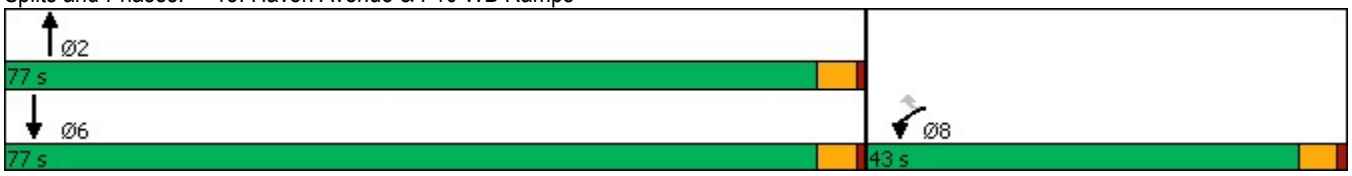
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	496	679	2604	0	0	1538
Future Volume (vph)	496	679	2604	0	0	1538
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	545	746	2862	0	0	1690
Shared Lane Traffic (%)		45%				
Lane Group Flow (vph)	881	410	2862	0	0	1690

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	496	679	2604	1538
Future Volume (vph)	496	679	2604	1538
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	37.6	37.6	72.5	72.5
Actuated g/C Ratio	0.32	0.32	0.61	0.61
v/c Ratio	0.94	0.95	0.77	0.46
Control Delay	58.7	73.4	19.2	13.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	58.7	73.4	19.2	13.2
LOS	E	E	B	B
Approach Delay	63.4		19.2	13.2
Approach LOS	E		B	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.1	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	881	410	2862	1690
v/c Ratio	0.94	0.95	0.77	0.46
Control Delay	58.7	73.4	19.2	13.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	58.7	73.4	19.2	13.2
Queue Length 50th (ft)	338	337	453	196
Queue Length 95th (ft)	#464	#558	500	223
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	957	442	3696	3696
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.92	0.93	0.77	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

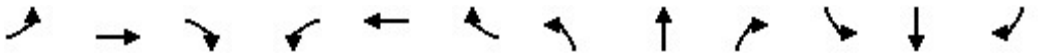
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	496	679	2604	0	0	1538
Future Volume (veh/h)	496	679	2604	0	0	1538
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	430	869	2862	0	0	1690
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	504	950	3690	0	0	3690
Arrive On Green	0.32	0.32	0.61	0.00	0.00	0.61
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	430	869	2862	0	0	1690
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	29.0	32.0	40.1	0.0	0.0	17.4
Cycle Q Clear(g_c), s	29.0	32.0	40.1	0.0	0.0	17.4
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	504	950	3690	0	0	3690
V/C Ratio(X)	0.85	0.91	0.78	0.00	0.00	0.46
Avail Cap(c_a), veh/h	534	1007	3848	0	0	3848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	36.8	37.8	16.9	0.0	0.0	12.4
Incr Delay (d2), s/veh	12.1	12.1	1.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.8	13.2	13.4	0.0	0.0	5.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	48.9	49.9	17.9	0.0	0.0	12.5
LnGrp LOS	D	D	B	A	A	B
Approach Vol, veh/h	1299		2862			1690
Approach Delay, s/veh	49.6		17.9			12.5
Approach LOS	D		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		74.0			74.0	40.8
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s		42.1			19.4	34.0
Green Ext Time (p_c), s		27.4			21.0	2.4

Intersection Summary		
HCM 6th Ctrl Delay	23.3	
HCM 6th LOS	C	

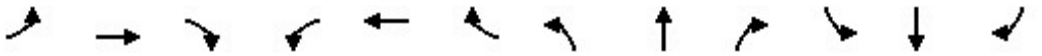
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			182			338			235
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



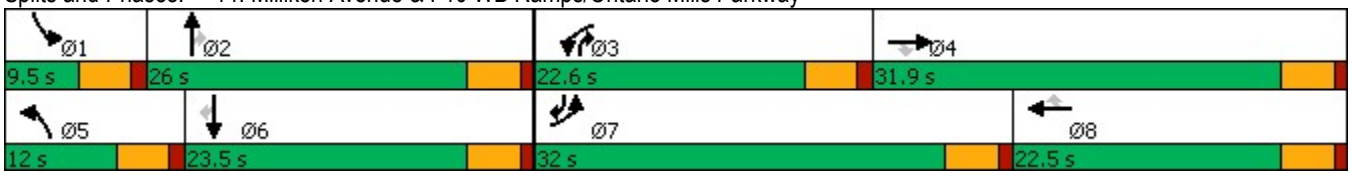
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	587	89	237	162	185	34	154	894	301	83	546	253
Future Volume (vph)	587	89	237	162	185	34	154	894	301	83	546	253
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	660	100	266	182	208	38	173	1004	338	93	613	284
Shared Lane Traffic (%)												
Lane Group Flow (vph)	660	100	266	182	208	38	173	1004	338	93	613	284

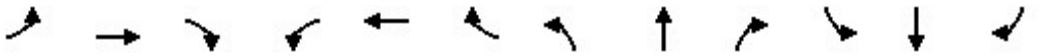
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	587	89	237	162	185	34	154	894	301	83	546	253
Future Volume (vph)	587	89	237	162	185	34	154	894	301	83	546	253
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	22.3	22.1	22.1	10.4	10.2	10.2	7.6	21.4	36.4	5.1	16.4	43.3
Actuated g/C Ratio	0.30	0.30	0.30	0.14	0.14	0.14	0.10	0.29	0.49	0.07	0.22	0.58
v/c Ratio	0.77	0.19	0.42	0.46	0.46	0.11	0.59	0.58	0.37	0.47	0.46	0.29
Control Delay	31.2	22.0	5.4	35.2	35.0	0.6	44.7	26.1	3.0	45.7	27.3	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	22.0	5.4	35.2	35.0	0.6	44.7	26.1	3.0	45.7	27.3	2.7
LOS	C	C	A	D	D	A	D	C	A	D	C	A
Approach Delay		23.6			32.0			23.1			21.9	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 58.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	660	100	266	182	208	38	173	1004	338	93	613	284
v/c Ratio	0.77	0.19	0.42	0.46	0.46	0.11	0.59	0.58	0.37	0.47	0.46	0.29
Control Delay	31.2	22.0	5.4	35.2	35.0	0.6	44.7	26.1	3.0	45.7	27.3	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	22.0	5.4	35.2	35.0	0.6	44.7	26.1	3.0	45.7	27.3	2.7
Queue Length 50th (ft)	149	36	0	43	50	0	42	123	0	23	73	9
Queue Length 95th (ft)	216	76	51	74	85	0	#88	173	41	#52	109	40
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1088	662	728	716	826	506	296	1787	1030	197	1579	1066
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.15	0.37	0.25	0.25	0.08	0.58	0.56	0.33	0.47	0.39	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	587	89	237	162	185	34	154	894	301	83	546	253
Future Volume (veh/h)	587	89	237	162	185	34	154	894	301	83	546	253
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	660	100	266	182	208	38	173	1004	338	93	613	284
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	800	507	430	274	355	158	250	1721	565	181	1578	801
Arrive On Green	0.27	0.29	0.29	0.09	0.11	0.11	0.09	0.28	0.28	0.06	0.26	0.26
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	660	100	266	182	208	38	173	1004	338	93	613	284
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	13.9	2.8	10.1	4.0	3.9	1.5	3.8	9.3	11.8	2.0	5.4	7.1
Cycle Q Clear(g_c), s	13.9	2.8	10.1	4.0	3.9	1.5	3.8	9.3	11.8	2.0	5.4	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	800	507	430	274	355	158	250	1721	565	181	1578	801
V/C Ratio(X)	0.83	0.20	0.62	0.66	0.59	0.24	0.69	0.58	0.60	0.51	0.39	0.35
Avail Cap(c_a), veh/h	1223	742	629	805	926	413	334	2003	635	222	1770	849
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.3	17.7	20.3	28.6	27.9	26.9	29.1	20.2	16.4	29.7	20.0	8.8
Incr Delay (d2), s/veh	2.9	0.2	1.5	2.8	1.5	0.8	3.9	0.3	1.3	2.2	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	1.1	3.4	1.4	1.6	0.6	1.4	3.1	3.9	0.7	1.8	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	17.9	21.7	31.4	29.4	27.6	32.9	20.5	17.7	31.9	20.1	9.0
LnGrp LOS	C	B	C	C	C	C	C	C	B	C	C	A
Approach Vol, veh/h		1026			428			1515			990	
Approach Delay, s/veh		23.5			30.1			21.3			18.1	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	23.0	10.7	23.2	10.1	21.4	22.5	11.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	4.0	13.8	6.0	12.1	5.8	9.1	15.9	5.9
Green Ext Time (p_c), s	0.0	4.6	0.4	1.3	0.1	3.7	2.1	1.0

Intersection Summary	
HCM 6th Ctrl Delay	22.0
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

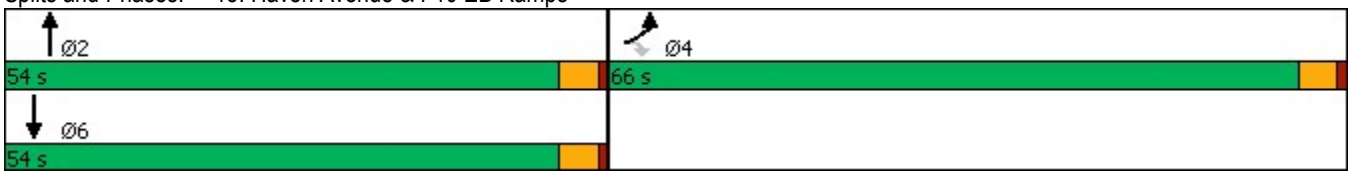
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1238	583	0	1695	1526	0
Future Volume (vph)	1238	583	0	1695	1526	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1391	655	0	1904	1715	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1457	589	0	1904	1715	0

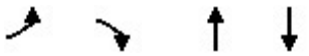
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1238	583	1695	1526
Future Volume (vph)	1238	583	1695	1526
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	59.1	59.1	48.1	48.1
Actuated g/C Ratio	0.51	0.51	0.41	0.41
v/c Ratio	0.93	0.85	0.76	0.68
Control Delay	39.2	38.0	31.8	29.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	39.2	38.0	31.8	29.8
LOS	D	D	C	C
Approach Delay	38.8		31.8	29.8
Approach LOS	D		C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 33.7	Intersection LOS: C
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1457	589	1904	1715
v/c Ratio	0.93	0.85	0.76	0.68
Control Delay	39.2	38.0	31.8	29.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	39.2	38.0	31.8	29.8
Queue Length 50th (ft)	521	413	361	311
Queue Length 95th (ft)	#678	#651	401	348
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1630	727	2599	2599
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.89	0.81	0.73	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1238	583	0	1695	1526	0
Future Volume (veh/h)	1238	583	0	1695	1526	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1391	655	0	1904	1715	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1583	746	0	2544	2544	0
Arrive On Green	0.50	0.50	0.00	0.42	0.42	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1391	655	0	1904	1715	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	40.9	40.8	0.0	27.8	23.9	0.0
Cycle Q Clear(g_c), s	40.9	40.8	0.0	27.8	23.9	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1583	746	0	2544	2544	0
V/C Ratio(X)	0.88	0.88	0.00	0.75	0.67	0.00
Avail Cap(c_a), veh/h	1869	880	0	2876	2876	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.6	23.6	0.0	25.9	24.8	0.0
Incr Delay (d2), s/veh	4.5	8.9	0.0	1.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.5	15.5	0.0	9.9	8.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.1	32.5	0.0	26.9	25.3	0.0
LnGrp LOS	C	C	A	C	C	A
Approach Vol, veh/h	2046			1904	1715	
Approach Delay, s/veh	29.5			26.9	25.3	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		48.3		56.6		48.3
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		29.8		42.9		25.9
Green Ext Time (p_c), s		14.0		9.2		14.3

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		5				264
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	654	587	159	698	727	230
Future Volume (vph)	654	587	159	698	727	230
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	752	675	183	802	836	264
Shared Lane Traffic (%)						
Lane Group Flow (vph)	752	675	183	802	836	264

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	654	587	159	698	727	230
Future Volume (vph)	654	587	159	698	727	230
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	28.0	28.0	52.0	24.0	38.0
Total Split (%)	42.2%	31.1%	31.1%	57.8%	26.7%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	23.3	40.4	12.3	33.5	16.5	44.5
Actuated g/C Ratio	0.35	0.61	0.19	0.51	0.25	0.67
v/c Ratio	0.74	0.74	0.34	0.26	0.55	0.24
Control Delay	24.8	14.8	27.0	10.0	24.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	14.8	27.0	10.0	24.9	1.4
LOS	C	B	C	A	C	A
Approach Delay	20.1			13.1	19.2	
Approach LOS	C			B	B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 66.3	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 57.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

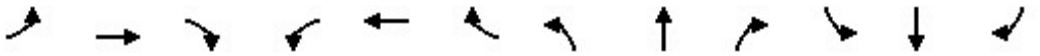
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	752	675	183	802	836	264
v/c Ratio	0.74	0.74	0.34	0.26	0.55	0.24
Control Delay	24.8	14.8	27.0	10.0	24.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	14.8	27.0	10.0	24.9	1.4
Queue Length 50th (ft)	129	171	34	50	82	0
Queue Length 95th (ft)	237	282	67	83	153	22
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1537	1194	1078	4539	1879	1300
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.57	0.17	0.18	0.44	0.20

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	654	587	159	698	727	230
Future Volume (veh/h)	654	587	159	698	727	230
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	752	675	183	802	836	264
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1336	835	282	2422	1395	1033
Arrive On Green	0.46	0.46	0.10	0.40	0.23	0.23
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	752	675	183	802	836	264
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	11.8	22.7	3.8	5.7	7.7	4.2
Cycle Q Clear(g_c), s	11.8	22.7	3.8	5.7	7.7	4.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1336	835	282	2422	1395	1033
V/C Ratio(X)	0.56	0.81	0.65	0.33	0.60	0.26
Avail Cap(c_a), veh/h	1554	947	1090	4615	1895	1156
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	11.2	27.3	13.1	21.6	3.7
Incr Delay (d2), s/veh	0.4	4.7	2.5	0.1	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	1.1	1.4	1.8	2.6	3.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	16.0	29.8	13.2	22.0	3.8
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	1427			985	1100	
Approach Delay, s/veh	14.3			16.3	17.7	
Approach LOS	B			B	B	

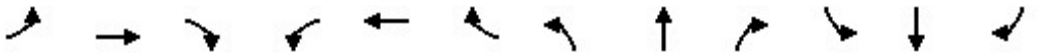
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.4		33.3	10.6	18.9
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	23.5	19.5
Max Q Clear Time (g_c+I1), s		7.7		24.7	5.8	9.7
Green Ext Time (p_c), s		6.7		4.1	0.5	4.7

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.964				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4644	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4644	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65				136			177		65	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	364	687	216	123	588	102	252	1527	178	146	1469	370
Future Volume (vph)	364	687	216	123	588	102	252	1527	178	146	1469	370
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	396	747	235	134	639	111	274	1660	193	159	1597	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	396	982	0	134	639	111	274	1660	193	159	1999	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	364	687	123	588	102	252	1527	178	146	1469
Future Volume (vph)	364	687	123	588	102	252	1527	178	146	1469
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.5	32.9	9.1	24.5	24.5	9.5	52.5	120.0	7.5	50.5
Actuated g/C Ratio	0.15	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	0.94	0.74	0.61	0.93	0.27	1.20	0.79	0.13	0.88	0.79
Control Delay	82.3	41.2	66.0	68.9	5.4	171.6	32.4	0.2	98.2	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	41.2	66.0	68.9	5.4	171.6	32.4	0.2	98.2	32.1
LOS	F	D	E	E	A	F	C	A	F	C
Approach Delay		53.0		60.5			47.4			37.0
Approach LOS		D		E			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 46.9	Intersection LOS: D
Intersection Capacity Utilization 82.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	396	982	134	639	111	274	1660	193	159	1999
v/c Ratio	0.94	0.74	0.61	0.93	0.27	1.20	0.79	0.13	0.88	0.79
Control Delay	82.3	41.2	66.0	68.9	5.4	171.6	32.4	0.2	98.2	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	41.2	66.0	68.9	5.4	171.6	32.4	0.2	98.2	32.1
Queue Length 50th (ft)	158	239	52	258	0	~132	396	0	64	374
Queue Length 95th (ft)	#255	293	86	#371	32	#221	458	0	#129	423
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	421	1319	228	684	414	228	2107	1500	180	2515
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.74	0.59	0.93	0.27	1.20	0.79	0.13	0.88	0.79

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

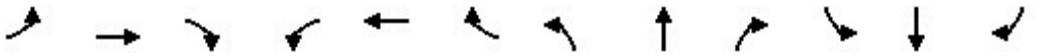
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	364	687	216	123	588	102	252	1527	178	146	1469	370
Future Volume (veh/h)	364	687	216	123	588	102	252	1527	178	146	1469	370
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	396	747	235	134	639	111	274	1660	0	159	1597	402
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	425	1052	327	180	686	306	231	2117		182	2059	518
Arrive On Green	0.15	0.29	0.29	0.06	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	2910	3655	1137	2910	3367	1502	2910	4837	1502	2910	4891	1231
Grp Volume(v), veh/h	396	658	324	134	639	111	274	1660	0	159	1493	506
Grp Sat Flow(s),veh/h/ln	1455	1612	1567	1455	1683	1502	1455	1612	1502	1455	1524	1550
Q Serve(g_s), s	16.1	21.9	22.2	5.4	22.4	7.6	9.5	35.2	0.0	6.5	33.7	33.7
Cycle Q Clear(g_c), s	16.1	21.9	22.2	5.4	22.4	7.6	9.5	35.2	0.0	6.5	33.7	33.7
Prop In Lane	1.00		0.73	1.00		1.00	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	425	928	451	180	686	306	231	2117		182	1925	653
V/C Ratio(X)	0.93	0.71	0.72	0.74	0.93	0.36	1.19	0.78		0.87	0.78	0.78
Avail Cap(c_a), veh/h	425	928	451	231	688	307	231	2117		182	1925	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.6	38.2	38.3	55.3	46.9	41.1	55.2	28.9	0.0	55.7	29.8	29.8
Incr Delay (d2), s/veh	27.5	2.5	5.4	9.3	19.5	0.7	119.8	3.0	0.0	34.3	3.1	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	8.9	9.2	2.2	11.2	2.9	7.3	13.9	0.0	3.3	12.7	13.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.2	40.7	43.8	64.6	66.4	41.8	175.0	31.9	0.0	90.0	33.0	38.6
LnGrp LOS	E	D	D	E	E	D	F	C		F	C	D
Approach Vol, veh/h		1378			884			1934	A		2158	
Approach Delay, s/veh		52.2			63.0			52.1			38.5	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	11.9	39.0	14.0	55.0	22.0	28.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	8.5	37.2	7.4	24.2	11.5	35.7	18.1	24.4
Green Ext Time (p_c), s	0.0	10.3	0.1	4.0	0.0	11.3	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	49.0
HCM 6th LOS	D

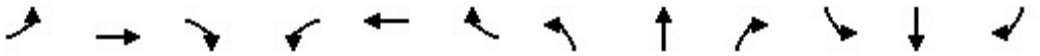
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6071	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6071	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				127			200		253	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	1801	5	1	1086	15	15	0	9	47	0	12
Future Volume (vph)	4	1801	5	1	1086	15	15	0	9	47	0	12
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	1896	5	1	1143	16	16	0	9	49	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	1901	0	1	1143	16	16	0	9	49	13	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	1801	1	1086	15	15	9	47	0
Future Volume (vph)	4	1801	1	1086	15	15	9	47	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.3	34.6	5.3	34.6	34.6	6.4	5.9	7.6	10.7
Actuated g/C Ratio	0.09	0.60	0.09	0.60	0.60	0.11	0.10	0.13	0.18
v/c Ratio	0.03	0.53	0.01	0.40	0.02	0.09	0.03	0.24	0.02
Control Delay	31.5	8.9	31.0	8.1	0.0	30.6	0.1	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	8.9	31.0	8.1	0.0	30.6	0.1	30.4	0.1
LOS	C	A	C	A	A	C	A	C	A
Approach Delay		9.0		8.0					24.1
Approach LOS		A		A					C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 58.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 47.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

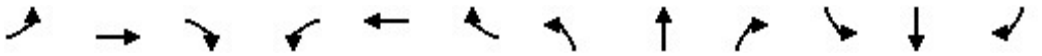
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	4	1901	1	1143	16	16	9	49	13
v/c Ratio	0.03	0.53	0.01	0.40	0.02	0.09	0.03	0.24	0.02
Control Delay	31.5	8.9	31.0	8.1	0.0	30.6	0.1	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	8.9	31.0	8.1	0.0	30.6	0.1	30.4	0.1
Queue Length 50th (ft)	2	113	0	77	0	6	0	18	0
Queue Length 95th (ft)	11	218	5	158	0	25	0	52	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	144	4214	144	3344	1080	211	657	287	1290
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.45	0.01	0.34	0.01	0.08	0.01	0.17	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1801	5	1	1086	15	15	0	9	47	0	12
Future Volume (veh/h)	4	1801	5	1	1086	15	15	0	9	47	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	4	1896	5	1	1143	16	16	0	9	49	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	3330	9	3	2528	785	31	163	138	77	203	181
Arrive On Green	0.01	0.53	0.53	0.00	0.52	0.52	0.02	0.00	0.09	0.05	0.00	0.12
Sat Flow, veh/h	1594	6324	17	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	4	1371	530	1	1143	16	16	0	9	49	0	13
Grp Sat Flow(s),veh/h/ln	1594	1524	1769	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.1	11.0	11.0	0.0	8.0	0.3	0.5	0.0	0.3	1.6	0.0	0.4
Cycle Q Clear(g_c), s	0.1	11.0	11.0	0.0	8.0	0.3	0.5	0.0	0.3	1.6	0.0	0.4
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	9	2407	931	3	2528	785	31	163	138	77	203	181
V/C Ratio(X)	0.47	0.57	0.57	0.34	0.45	0.02	0.51	0.00	0.07	0.64	0.00	0.07
Avail Cap(c_a), veh/h	147	3194	1236	147	3379	1049	214	627	531	291	676	603
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.9	8.7	8.7	27.1	8.1	6.3	26.3	0.0	22.5	25.4	0.0	21.2
Incr Delay (d2), s/veh	34.5	0.2	0.6	57.3	0.1	0.0	12.1	0.0	0.2	8.5	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	2.8	3.4	0.1	2.2	0.1	0.3	0.0	0.1	0.8	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.4	8.9	9.2	84.3	8.2	6.3	38.4	0.0	22.7	33.9	0.0	21.3
LnGrp LOS	E	A	A	F	A	A	D	A	C	C	A	C
Approach Vol, veh/h		1905			1160			25			62	
Approach Delay, s/veh		9.1			8.3			32.8			31.3	
Approach LOS		A			A			C			C	

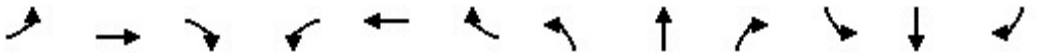
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	9.5	4.6	33.1	5.6	11.0	4.8	32.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	3.6	2.3	2.0	13.0	2.5	2.4	2.1	10.0
Green Ext Time (p_c), s	0.0	0.0	0.0	15.6	0.0	0.0	0.0	9.7

Intersection Summary	
HCM 6th Ctrl Delay	9.4
HCM 6th LOS	A



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4794	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.727				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4794	0	1212	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10				154			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



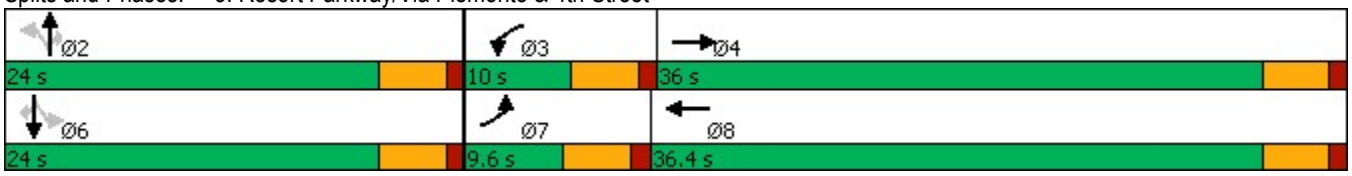
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	29	1818	8	5	1086	38	11	0	20	43	1	20
Future Volume (vph)	29	1818	8	5	1086	38	11	0	20	43	1	20
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	31	1914	8	5	1143	40	12	0	21	45	1	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	1922	0	5	1183	0	12	0	21	0	46	21

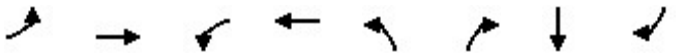
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	29	1818	5	1086	11	20	43	1	20
Future Volume (vph)	29	1818	5	1086	11	20	43	1	20
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	30.7	5.6	29.0	7.3	7.3		7.3	7.3
Actuated g/C Ratio	0.11	0.63	0.11	0.59	0.15	0.15		0.15	0.15
v/c Ratio	0.10	0.50	0.03	0.41	0.07	0.06		0.24	0.07
Control Delay	23.9	6.2	23.6	6.8	21.1	0.3		23.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	23.9	6.2	23.6	6.8	21.1	0.3		23.8	0.5
LOS	C	A	C	A	C	A		C	A
Approach Delay		6.5		6.9				16.4	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 48.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 47.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	31	1922	5	1183	12	21	46	21
v/c Ratio	0.10	0.50	0.03	0.41	0.07	0.06	0.24	0.07
Control Delay	23.9	6.2	23.6	6.8	21.1	0.3	23.8	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.9	6.2	23.6	6.8	21.1	0.3	23.8	0.5
Queue Length 50th (ft)	4	56	1	39	3	0	11	0
Queue Length 95th (ft)	17	163	10	119	16	0	41	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	309	4088	182	3210	495	704	527	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.47	0.03	0.37	0.02	0.03	0.09	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1818	8	5	1086	38	11	0	20	43	1	20
Future Volume (veh/h)	29	1818	8	5	1086	38	11	0	20	43	1	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	31	1914	8	5	1143	40	12	0	21	45	1	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	105	3563	15	11	2569	90	280	205	174	322	5	174
Arrive On Green	0.04	0.56	0.56	0.01	0.54	0.54	0.12	0.00	0.12	0.12	0.12	0.12
Sat Flow, veh/h	2910	6312	26	1594	4799	168	1312	1772	1502	1355	46	1502
Grp Volume(v), veh/h	31	1386	536	5	768	415	12	0	21	46	0	21
Grp Sat Flow(s),veh/h/ln	1455	1524	1767	1594	1612	1742	1312	1772	1502	1401	0	1502
Q Serve(g_s), s	0.4	8.2	8.2	0.1	6.3	6.3	0.4	0.0	0.5	1.2	0.0	0.5
Cycle Q Clear(g_c), s	0.4	8.2	8.2	0.1	6.3	6.3	1.6	0.0	0.5	1.3	0.0	0.5
Prop In Lane	1.00		0.01	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	105	2581	998	11	1726	932	280	205	174	327	0	174
V/C Ratio(X)	0.30	0.54	0.54	0.47	0.44	0.45	0.04	0.00	0.12	0.14	0.00	0.12
Avail Cap(c_a), veh/h	344	3338	1290	203	2384	1288	721	801	679	797	0	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.3	5.9	5.9	21.3	6.1	6.1	18.2	0.0	17.1	17.4	0.0	17.1
Incr Delay (d2), s/veh	1.6	0.2	0.5	28.2	0.2	0.3	0.1	0.0	0.3	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.6	1.9	0.1	1.4	1.6	0.1	0.0	0.2	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.8	6.0	6.3	49.6	6.3	6.5	18.2	0.0	17.4	17.6	0.0	17.4
LnGrp LOS	C	A	A	D	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1953			1188			33			67	
Approach Delay, s/veh		6.4			6.5			17.7			17.6	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	4.8	28.9		9.5	6.1	27.6				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		3.6	2.1	10.2		3.3	2.4	8.3				
Green Ext Time (p_c), s		0.0	0.0	14.2		0.2	0.0	8.8				

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	4794	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4794	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1825	63	0	1103	0	27
Future Volume (vph)	1825	63	0	1103	0	27
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1901	66	0	1149	0	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1967	0	0	1149	0	28

Intersection Summary

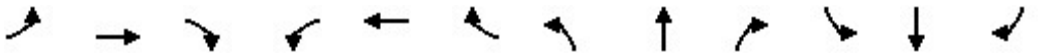
Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1825	63	0	1103	0	27
Future Vol, veh/h	1825	63	0	1103	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1901	66	0	1149	0	28

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	984
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	213
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	213
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

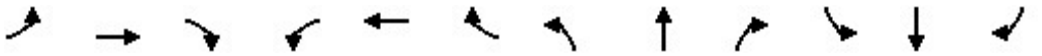
Approach	EB	WB	NB
HCM Control Delay, s	0	0	24.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	213	-	-	-
HCM Lane V/C Ratio	0.132	-	-	-
HCM Control Delay (s)	24.5	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			188			285			55		32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



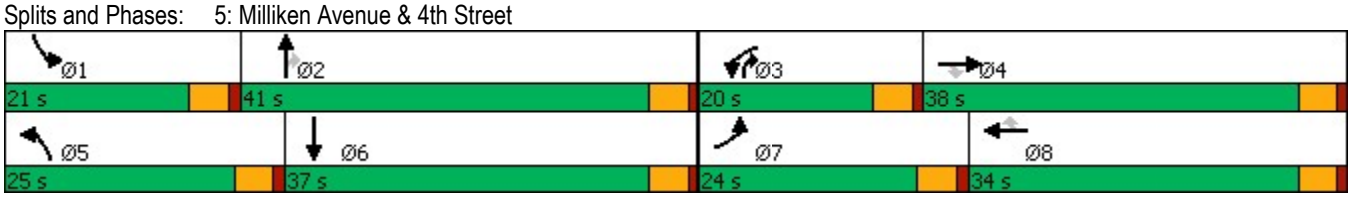
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	436	1072	206	368	846	275	302	1488	365	432	920	144
Future Volume (vph)	436	1072	206	368	846	275	302	1488	365	432	920	144
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	454	1117	215	383	881	286	315	1550	380	450	958	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	1117	215	383	881	286	315	1550	380	450	1108	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	436	1072	206	368	846	275	302	1488	365	432	920
Future Volume (vph)	436	1072	206	368	846	275	302	1488	365	432	920
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.5	32.7	32.7	15.5	28.7	28.7	17.6	36.2	56.2	16.5	35.2
Actuated g/C Ratio	0.16	0.28	0.28	0.13	0.24	0.24	0.15	0.30	0.47	0.14	0.30
v/c Ratio	0.96	0.84	0.39	1.02	0.76	0.50	0.74	0.84	0.51	1.12	0.62
Control Delay	82.2	47.7	9.2	102.1	46.8	7.5	59.2	43.7	21.5	129.3	37.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.2	47.7	9.2	102.1	46.8	7.5	59.2	43.7	21.5	129.3	37.4
LOS	F	D	A	F	D	A	E	D	C	F	D
Approach Delay		51.8			53.2			42.1			64.0
Approach LOS		D			D			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.12	
Intersection Signal Delay: 51.7	Intersection LOS: D
Intersection Capacity Utilization 86.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

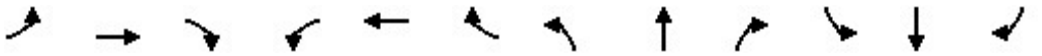


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	454	1117	215	383	881	286	315	1550	380	450	1108
v/c Ratio	0.96	0.84	0.39	1.02	0.76	0.50	0.74	0.84	0.51	1.12	0.62
Control Delay	82.2	47.7	9.2	102.1	46.8	7.5	59.2	43.7	21.5	129.3	37.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.2	47.7	9.2	102.1	46.8	7.5	59.2	43.7	21.5	129.3	37.4
Queue Length 50th (ft)	182	297	15	~162	231	1	121	325	171	~208	211
Queue Length 95th (ft)	#287	355	78	#262	282	71	168	374	263	#314	257
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	473	1358	557	377	1195	586	498	1863	738	401	1781
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.82	0.39	1.02	0.74	0.49	0.63	0.83	0.51	1.12	0.62

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



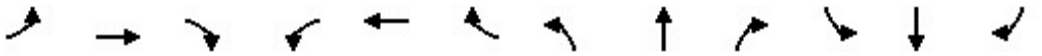
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	436	1072	206	368	846	275	302	1488	365	432	920	144
Future Volume (veh/h)	436	1072	206	368	846	275	302	1488	365	432	920	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	454	1117	215	383	881	286	315	1550	380	450	958	150
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	487	1304	405	387	1138	353	373	1839	653	412	1691	261
Arrive On Green	0.17	0.27	0.27	0.13	0.24	0.24	0.13	0.30	0.30	0.14	0.32	0.32
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5365	829
Grp Volume(v), veh/h	454	1117	215	383	881	286	315	1550	380	450	814	294
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1623
Q Serve(g_s), s	18.0	25.6	14.2	15.3	19.9	21.0	12.3	27.8	22.3	16.5	17.3	17.6
Cycle Q Clear(g_c), s	18.0	25.6	14.2	15.3	19.9	21.0	12.3	27.8	22.3	16.5	17.3	17.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	487	1304	405	387	1138	353	373	1839	653	412	1441	511
V/C Ratio(X)	0.93	0.86	0.53	0.99	0.77	0.81	0.85	0.84	0.58	1.09	0.57	0.57
Avail Cap(c_a), veh/h	487	1389	431	387	1224	380	511	1908	669	412	1441	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.9	40.5	36.3	50.5	41.7	42.1	49.7	38.1	25.0	50.1	33.3	33.4
Incr Delay (d2), s/veh	25.2	5.3	1.1	43.1	3.0	11.7	9.3	3.5	1.2	71.8	0.5	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	10.7	5.3	7.9	8.2	8.9	5.0	10.7	8.1	10.1	6.4	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.1	45.7	37.4	93.6	44.7	53.8	59.0	41.7	26.2	121.9	33.8	35.0
LnGrp LOS	E	D	D	F	D	D	E	D	C	F	C	C
Approach Vol, veh/h		1786			1550			2245			1558	
Approach Delay, s/veh		51.7			58.4			41.5			59.5	
Approach LOS		D			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	39.7	20.0	35.9	19.4	41.3	24.0	31.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	29.8	17.3	27.6	14.3	19.6	20.0	23.0
Green Ext Time (p_c), s	0.0	5.4	0.0	3.9	0.6	6.1	0.0	3.7

Intersection Summary	
HCM 6th Ctrl Delay	51.6
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.927	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2977	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2977	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			130			192			275		188	319
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



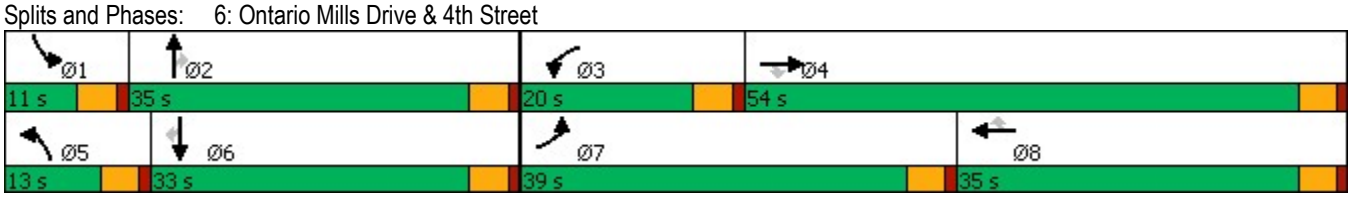
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	956	1213	120	226	965	312	141	310	352	78	312	588
Future Volume (vph)	956	1213	120	226	965	312	141	310	352	78	312	588
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1039	1318	130	246	1049	339	153	337	383	85	339	639
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	1039	1318	130	246	1049	339	153	337	383	85	659	319

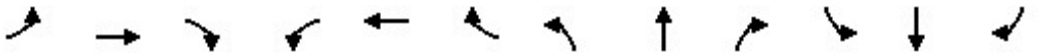
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	956	1213	120	226	965	312	141	310	352	78	312	588
Future Volume (vph)	956	1213	120	226	965	312	141	310	352	78	312	588
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.6	50.6	50.6	14.0	29.9	29.9	8.5	27.4	27.4	6.5	25.4	25.4
Actuated g/C Ratio	0.30	0.43	0.43	0.12	0.26	0.26	0.07	0.24	0.24	0.06	0.22	0.22
v/c Ratio	1.21	0.63	0.18	0.71	0.85	0.64	1.33	0.43	0.68	0.97	0.83	0.58
Control Delay	142.8	28.1	4.3	61.7	49.0	22.8	236.8	39.5	18.2	143.6	40.4	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	142.8	28.1	4.3	61.7	49.0	22.8	236.8	39.5	18.2	143.6	40.4	8.8
LOS	F	C	A	E	D	C	F	D	B	F	D	A
Approach Delay		74.8			45.5			64.8			39.2	
Approach LOS		E			D			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.5	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.33	
Intersection Signal Delay: 59.2	Intersection LOS: E
Intersection Capacity Utilization 91.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



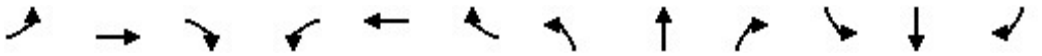


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1039	1318	130	246	1049	339	153	337	383	85	659	319
v/c Ratio	1.21	0.63	0.18	0.71	0.85	0.64	1.33	0.43	0.68	0.97	0.83	0.58
Control Delay	142.8	28.1	4.3	61.7	49.0	22.8	236.8	39.5	18.2	143.6	40.4	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	142.8	28.1	4.3	61.7	49.0	22.8	236.8	39.5	18.2	143.6	40.4	8.8
Queue Length 50th (ft)	~518	297	0	94	284	100	~156	114	69	67	191	0
Queue Length 95th (ft)	#648	350	38	139	342	208	#293	159	182	#174	267	86
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	857	2090	724	385	1263	535	115	879	596	88	871	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.21	0.63	0.18	0.64	0.83	0.63	1.33	0.38	0.64	0.97	0.76	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



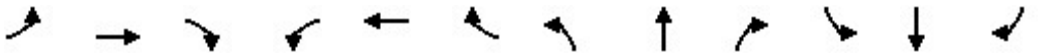
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	956	1213	120	226	965	312	141	310	352	78	312	588
Future Volume (veh/h)	956	1213	120	226	965	312	141	310	352	78	312	588
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1039	1318	130	246	1049	339	153	337	383	85	339	639
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	841	2115	656	297	1210	376	114	860	384	87	423	717
Arrive On Green	0.29	0.44	0.44	0.10	0.25	0.25	0.07	0.26	0.26	0.05	0.24	0.24
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	1039	1318	130	246	1049	339	153	337	383	85	339	639
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	34.5	25.2	6.4	9.9	24.8	26.1	8.5	9.9	30.4	6.4	21.5	24.6
Cycle Q Clear(g_c), s	34.5	25.2	6.4	9.9	24.8	26.1	8.5	9.9	30.4	6.4	21.5	24.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	841	2115	656	297	1210	376	114	860	384	87	423	717
V/C Ratio(X)	1.24	0.62	0.20	0.83	0.87	0.90	1.35	0.39	1.00	0.98	0.80	0.89
Avail Cap(c_a), veh/h	841	2115	656	378	1236	384	114	860	384	87	423	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	26.0	20.7	52.6	42.9	43.3	55.4	36.7	44.4	56.4	42.8	43.9
Incr Delay (d2), s/veh	116.0	0.6	0.1	11.5	6.7	23.6	203.7	0.3	45.4	89.5	10.6	13.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.8	9.6	2.3	4.1	10.6	12.1	9.8	4.1	16.0	4.7	10.6	10.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	158.5	26.6	20.8	64.1	49.5	67.0	259.2	37.0	89.8	145.8	53.3	57.3
LnGrp LOS	F	C	C	E	D	E	F	D	F	F	D	E
Approach Vol, veh/h		2487			1634			873			1063	
Approach Delay, s/veh		81.4			55.3			99.1			63.1	
Approach LOS		F			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	16.7	56.7	13.0	33.0	39.0	34.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.4	32.4	11.9	27.2	10.5	26.6	36.5	28.1
Green Ext Time (p_c), s	0.0	0.0	0.3	10.9	0.0	1.0	0.0	1.7

Intersection Summary	
HCM 6th Ctrl Delay	73.7
HCM 6th LOS	E

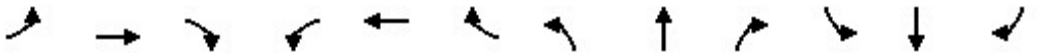
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.972			0.936				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	2891	4818	1500	1583	4683	0	1583	3138	0	1504	1646	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	2891	4818	1500	1583	4683	0	1583	3138	0	1504	1646	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101		41			60				297
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



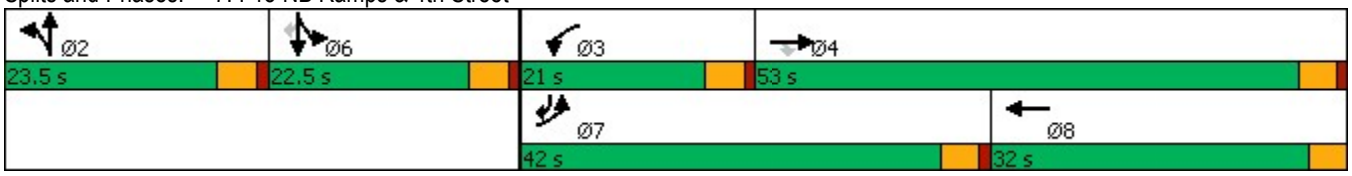
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	831	705	97	79	746	171	119	77	58	144	68	625
Future Volume (vph)	831	705	97	79	746	171	119	77	58	144	68	625
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	866	734	101	82	777	178	124	80	60	150	71	651
Shared Lane Traffic (%)										27%		
Lane Group Flow (vph)	866	734	101	82	955	0	124	140	0	109	112	651

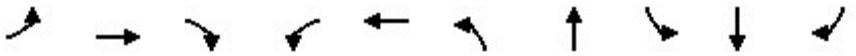
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	831	705	97	79	746	119	77	144	68	625
Future Volume (vph)	831	705	97	79	746	119	77	144	68	625
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	36.2	53.5	53.5	11.0	26.4	13.5	13.5	12.8	12.8	53.6
Actuated g/C Ratio	0.34	0.50	0.50	0.10	0.25	0.13	0.13	0.12	0.12	0.50
v/c Ratio	0.88	0.30	0.13	0.50	0.80	0.62	0.31	0.60	0.57	0.44
Control Delay	46.0	18.4	4.6	58.4	42.7	59.5	27.6	60.5	57.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	18.4	4.6	58.4	42.7	59.5	27.6	60.5	57.5	9.9
LOS	D	B	A	E	D	E	C	E	E	A
Approach Delay		31.6			43.9		42.6		22.4	
Approach LOS		C			D		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 106.3	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 33.6	Intersection LOS: C
Intersection Capacity Utilization 75.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	866	734	101	82	955	124	140	109	112	651
v/c Ratio	0.88	0.30	0.13	0.50	0.80	0.62	0.31	0.60	0.57	0.44
Control Delay	46.0	18.4	4.6	58.4	42.7	59.5	27.6	60.5	57.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	18.4	4.6	58.4	42.7	59.5	27.6	60.5	57.5	9.9
Queue Length 50th (ft)	294	110	0	56	220	84	26	77	80	81
Queue Length 95th (ft)	#470	179	34	111	304	153	59	146	147	140
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1036	2423	804	249	1305	287	619	258	283	1520
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.30	0.13	0.33	0.73	0.43	0.23	0.42	0.40	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	831	705	97	79	746	171	119	77	58	144	68	625
Future Volume (veh/h)	831	705	97	79	746	171	119	77	58	144	68	625
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	866	734	101	82	777	178	124	80	60	110	126	651
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	939	2408	748	102	943	214	162	194	133	264	293	1466
Arrive On Green	0.32	0.50	0.50	0.06	0.24	0.24	0.10	0.10	0.10	0.17	0.17	0.17
Sat Flow, veh/h	2910	4837	1502	1594	3941	895	1594	1910	1309	1594	1772	3003
Grp Volume(v), veh/h	866	734	101	82	635	320	124	70	70	110	126	651
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1611	1594	1683	1536	1594	1772	1502
Q Serve(g_s), s	30.2	9.5	3.8	5.3	19.6	19.9	8.0	4.1	4.5	6.5	6.7	14.9
Cycle Q Clear(g_c), s	30.2	9.5	3.8	5.3	19.6	19.9	8.0	4.1	4.5	6.5	6.7	14.9
Prop In Lane	1.00		1.00	1.00		0.56	1.00		0.85	1.00		1.00
Lane Grp Cap(c), veh/h	939	2408	748	102	772	386	162	171	156	264	293	1466
V/C Ratio(X)	0.92	0.30	0.14	0.80	0.82	0.83	0.76	0.41	0.45	0.42	0.43	0.44
Avail Cap(c_a), veh/h	1035	2408	748	250	872	436	287	303	277	272	303	1482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.4	15.7	14.2	48.6	38.0	38.1	46.1	44.4	44.6	39.4	39.5	17.6
Incr Delay (d2), s/veh	12.4	0.1	0.1	13.3	5.8	11.7	7.3	1.5	2.0	1.1	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	3.4	1.3	2.5	8.3	9.0	3.5	1.8	1.8	2.6	3.0	5.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.9	15.7	14.3	61.9	43.7	49.7	53.4	45.9	46.6	40.5	40.5	17.8
LnGrp LOS	D	B	B	E	D	D	D	D	D	D	D	B
Approach Vol, veh/h		1701			1037			264			887	
Approach Delay, s/veh		31.5			47.0			49.6			23.9	
Approach LOS		C			D			D			C	

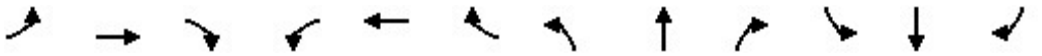
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.2	11.3	57.0		21.9	38.5	29.7				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		10.0	7.3	11.5		16.9	32.2	21.9				
Green Ext Time (p_c), s		0.7	0.1	6.4		0.5	1.8	3.3				

Intersection Summary	
HCM 6th Ctrl Delay	35.1
HCM 6th LOS	D

Notes

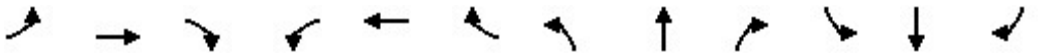
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



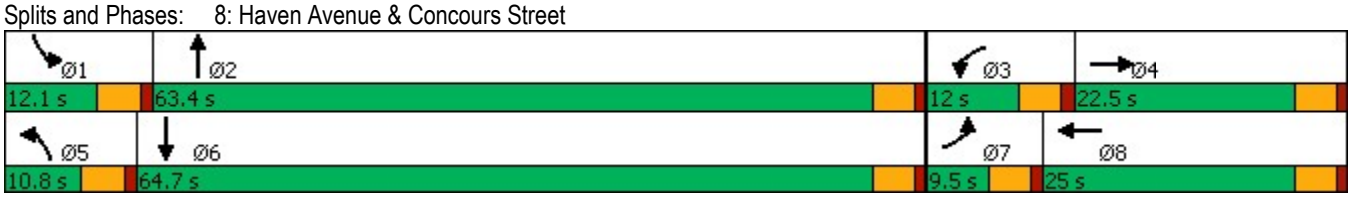
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	26	40	65	178	95	97	48	2351	183	44	1907	28
Future Volume (vph)	26	40	65	178	95	97	48	2351	183	44	1907	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	27	41	66	182	97	99	49	2399	187	45	1946	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	107	0	182	97	99	49	2399	187	45	1946	29

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	40	178	95	97	48	2351	183	44	1907	28
Future Volume (vph)	26	40	178	95	97	48	2351	183	44	1907	28
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	7.0	7.5	13.8	92.3	6.2	57.5	92.3	6.8	55.8	92.3
Actuated g/C Ratio	0.06	0.08	0.08	0.15	1.00	0.07	0.62	1.00	0.07	0.60	1.00
v/c Ratio	0.17	0.37	0.57	0.19	0.07	0.25	0.63	0.12	0.21	0.53	0.02
Control Delay	47.9	23.6	50.3	40.2	0.1	47.5	12.7	0.2	45.6	11.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	23.6	50.3	40.2	0.1	47.5	12.7	0.2	45.6	11.7	0.0
LOS	D	C	D	D	A	D	B	A	D	B	A
Approach Delay		28.5		34.5			12.4			12.3	
Approach LOS		C		C			B			B	

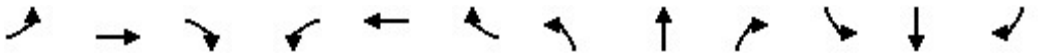
Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 92.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 14.4	Intersection LOS: B
Intersection Capacity Utilization 54.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	107	182	97	99	49	2399	187	45	1946	29
v/c Ratio	0.17	0.37	0.57	0.19	0.07	0.25	0.63	0.12	0.21	0.53	0.02
Control Delay	47.9	23.6	50.3	40.2	0.1	47.5	12.7	0.2	45.6	11.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	23.6	50.3	40.2	0.1	47.5	12.7	0.2	45.6	11.7	0.0
Queue Length 50th (ft)	8	13	39	30	0	15	266	0	13	188	0
Queue Length 95th (ft)	23	39	65	56	0	35	332	0	32	234	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	158	653	324	753	1500	199	3920	1500	240	4007	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.56	0.13	0.07	0.25	0.61	0.12	0.19	0.49	0.02

Intersection Summary



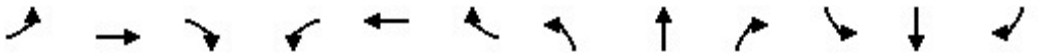
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	40	65	178	95	97	48	2351	183	44	1907	28
Future Volume (veh/h)	26	40	65	178	95	97	48	2351	183	44	1907	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	27	41	66	182	97	0	49	2399	0	45	1946	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	119	106	273	377		118	3694		113	3683	
Arrive On Green	0.03	0.07	0.07	0.07	0.11	0.00	0.04	0.61	0.00	0.04	0.60	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	27	41	66	182	97	0	49	2399	0	45	1946	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.8	1.9	3.6	3.7	2.2	0.0	1.4	21.4	0.0	1.3	15.5	0.0
Cycle Q Clear(g_c), s	0.8	1.9	3.6	3.7	2.2	0.0	1.4	21.4	0.0	1.3	15.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	81	119	106	273	377		118	3694		113	3683	
V/C Ratio(X)	0.33	0.34	0.62	0.67	0.26		0.41	0.65		0.40	0.53	
Avail Cap(c_a), veh/h	174	363	323	356	826		219	4296		265	4391	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.9	37.0	37.7	38.0	33.9	0.0	39.1	10.7	0.0	39.2	9.6	0.0
Incr Delay (d2), s/veh	2.4	1.7	5.8	3.0	0.4	0.0	2.3	0.3	0.0	2.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	1.5	1.3	0.9	0.0	0.5	6.3	0.0	0.5	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.2	38.7	43.5	41.0	34.3	0.0	41.4	11.0	0.0	41.5	9.7	0.0
LnGrp LOS	D	D	D	D	C		D	B		D	A	
Approach Vol, veh/h		134			279	A		2448	A		1991	A
Approach Delay, s/veh		41.8			38.6			11.6			10.4	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	55.1	10.3	10.4	7.9	55.0	6.8	13.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	3.3	23.4	5.7	5.6	3.4	17.5	2.8	4.2
Green Ext Time (p_c), s	0.0	27.3	0.1	0.4	0.0	23.8	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

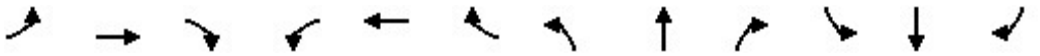
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.935			0.951						0.998	
Flt Protected	0.950	0.972			0.969		0.950			0.950		
Satd. Flow (prot)	1593	1524	0	0	1626	0	1676	4818	0	1676	4808	0
Flt Permitted	0.950	0.972					0.950			0.950		
Satd. Flow (perm)	1593	1524	0	0	1678	0	1676	4818	0	1676	4808	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



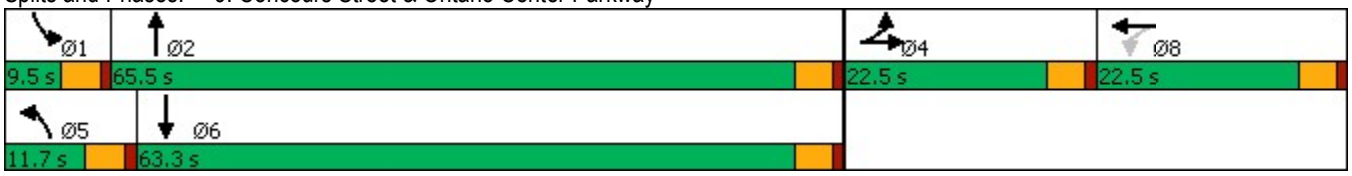
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	47	0	12	15	0	9	4	1801	5	1	1086	15
Future Volume (vph)	47	0	12	15	0	9	4	1801	5	1	1086	15
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	49	0	13	16	0	9	4	1896	5	1	1143	16
Shared Lane Traffic (%)	35%											
Lane Group Flow (vph)	32	30	0	0	25	0	4	1901	0	1	1159	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	47	0	15	0	4	1801	1	1086
Future Volume (vph)	47	0	15	0	4	1801	1	1086
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.6	7.6		6.0	6.2	56.9	5.4	56.7
Actuated g/C Ratio	0.10	0.10		0.08	0.08	0.77	0.07	0.77
v/c Ratio	0.20	0.12		0.11	0.03	0.51	0.01	0.31
Control Delay	40.2	1.1		1.0	40.5	6.6	42.0	5.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	1.1		1.0	40.5	6.6	42.0	5.3
LOS	D	A		A	D	A	D	A
Approach Delay		21.2		1.0		6.7		5.3
Approach LOS		C		A		A		A

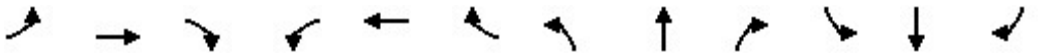
Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 73.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	32	30	25	4	1901	1	1159
v/c Ratio	0.20	0.12	0.11	0.03	0.51	0.01	0.31
Control Delay	40.2	1.1	1.0	40.5	6.6	42.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	1.1	1.0	40.5	6.6	42.0	5.3
Queue Length 50th (ft)	15	0	0	2	82	1	39
Queue Length 95th (ft)	50	0	0	13	305	6	160
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	420	472	513	177	3924	123	3844
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.06	0.05	0.02	0.48	0.01	0.30

Intersection Summary



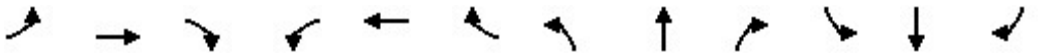
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	47	0	12	15	0	9	4	1801	5	1	1086	15
Future Volume (veh/h)	47	0	12	15	0	9	4	1801	5	1	1086	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	31	25	13	16	0	9	4	1896	5	1	1143	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	95	62	32	29	0	16	9	3103	8	3	3042	43
Arrive On Green	0.06	0.06	0.06	0.03	0.00	0.03	0.01	0.62	0.62	0.00	0.62	0.62
Sat Flow, veh/h	1688	1098	571	1034	0	582	1688	4981	13	1688	4916	69
Grp Volume(v), veh/h	31	0	38	25	0	0	4	1227	674	1	750	409
Grp Sat Flow(s),veh/h/ln	1688	0	1669	1616	0	0	1688	1612	1770	1688	1612	1760
Q Serve(g_s), s	1.1	0.0	1.4	0.9	0.0	0.0	0.1	14.3	14.3	0.0	7.1	7.1
Cycle Q Clear(g_c), s	1.1	0.0	1.4	0.9	0.0	0.0	0.1	14.3	14.3	0.0	7.1	7.1
Prop In Lane	1.00		0.34	0.64		0.36	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	95	0	94	46	0	0	9	2009	1102	3	1996	1089
V/C Ratio(X)	0.33	0.00	0.41	0.55	0.00	0.00	0.44	0.61	0.61	0.37	0.38	0.38
Avail Cap(c_a), veh/h	492	0	486	471	0	0	197	3184	1747	137	3070	1675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	28.2	29.6	0.0	0.0	30.6	7.1	7.1	30.8	5.8	5.8
Incr Delay (d2), s/veh	2.0	0.0	2.8	9.9	0.0	0.0	30.3	0.3	0.6	66.6	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.6	0.5	0.0	0.0	0.1	3.6	4.1	0.1	1.8	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.0	0.0	31.0	39.5	0.0	0.0	60.9	7.4	7.6	97.5	6.0	6.1
LnGrp LOS	C	A	C	D	A	A	E	A	A	F	A	A
Approach Vol, veh/h		69			25			1905			1160	
Approach Delay, s/veh		30.5			39.5			7.6			6.1	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	43.0		8.0	4.8	42.7		6.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.0	16.3		3.4	2.1	9.1		2.9				
Green Ext Time (p_c), s	0.0	22.2		0.2	0.0	10.4		0.0				

Intersection Summary		
HCM 6th Ctrl Delay	7.8	
HCM 6th LOS	A	

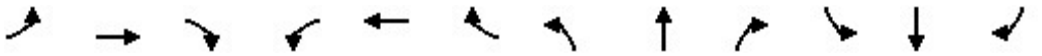
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			193			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



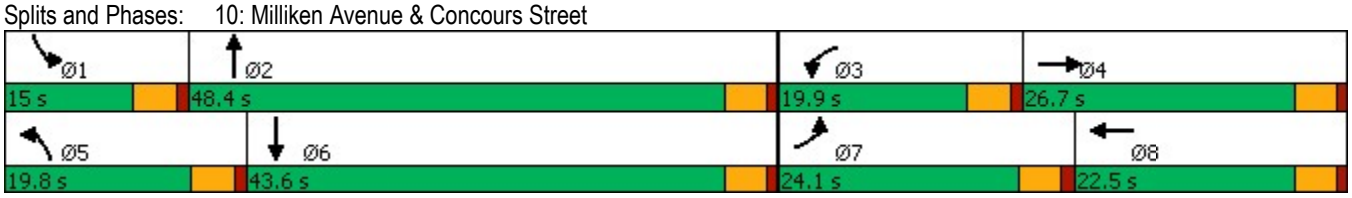
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	339	133	144	173	69	117	186	1664	130	184	1239	129
Future Volume (vph)	339	133	144	173	69	117	186	1664	130	184	1239	129
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	353	139	150	180	72	122	194	1733	135	192	1291	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	353	139	150	180	72	122	194	1733	135	192	1291	134

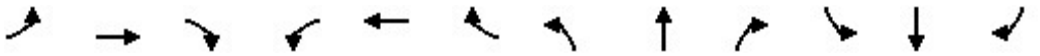
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	339	133	144	173	69	117	186	1664	130	184	1239	129
Future Volume (vph)	339	133	144	173	69	117	186	1664	130	184	1239	129
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.2	11.8	91.5	11.2	7.5	91.5	11.6	40.1	91.5	10.0	38.5	91.5
Actuated g/C Ratio	0.20	0.13	1.00	0.12	0.08	1.00	0.13	0.44	1.00	0.11	0.42	1.00
v/c Ratio	0.61	0.32	0.10	0.51	0.26	0.08	0.53	0.65	0.09	0.61	0.50	0.09
Control Delay	40.8	39.9	0.1	44.5	44.8	0.1	44.5	22.0	0.1	49.9	21.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	39.9	0.1	44.5	44.8	0.1	44.5	22.0	0.1	49.9	21.1	0.1
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		31.1			30.1			22.7			22.8	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 91.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

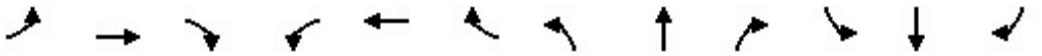
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	353	139	150	180	72	122	194	1733	135	192	1291	134
v/c Ratio	0.61	0.32	0.10	0.51	0.26	0.08	0.53	0.65	0.09	0.61	0.50	0.09
Control Delay	40.8	39.9	0.1	44.5	44.8	0.1	44.5	22.0	0.1	49.9	21.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	39.9	0.1	44.5	44.8	0.1	44.5	22.0	0.1	49.9	21.1	0.1
Queue Length 50th (ft)	106	41	0	54	22	0	58	229	0	59	159	0
Queue Length 95th (ft)	157	73	0	89	45	0	95	293	0	100	222	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	630	828	1500	495	671	1500	492	2966	1500	337	2710	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.17	0.10	0.36	0.11	0.08	0.39	0.58	0.09	0.57	0.48	0.09

Intersection Summary



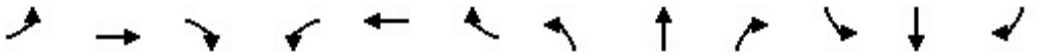
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	339	133	144	173	69	117	186	1664	130	184	1239	129
Future Volume (veh/h)	339	133	144	173	69	117	186	1664	130	184	1239	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	353	139	0	180	72	0	194	1733	0	192	1291	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	450	443		260	224		276	2730		267	2712	
Arrive On Green	0.15	0.13	0.00	0.09	0.07	0.00	0.09	0.45	0.00	0.09	0.44	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	353	139	0	180	72	0	194	1733	0	192	1291	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	8.8	2.8	0.0	4.5	1.5	0.0	4.9	16.5	0.0	4.8	11.2	0.0
Cycle Q Clear(g_c), s	8.8	2.8	0.0	4.5	1.5	0.0	4.9	16.5	0.0	4.8	11.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	450	443		260	224		276	2730		267	2712	
V/C Ratio(X)	0.78	0.31		0.69	0.32		0.70	0.63		0.72	0.48	
Avail Cap(c_a), veh/h	758	994		596	806		592	3558		406	3169	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.6	29.6	0.0	33.2	33.5	0.0	33.0	16.0	0.0	33.2	14.7	0.0
Incr Delay (d2), s/veh	3.1	0.4	0.0	3.3	0.8	0.0	3.3	0.2	0.0	3.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	1.1	0.0	1.7	0.6	0.0	1.8	5.3	0.0	1.8	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.6	30.0	0.0	36.5	34.3	0.0	36.3	16.3	0.0	36.8	14.8	0.0
LnGrp LOS	C	C		D	C		D	B		D	B	
Approach Vol, veh/h		492	A		252	A		1927	A		1483	A
Approach Delay, s/veh		32.6			35.9			18.3			17.7	
Approach LOS		C			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	38.2	11.2	14.4	11.6	38.0	16.1	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	6.8	18.5	6.5	4.8	6.9	13.2	10.8	3.5
Green Ext Time (p_c), s	0.2	15.2	0.4	0.7	0.4	10.8	0.9	0.2

Intersection Summary	
HCM 6th Ctrl Delay	20.8
HCM 6th LOS	C

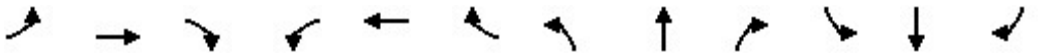
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			242			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



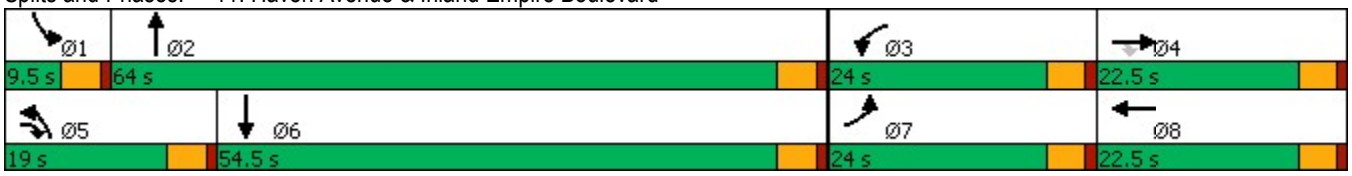
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	170	218	483	638	157	41	352	1895	435	42	2215	46
Future Volume (vph)	170	218	483	638	157	41	352	1895	435	42	2215	46
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	183	234	519	686	169	44	378	2038	468	45	2382	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	234	519	686	169	44	378	2038	468	45	2382	49

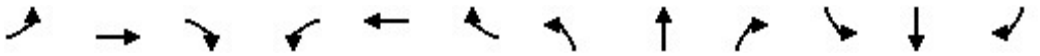
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	218	483	638	157	41	352	1895	435	42	2215	46
Future Volume (vph)	170	218	483	638	157	41	352	1895	435	42	2215	46
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	12.6	13.3	32.3	19.5	20.2	115.4	14.5	61.5	115.4	5.0	50.0	115.4
Actuated g/C Ratio	0.11	0.12	0.28	0.17	0.18	1.00	0.13	0.53	1.00	0.04	0.43	1.00
v/c Ratio	0.58	0.61	1.13	1.03	0.29	0.03	1.04	0.63	0.31	0.36	0.91	0.03
Control Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	20.8	0.5	62.9	36.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	20.8	0.5	62.9	36.8	0.0
LOS	E	E	F	F	D	A	F	C	A	E	D	A
Approach Delay		89.9			76.9			28.9			36.5	
Approach LOS		F			E			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115.4	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 45.4	Intersection LOS: D
Intersection Capacity Utilization 92.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard



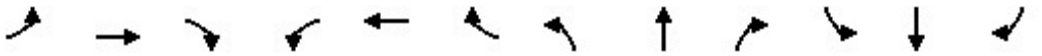


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	183	234	519	686	169	44	378	2038	468	45	2382	49
v/c Ratio	0.58	0.61	1.13	1.03	0.29	0.03	1.04	0.63	0.31	0.36	0.91	0.03
Control Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	20.8	0.5	62.9	36.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	20.8	0.5	62.9	36.8	0.0
Queue Length 50th (ft)	67	88	~417	~193	57	0	~156	308	0	17	469	0
Queue Length 95th (ft)	105	130	#623	#289	94	0	#267	375	0	38	559	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	488	523	459	666	587	1500	363	3236	1500	125	2632	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.45	1.13	1.03	0.29	0.03	1.04	0.63	0.31	0.36	0.91	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



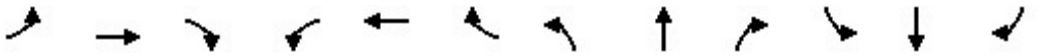
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	218	483	638	157	41	352	1895	435	42	2215	46
Future Volume (veh/h)	170	218	483	638	157	41	352	1895	435	42	2215	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	183	234	519	686	169	0	378	2038	0	45	2382	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	506	407	645	779		352	3075		94	2535	
Arrive On Green	0.08	0.15	0.15	0.16	0.23	0.00	0.12	0.50	0.00	0.03	0.42	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	183	234	519	686	169	0	378	2038	0	45	2382	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	7.4	7.6	18.0	19.5	4.9	0.0	14.5	29.8	0.0	1.8	44.9	0.0
Cycle Q Clear(g_c), s	7.4	7.6	18.0	19.5	4.9	0.0	14.5	29.8	0.0	1.8	44.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	506	407	645	779		352	3075		94	2535	
V/C Ratio(X)	0.77	0.46	1.27	1.06	0.22		1.07	0.66		0.48	0.94	
Avail Cap(c_a), veh/h	474	506	407	645	779		352	3075		121	2543	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.9	46.5	43.7	50.2	37.3	0.0	52.7	22.1	0.0	57.0	33.6	0.0
Incr Delay (d2), s/veh	5.3	0.7	141.4	53.4	0.1	0.0	68.9	0.5	0.0	3.7	7.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	3.2	27.9	9.6	2.0	0.0	8.7	10.5	0.0	0.7	17.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.2	47.2	185.1	103.5	37.4	0.0	121.6	22.6	0.0	60.7	41.3	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	D	
Approach Vol, veh/h		936			855	A		2416	A		2427	A
Approach Delay, s/veh		126.0			90.5			38.1			41.7	
Approach LOS		F			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	65.0	24.0	22.5	19.0	54.3	14.3	32.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	3.8	31.8	21.5	20.0	16.5	46.9	9.4	6.9
Green Ext Time (p_c), s	0.0	19.2	0.0	0.0	0.0	2.9	0.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	58.6
HCM 6th LOS	E

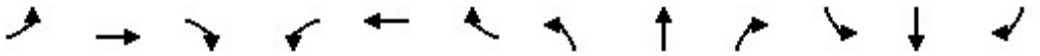
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			340			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



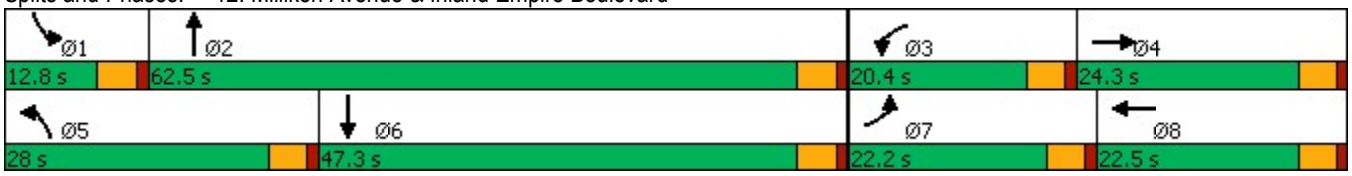
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	294	287	323	212	78	86	391	1590	365	97	1405	119
Future Volume (vph)	294	287	323	212	78	86	391	1590	365	97	1405	119
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	309	302	340	223	82	91	412	1674	384	102	1479	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	309	302	340	223	82	91	412	1674	384	102	1479	125

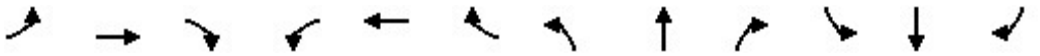
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	287	323	212	78	86	391	1590	365	97	1405	119
Future Volume (vph)	294	287	323	212	78	86	391	1590	365	97	1405	119
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.8	14.9	103.3	13.1	12.0	103.3	19.5	48.9	103.3	7.9	37.3	103.3
Actuated g/C Ratio	0.18	0.14	1.00	0.13	0.12	1.00	0.19	0.47	1.00	0.08	0.36	1.00
v/c Ratio	0.59	0.63	0.23	0.61	0.21	0.06	0.76	0.58	0.26	0.46	0.68	0.08
Control Delay	48.0	49.6	0.3	52.7	45.3	0.1	50.9	20.9	0.4	57.3	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.0	49.6	0.3	52.7	45.3	0.1	50.9	20.9	0.4	57.3	30.4	0.1
LOS	D	D	A	D	D	A	D	C	A	E	C	A
Approach Delay		31.5			39.1			22.7			29.8	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 103.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 27.6	Intersection LOS: C
Intersection Capacity Utilization 65.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	309	302	340	223	82	91	412	1674	384	102	1479	125
v/c Ratio	0.59	0.63	0.23	0.61	0.21	0.06	0.76	0.58	0.26	0.46	0.68	0.08
Control Delay	48.0	49.6	0.3	52.7	45.3	0.1	50.9	20.9	0.4	57.3	30.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.0	49.6	0.3	52.7	45.3	0.1	50.9	20.9	0.4	57.3	30.4	0.1
Queue Length 50th (ft)	106	106	0	77	27	0	141	231	0	36	245	0
Queue Length 95th (ft)	169	162	0	127	54	0	213	298	0	70	323	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	551	661	1500	457	600	1500	676	3507	1500	238	2588	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.46	0.23	0.49	0.14	0.06	0.61	0.48	0.26	0.43	0.57	0.08

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	294	287	323	212	78	86	391	1590	365	97	1405	119
Future Volume (veh/h)	294	287	323	212	78	86	391	1590	365	97	1405	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	309	302	0	223	82	0	412	1674	0	102	1479	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	393	428		301	322		507	3016		160	2289	
Arrive On Green	0.13	0.13	0.00	0.10	0.10	0.00	0.17	0.49	0.00	0.06	0.38	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	309	302	0	223	82	0	412	1674	0	102	1479	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	8.4	7.0	0.0	6.1	1.9	0.0	11.2	15.7	0.0	2.8	16.4	0.0
Cycle Q Clear(g_c), s	8.4	7.0	0.0	6.1	1.9	0.0	11.2	15.7	0.0	2.8	16.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	393	428		301	322		507	3016		160	2289	
V/C Ratio(X)	0.79	0.71		0.74	0.25		0.81	0.56		0.64	0.65	
Avail Cap(c_a), veh/h	629	813		565	740		835	4314		295	3184	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.3	34.3	0.0	35.7	34.3	0.0	32.5	14.4	0.0	37.9	21.1	0.0
Incr Delay (d2), s/veh	3.5	2.2	0.0	3.6	0.4	0.0	3.2	0.2	0.0	4.2	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	2.9	0.0	2.3	0.8	0.0	4.0	5.0	0.0	1.1	5.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.8	36.5	0.0	39.2	34.8	0.0	35.7	14.6	0.0	42.1	21.4	0.0
LnGrp LOS	D	D		D	C		D	B		D	C	
Approach Vol, veh/h		611	A		305	A		2086	A		1581	A
Approach Delay, s/veh		37.2			38.0			18.8			22.7	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	45.0	13.0	14.9	18.8	35.3	15.6	12.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	4.8	17.7	8.1	9.0	13.2	18.4	10.4	3.9
Green Ext Time (p_c), s	0.1	18.6	0.4	1.4	1.1	12.4	0.6	0.3

Intersection Summary	
HCM 6th Ctrl Delay	23.9
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.984	0.850				
Flt Protected	0.957					
Satd. Flow (prot)	3045	1365	6071	0	0	6071
Flt Permitted	0.957					
Satd. Flow (perm)	3045	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	498	314	2234	0	0	2266
Future Volume (vph)	498	314	2234	0	0	2266
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	519	327	2327	0	0	2360
Shared Lane Traffic (%)		19%				
Lane Group Flow (vph)	581	265	2327	0	0	2360

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	498	314	2234	2266
Future Volume (vph)	498	314	2234	2266
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	16.5	16.5	36.6	36.6
Actuated g/C Ratio	0.27	0.27	0.59	0.59
v/c Ratio	0.72	0.73	0.65	0.66
Control Delay	26.0	33.1	10.0	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.0	33.1	10.0	10.2
LOS	C	C	B	B
Approach Delay	28.2		10.0	10.2
Approach LOS	C		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 62.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 12.9	Intersection LOS: B
Intersection Capacity Utilization 64.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	581	265	2327	2360
v/c Ratio	0.72	0.73	0.65	0.66
Control Delay	26.0	33.1	10.0	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.0	33.1	10.0	10.2
Queue Length 50th (ft)	101	97	159	164
Queue Length 95th (ft)	149	#184	210	215
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	960	431	3575	3575
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.61	0.65	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

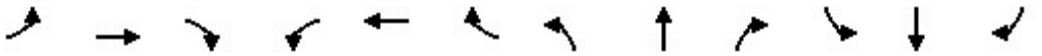
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	498	314	2234	0	0	2266
Future Volume (veh/h)	498	314	2234	0	0	2266
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	561	282	2327	0	0	2360
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	789	371	3611	0	0	3611
Arrive On Green	0.25	0.25	0.59	0.00	0.00	0.59
Sat Flow, veh/h	3188	1502	6592	0	0	6592
Grp Volume(v), veh/h	561	282	2327	0	0	2360
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	9.0	9.8	14.1	0.0	0.0	14.5
Cycle Q Clear(g_c), s	9.0	9.8	14.1	0.0	0.0	14.5
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	789	371	3611	0	0	3611
V/C Ratio(X)	0.71	0.76	0.64	0.00	0.00	0.65
Avail Cap(c_a), veh/h	1107	521	3961	0	0	3961
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	19.3	19.6	7.5	0.0	0.0	7.6
Incr Delay (d2), s/veh	1.3	4.1	0.3	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	3.5	3.3	0.0	0.0	3.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.6	23.7	7.9	0.0	0.0	8.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	843		2327			2360
Approach Delay, s/veh	21.6		7.9			8.0
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		37.8			37.8	18.4
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		16.1			16.5	11.8
Green Ext Time (p_c), s		16.9			16.8	2.1

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

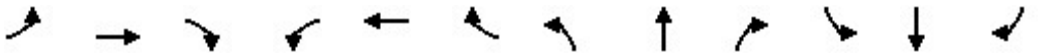
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			136			281			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



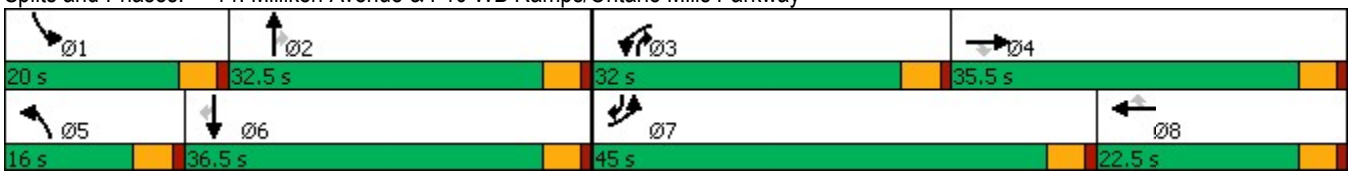
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	775	197	237	253	301	63	240	1020	453	332	1073	479
Future Volume (vph)	775	197	237	253	301	63	240	1020	453	332	1073	479
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	807	205	247	264	314	66	250	1063	472	346	1118	499
Shared Lane Traffic (%)												
Lane Group Flow (vph)	807	205	247	264	314	66	250	1063	472	346	1118	499

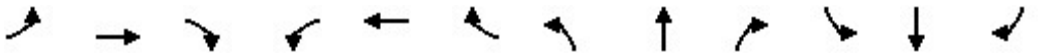
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	775	197	237	253	301	63	240	1020	453	332	1073	479
Future Volume (vph)	775	197	237	253	301	63	240	1020	453	332	1073	479
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	35.9	34.9	34.9	16.3	15.2	15.2	11.6	26.1	46.9	15.5	29.9	70.3
Actuated g/C Ratio	0.32	0.31	0.31	0.15	0.14	0.14	0.10	0.24	0.42	0.14	0.27	0.63
v/c Ratio	0.86	0.37	0.43	0.62	0.68	0.20	0.83	0.75	0.59	0.86	0.68	0.51
Control Delay	46.2	32.8	15.6	52.0	54.7	1.4	72.9	43.8	12.7	69.6	39.4	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	32.8	15.6	52.0	54.7	1.4	72.9	43.8	12.7	69.6	39.4	11.9
LOS	D	C	B	D	D	A	E	D	B	E	D	B
Approach Delay		38.0			48.2			39.6			37.7	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 110.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 39.6	Intersection LOS: D
Intersection Capacity Utilization 76.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	807	205	247	264	314	66	250	1063	472	346	1118	499
v/c Ratio	0.86	0.37	0.43	0.62	0.68	0.20	0.83	0.75	0.59	0.86	0.68	0.51
Control Delay	46.2	32.8	15.6	52.0	54.7	1.4	72.9	43.8	12.7	69.6	39.4	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	32.8	15.6	52.0	54.7	1.4	72.9	43.8	12.7	69.6	39.4	11.9
Queue Length 50th (ft)	287	117	55	98	121	0	97	217	103	135	220	159
Queue Length 95th (ft)	376	197	137	138	171	0	#178	265	199	#229	267	251
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1069	574	586	726	551	360	303	1552	923	409	1774	1038
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.36	0.42	0.36	0.57	0.18	0.83	0.68	0.51	0.85	0.63	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	775	197	237	253	301	63	240	1020	453	332	1073	479
Future Volume (veh/h)	775	197	237	253	301	63	240	1020	453	332	1073	479
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	807	205	247	264	314	66	250	1062	472	346	1118	499
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	896	556	471	334	405	181	301	1613	570	398	1816	910
Arrive On Green	0.31	0.31	0.31	0.11	0.12	0.12	0.10	0.26	0.26	0.14	0.30	0.30
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	807	205	247	264	314	66	250	1062	472	346	1118	499
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	28.1	9.5	14.3	9.3	9.6	4.3	8.9	16.4	28.0	12.3	16.7	20.8
Cycle Q Clear(g_c), s	28.1	9.5	14.3	9.3	9.6	4.3	8.9	16.4	28.0	12.3	16.7	20.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	896	556	471	334	405	181	301	1613	570	398	1816	910
V/C Ratio(X)	0.90	0.37	0.52	0.79	0.77	0.37	0.83	0.66	0.83	0.87	0.62	0.55
Avail Cap(c_a), veh/h	1114	556	471	756	573	255	316	1613	570	426	1844	917
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	28.2	29.8	45.6	45.1	42.8	46.5	34.6	29.7	44.7	31.9	12.3
Incr Delay (d2), s/veh	8.7	0.4	1.1	4.2	4.3	1.2	16.1	1.0	9.9	16.4	0.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	4.1	5.2	3.6	4.2	1.6	3.9	6.1	12.1	5.3	6.1	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.7	28.6	30.9	49.8	49.4	44.0	62.6	35.6	39.6	61.1	32.5	13.0
LnGrp LOS	D	C	C	D	D	D	E	D	D	E	C	B
Approach Vol, veh/h		1259			644			1784			1963	
Approach Delay, s/veh		38.7			49.0			40.5			32.6	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	32.5	16.6	37.7	15.5	36.0	37.1	17.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	14.3	30.0	11.3	16.3	10.9	22.8	30.1	11.6
Green Ext Time (p_c), s	0.2	0.0	0.8	1.8	0.1	6.1	2.5	1.2

Intersection Summary	
HCM 6th Ctrl Delay	38.3
HCM 6th LOS	D

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3066	1365	0	6071	6071	0
Flt Permitted	0.955					
Satd. Flow (perm)	3066	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6	14				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

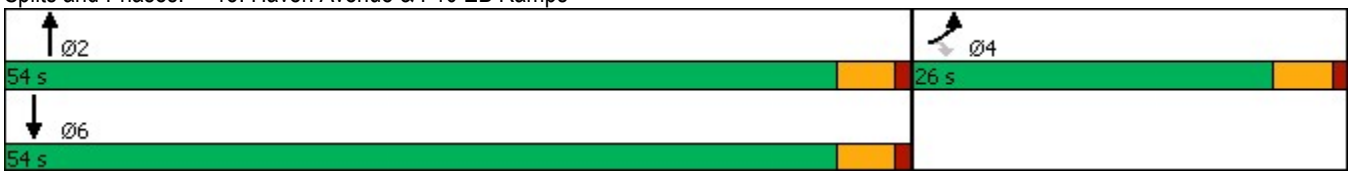
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	505	247	0	2465	1900	0
Future Volume (vph)	505	247	0	2465	1900	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	526	257	0	2568	1979	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	552	231	0	2568	1979	0

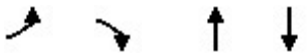
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	505	247	2465	1900
Future Volume (vph)	505	247	2465	1900
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	18.3	18.3	49.6	49.6
Actuated g/C Ratio	0.24	0.24	0.64	0.64
v/c Ratio	0.75	0.69	0.66	0.51
Control Delay	33.9	36.4	9.8	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.9	36.4	9.8	8.1
LOS	C	D	A	A
Approach Delay	34.6		9.8	8.1
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 76.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 64.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	552	231	2568	1979
v/c Ratio	0.75	0.69	0.66	0.51
Control Delay	33.9	36.4	9.8	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	33.9	36.4	9.8	8.1
Queue Length 50th (ft)	125	103	204	134
Queue Length 95th (ft)	178	186	259	173
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	862	392	3912	3912
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.64	0.59	0.66	0.51

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	505	247	0	2465	1900	0
Future Volume (veh/h)	505	247	0	2465	1900	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	526	257	0	2568	1979	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	701	330	0	3959	3959	0
Arrive On Green	0.22	0.22	0.00	0.65	0.65	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	526	257	0	2568	1979	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	10.6	11.1	0.0	17.6	11.6	0.0
Cycle Q Clear(g_c), s	10.6	11.1	0.0	17.6	11.6	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	701	330	0	3959	3959	0
V/C Ratio(X)	0.75	0.78	0.00	0.65	0.50	0.00
Avail Cap(c_a), veh/h	995	469	0	4380	4380	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.1	25.3	0.0	7.3	6.3	0.0
Incr Delay (d2), s/veh	2.0	5.3	0.0	0.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.2	0.0	4.3	2.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.1	30.6	0.0	7.6	6.4	0.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	783			2568	1979	
Approach Delay, s/veh	28.2			7.6	6.4	
Approach LOS	C			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		49.2		19.6		49.2
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		19.6		13.1		13.6
Green Ext Time (p_c), s		25.2		2.0		22.0

Intersection Summary	
HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		9				83
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	513	202	326	1206	1018	562
Future Volume (vph)	513	202	326	1206	1018	562
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	529	208	336	1243	1049	579
Shared Lane Traffic (%)						
Lane Group Flow (vph)	529	208	336	1243	1049	579

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	513	202	326	1206	1018	562
Future Volume (vph)	513	202	326	1206	1018	562
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.3	29.8	9.9	31.0	16.6	36.5
Actuated g/C Ratio	0.28	0.54	0.18	0.56	0.30	0.66
v/c Ratio	0.66	0.26	0.65	0.37	0.58	0.57
Control Delay	22.6	7.8	29.4	7.4	18.4	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	7.8	29.4	7.4	18.4	6.9
LOS	C	A	C	A	B	A
Approach Delay	18.4			12.1	14.3	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 55.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 55.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	529	208	336	1243	1049	579
v/c Ratio	0.66	0.26	0.65	0.37	0.58	0.57
Control Delay	22.6	7.8	29.4	7.4	18.4	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	7.8	29.4	7.4	18.4	6.9
Queue Length 50th (ft)	83	34	58	64	90	70
Queue Length 95th (ft)	128	66	#100	86	121	135
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	952	827	550	3666	2010	1089
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.25	0.61	0.34	0.52	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

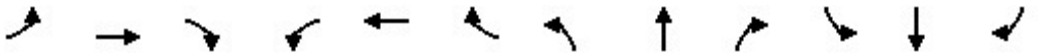
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	513	202	326	1206	1018	562
Future Volume (veh/h)	513	202	326	1206	1018	562
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	529	208	336	1243	1049	579
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	704	595	450	3553	2077	875
Arrive On Green	0.24	0.24	0.15	0.58	0.34	0.34
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	529	208	336	1243	1049	579
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	8.7	5.0	5.7	5.5	7.0	13.5
Cycle Q Clear(g_c), s	8.7	5.0	5.7	5.5	7.0	13.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	704	595	450	3553	2077	875
V/C Ratio(X)	0.75	0.35	0.75	0.35	0.51	0.66
Avail Cap(c_a), veh/h	1019	758	589	3915	2147	892
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	10.9	20.8	5.6	13.5	7.3
Incr Delay (d2), s/veh	1.9	0.4	3.7	0.1	0.2	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	4.8	2.0	1.2	2.1	6.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.9	11.2	24.5	5.7	13.7	9.1
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	737			1579	1628	
Approach Delay, s/veh	17.5			9.7	12.0	
Approach LOS	B			A	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		34.5		16.9	12.4	22.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		7.5		10.7	7.7	15.5
Green Ext Time (p_c), s		10.3		1.8	0.3	2.1

Intersection Summary	
HCM 6th Ctrl Delay	12.1
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.972				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50				181			262		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	52	551	128	207	523	170	185	1148	361	176	1115	79
Future Volume (vph)	52	551	128	207	523	170	185	1148	361	176	1115	79
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	55	586	136	220	556	181	197	1221	384	187	1186	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	722	0	220	556	181	197	1221	384	187	1270	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	52	551	207	523	170	185	1148	361	176	1115
Future Volume (vph)	52	551	207	523	170	185	1148	361	176	1115
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	20.0	11.3	28.4	28.4	11.8	36.0	95.2	9.8	34.1
Actuated g/C Ratio	0.05	0.21	0.12	0.30	0.30	0.12	0.38	1.00	0.10	0.36
v/c Ratio	0.36	0.71	0.64	0.56	0.32	0.55	0.67	0.26	0.63	0.59
Control Delay	52.4	36.7	49.9	31.1	5.6	45.7	27.6	0.4	51.8	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.4	36.7	49.9	31.1	5.6	45.7	27.6	0.4	51.8	27.0
LOS	D	D	D	C	A	D	C	A	D	C
Approach Delay		37.8		30.6			23.8			30.2
Approach LOS		D		C			C			C

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 95.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 29.1	Intersection LOS: C
Intersection Capacity Utilization 65.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	55	722	220	556	181	197	1221	384	187	1270
v/c Ratio	0.36	0.71	0.64	0.56	0.32	0.55	0.67	0.26	0.63	0.59
Control Delay	52.4	36.7	49.9	31.1	5.6	45.7	27.6	0.4	51.8	27.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.4	36.7	49.9	31.1	5.6	45.7	27.6	0.4	51.8	27.0
Queue Length 50th (ft)	17	142	67	154	0	60	232	0	58	183
Queue Length 95th (ft)	38	185	108	208	48	94	294	0	96	243
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	152	1178	381	1081	606	502	1822	1500	319	2160
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.61	0.58	0.51	0.30	0.39	0.67	0.26	0.59	0.59

Intersection Summary

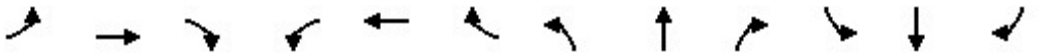
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	551	128	207	523	170	185	1148	361	176	1115	79
Future Volume (veh/h)	52	551	128	207	523	170	185	1148	361	176	1115	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	55	586	136	220	556	181	197	1221	0	187	1186	84
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	122	790	180	288	867	387	269	1978		252	2360	166
Arrive On Green	0.04	0.20	0.20	0.10	0.26	0.26	0.09	0.41	0.00	0.09	0.40	0.40
Sat Flow, veh/h	2910	3939	897	2910	3367	1502	2910	4837	1502	2910	5856	413
Grp Volume(v), veh/h	55	478	244	220	556	181	197	1221	0	187	925	345
Grp Sat Flow(s),veh/h/ln	1455	1612	1611	1455	1683	1502	1455	1612	1502	1455	1524	1698
Q Serve(g_s), s	1.6	12.2	12.5	6.5	12.9	8.9	5.8	17.5	0.0	5.5	13.3	13.4
Cycle Q Clear(g_c), s	1.6	12.2	12.5	6.5	12.9	8.9	5.8	17.5	0.0	5.5	13.3	13.4
Prop In Lane	1.00		0.56	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	122	647	323	288	867	387	269	1978		252	1842	684
V/C Ratio(X)	0.45	0.74	0.76	0.76	0.64	0.47	0.73	0.62		0.74	0.50	0.50
Avail Cap(c_a), veh/h	166	849	424	414	1174	523	547	1978		348	1842	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.1	32.9	33.1	38.5	29.0	27.5	38.8	20.5	0.0	39.1	19.6	19.6
Incr Delay (d2), s/veh	2.6	2.4	5.5	5.1	0.8	0.9	3.8	1.5	0.0	5.4	1.0	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	4.9	5.3	2.5	5.2	3.2	2.2	6.5	0.0	2.1	4.7	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	35.4	38.6	43.6	29.8	28.4	42.6	22.0	0.0	44.6	20.6	22.3
LnGrp LOS	D	D	D	D	C	C	D	C		D	C	C
Approach Vol, veh/h		777			957			1418	A		1457	
Approach Delay, s/veh		37.0			32.7			24.8			24.1	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	40.4	13.2	22.1	12.6	39.9	8.2	27.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	7.5	19.5	8.5	14.5	7.8	15.4	3.6	14.9
Green Ext Time (p_c), s	0.2	8.0	0.3	3.1	0.4	7.4	0.0	4.0

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

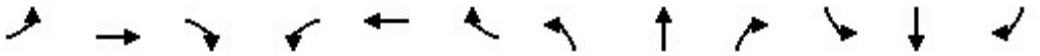
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.850			0.850		0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	1667	6071	0	1583	4818	1500	1667	1765	1500	1583	2850	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	1667	6071	0	1583	4818	1500	1667	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				153			386		399	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



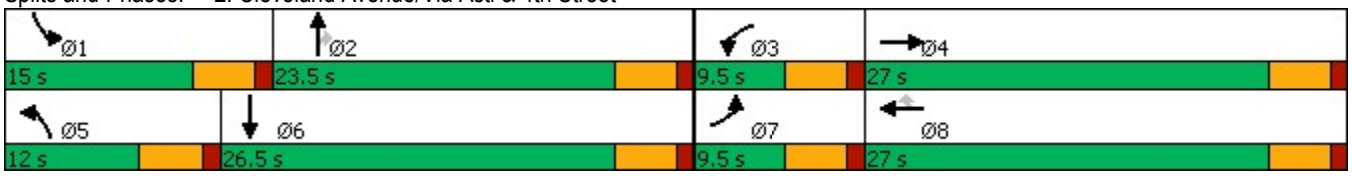
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1170	4	3	912	4	0	0	4	3	0	1
Future Volume (vph)	0	1170	4	3	912	4	0	0	4	3	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1206	4	3	940	4	0	0	4	3	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1210	0	3	940	4	0	0	4	3	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT	Ø5	Ø7
Lane Configurations									
Traffic Volume (vph)	1170	3	912	4	4	3	0		
Future Volume (vph)	1170	3	912	4	4	3	0		
Turn Type	NA	Prot	NA	Perm	Perm	Prot	NA		
Protected Phases	4	3	8			1	6	5	7
Permitted Phases				8	2				
Detector Phase	4	3	8	8	2	1	6		
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	22.5	9.5	22.5	9.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	23.5	15.0	26.5	12.0	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	31.3%	20.0%	35.3%	16%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
Lead/Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min	None	None
Act Effct Green (s)	17.4	5.4	18.6	18.6	5.9	6.0	7.2		
Actuated g/C Ratio	0.49	0.15	0.52	0.52	0.17	0.17	0.20		
v/c Ratio	0.41	0.01	0.37	0.00	0.01	0.01	0.00		
Control Delay	7.2	19.3	5.5	0.0	0.0	18.3	0.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	7.2	19.3	5.5	0.0	0.0	18.3	0.0		
LOS	A	B	A	A	A	B	A		
Approach Delay	7.2		5.5				13.8		
Approach LOS	A		A				B		

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 35.5	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 6.5	Intersection LOS: A
Intersection Capacity Utilization 37.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



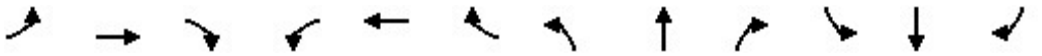
Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT
Lane Group Flow (vph)	1210	3	940	4	4	3	1
v/c Ratio	0.41	0.01	0.37	0.00	0.01	0.01	0.00
Control Delay	7.2	19.3	5.5	0.0	0.0	18.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	19.3	5.5	0.0	0.0	18.3	0.0
Queue Length 50th (ft)	25	1	25	0	0	1	0
Queue Length 95th (ft)	115	8	78	0	0	7	0
Internal Link Dist (ft)	2546		362				358
Turn Bay Length (ft)		130		145	165	50	
Base Capacity (vph)	4135	239	3442	1115	1026	503	2031
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.01	0.27	0.00	0.00	0.01	0.00

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1170	4	3	912	4	0	0	4	3	0	1
Future Volume (veh/h)	0	1170	4	3	912	4	0	0	4	3	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	0	1206	4	3	940	4	0	0	4	3	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	2442	8	7	2462	764	4	233	198	7	428	382
Arrive On Green	0.00	0.39	0.39	0.00	0.51	0.51	0.00	0.00	0.13	0.00	0.00	0.25
Sat Flow, veh/h	1594	6319	21	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	0	872	338	3	940	4	0	0	4	3	0	1
Grp Sat Flow(s),veh/h/ln	1594	1524	1768	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.0	5.5	5.5	0.1	4.5	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.5	5.5	0.1	4.5	0.0	0.0	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	4	1767	683	7	2462	764	4	233	198	7	428	382
V/C Ratio(X)	0.00	0.49	0.49	0.46	0.38	0.01	0.00	0.00	0.02	0.46	0.00	0.00
Avail Cap(c_a), veh/h	210	2707	1047	210	2864	889	315	886	751	440	975	869
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	8.8	8.8	18.9	5.7	4.6	0.0	0.0	14.4	18.9	0.0	10.6
Incr Delay (d2), s/veh	0.0	0.2	0.6	42.9	0.1	0.0	0.0	0.0	0.0	42.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	1.6	0.1	0.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	9.1	9.4	61.8	5.8	4.6	0.0	0.0	14.4	61.8	0.0	10.6
LnGrp LOS	A	A	A	E	A	A	A	A	B	E	A	B
Approach Vol, veh/h		1210			947			4			4	
Approach Delay, s/veh		9.1			6.0			14.4			49.0	
Approach LOS		A			A			B			D	

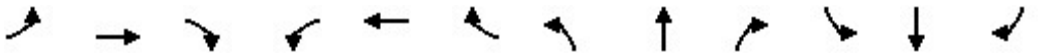
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.7	9.5	4.7	19.2	0.0	14.2	0.0	23.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	2.1	2.1	2.1	7.5	0.0	2.0	0.0	6.5
Green Ext Time (p_c), s	0.0	0.0	0.0	7.2	0.0	0.0	0.0	6.0

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4779	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.725				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4779	0	1208	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			15				225			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



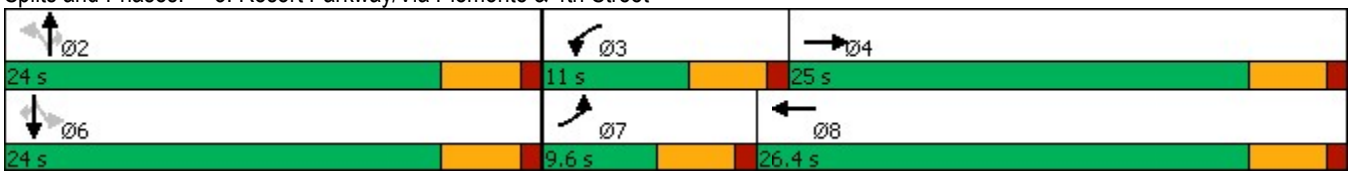
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	1151	8	5	884	47	3	0	8	47	1	16
Future Volume (vph)	11	1151	8	5	884	47	3	0	8	47	1	16
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	1187	8	5	911	48	3	0	8	48	1	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1195	0	5	959	0	3	0	8	0	49	16

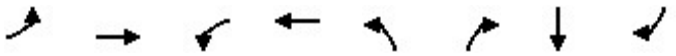
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	11	1151	5	884	3	8	47	1	16
Future Volume (vph)	11	1151	5	884	3	8	47	1	16
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.4	16.7	6.0	16.9	7.0	7.0		7.0	7.0
Actuated g/C Ratio	0.16	0.48	0.17	0.49	0.20	0.20		0.20	0.20
v/c Ratio	0.02	0.41	0.02	0.41	0.01	0.02		0.19	0.04
Control Delay	17.2	6.9	16.6	6.8	14.7	0.1		16.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	17.2	6.9	16.6	6.8	14.7	0.1		16.2	0.2
LOS	B	A	B	A	B	A		B	A
Approach Delay		7.0		6.8				12.2	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 34.7	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 7.0	Intersection LOS: A
Intersection Capacity Utilization 38.7%	ICU Level of Service A
Analysis Period (min) 15	

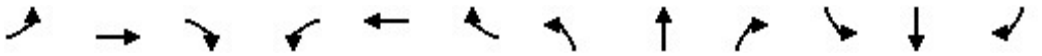
Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	11	1195	5	959	3	8	49	16
v/c Ratio	0.02	0.41	0.02	0.41	0.01	0.02	0.19	0.04
Control Delay	17.2	6.9	16.6	6.8	14.7	0.1	16.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	6.9	16.6	6.8	14.7	0.1	16.2	0.2
Queue Length 50th (ft)	1	29	1	28	1	0	7	0
Queue Length 95th (ft)	7	93	9	93	6	0	35	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	447	3779	312	3179	714	979	762	931
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.32	0.02	0.30	0.00	0.01	0.06	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1151	8	5	884	47	3	0	8	47	1	16
Future Volume (veh/h)	11	1151	8	5	884	47	3	0	8	47	1	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	11	1187	8	5	911	48	3	0	8	48	1	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	2604	18	11	1910	100	393	278	235	438	7	235
Arrive On Green	0.01	0.41	0.41	0.01	0.41	0.41	0.16	0.00	0.16	0.16	0.16	0.16
Sat Flow, veh/h	2910	6293	42	1594	4705	247	1318	1772	1502	1373	43	1502
Grp Volume(v), veh/h	11	862	333	5	624	335	3	0	8	49	0	16
Grp Sat Flow(s),veh/h/ln	1455	1524	1764	1594	1612	1727	1318	1772	1502	1416	0	1502
Q Serve(g_s), s	0.1	4.3	4.4	0.1	4.5	4.6	0.1	0.0	0.1	0.9	0.0	0.3
Cycle Q Clear(g_c), s	0.1	4.3	4.4	0.1	4.5	4.6	1.0	0.0	0.1	1.0	0.0	0.3
Prop In Lane	1.00		0.02	1.00		0.14	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	42	1891	730	11	1309	701	393	278	235	445	0	235
V/C Ratio(X)	0.26	0.46	0.46	0.46	0.48	0.48	0.01	0.00	0.03	0.11	0.00	0.07
Avail Cap(c_a), veh/h	465	2935	1133	324	2212	1185	991	1082	917	1087	0	917
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.6	6.8	6.8	15.8	7.0	7.0	12.2	0.0	11.4	11.8	0.0	11.5
Incr Delay (d2), s/veh	3.2	0.2	0.4	27.7	0.3	0.5	0.0	0.0	0.1	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.9	1.0	0.1	1.0	1.1	0.0	0.0	0.0	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.8	6.9	7.2	43.5	7.3	7.5	12.2	0.0	11.5	11.9	0.0	11.6
LnGrp LOS	B	A	A	D	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1206			964			11			65	
Approach Delay, s/veh		7.1			7.5			11.7			11.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	4.7	17.7		9.5	5.0	17.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		3.0	2.1	6.4		3.0	2.1	6.6				
Green Ext Time (p_c), s		0.0	0.0	6.9		0.2	0.0	5.7				

Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	4774	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4774	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1131	75	0	957	0	16
Future Volume (vph)	1131	75	0	957	0	16
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1191	79	0	1007	0	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1270	0	0	1007	0	17

Intersection Summary

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1131	75	0	957	0	16
Future Vol, veh/h	1131	75	0	957	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1191	79	0	1007	0	17

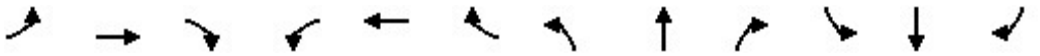
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	635
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	361
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	361
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	361	-	-	-
HCM Lane V/C Ratio	0.047	-	-	-
HCM Control Delay (s)	15.5	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			257			293			95		38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



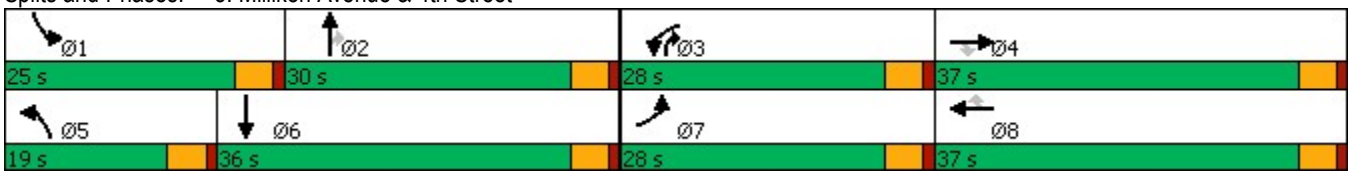
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	274	918	283	527	662	278	207	853	364	390	825	152
Future Volume (vph)	274	918	283	527	662	278	207	853	364	390	825	152
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	288	966	298	555	697	293	218	898	383	411	868	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	288	966	298	555	697	293	218	898	383	411	1028	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	274	918	283	527	662	278	207	853	364	390	825
Future Volume (vph)	274	918	283	527	662	278	207	853	364	390	825
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	16.8	30.4	30.4	23.6	37.3	37.3	12.9	23.6	51.7	19.3	29.9
Actuated g/C Ratio	0.15	0.26	0.26	0.21	0.32	0.32	0.11	0.21	0.45	0.17	0.26
v/c Ratio	0.68	0.76	0.51	0.94	0.45	0.43	0.67	0.72	0.53	0.85	0.65
Control Delay	55.7	43.6	10.2	70.4	32.9	5.8	60.6	46.7	20.3	64.2	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	43.6	10.2	70.4	32.9	5.8	60.6	46.7	20.3	64.2	39.1
LOS	E	D	B	E	C	A	E	D	C	E	D
Approach Delay		39.4			41.2			42.0			46.2
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 42.2	Intersection LOS: D
Intersection Capacity Utilization 77.8%	ICU Level of Service D
Analysis Period (min) 15	

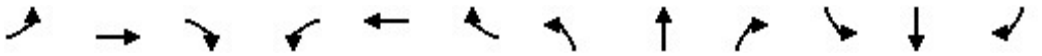
Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	288	966	298	555	697	293	218	898	383	411	1028
v/c Ratio	0.68	0.76	0.51	0.94	0.45	0.43	0.67	0.72	0.53	0.85	0.65
Control Delay	55.7	43.6	10.2	70.4	32.9	5.8	60.6	46.7	20.3	64.2	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	43.6	10.2	70.4	32.9	5.8	60.6	46.7	20.3	64.2	39.1
Queue Length 50th (ft)	110	250	24	222	156	0	84	188	157	160	198
Queue Length 95th (ft)	151	302	104	#338	207	66	126	227	252	#239	238
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	593	1368	610	593	1562	684	366	1353	726	517	1662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.71	0.49	0.94	0.45	0.43	0.60	0.66	0.53	0.79	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



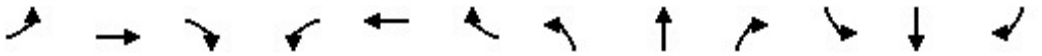
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	274	918	283	527	662	278	207	853	364	390	825	152
Future Volume (veh/h)	274	918	283	527	662	278	207	853	364	390	825	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	288	966	298	555	697	293	218	898	383	411	868	160
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	352	1214	377	600	1625	505	272	1358	644	466	1513	274
Arrive On Green	0.12	0.25	0.25	0.21	0.34	0.34	0.09	0.22	0.22	0.16	0.29	0.29
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5228	946
Grp Volume(v), veh/h	288	966	298	555	697	293	218	898	383	411	757	271
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1602
Q Serve(g_s), s	10.9	21.0	20.8	21.0	12.6	18.1	8.3	15.1	22.0	15.5	15.9	16.3
Cycle Q Clear(g_c), s	10.9	21.0	20.8	21.0	12.6	18.1	8.3	15.1	22.0	15.5	15.9	16.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.59
Lane Grp Cap(c), veh/h	352	1214	377	600	1625	505	272	1358	644	466	1323	464
V/C Ratio(X)	0.82	0.80	0.79	0.93	0.43	0.58	0.80	0.66	0.59	0.88	0.57	0.58
Avail Cap(c_a), veh/h	608	1399	434	608	1625	505	375	1383	650	531	1323	464
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.2	39.4	39.4	43.8	29.0	30.8	49.9	39.8	24.6	46.2	34.0	34.2
Incr Delay (d2), s/veh	4.7	2.9	8.4	20.1	0.2	1.7	8.3	1.2	1.4	14.6	0.6	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	8.6	8.5	9.2	4.9	6.7	3.3	5.7	7.9	6.5	5.9	6.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.9	42.3	47.8	63.9	29.1	32.5	58.3	41.0	26.1	60.8	34.6	36.0
LnGrp LOS	D	D	D	E	C	C	E	D	C	E	C	D
Approach Vol, veh/h		1552			1545			1499			1439	
Approach Delay, s/veh		45.3			42.3			39.7			42.4	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.5	29.5	27.7	32.7	15.0	37.0	18.1	42.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	17.5	24.0	23.0	23.0	10.3	18.3	12.9	20.1
Green Ext Time (p_c), s	0.5	1.1	0.1	5.2	0.3	5.8	0.7	4.7

Intersection Summary	
HCM 6th Ctrl Delay	42.4
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.947	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3042	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3042	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			163			277			373		79	402
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



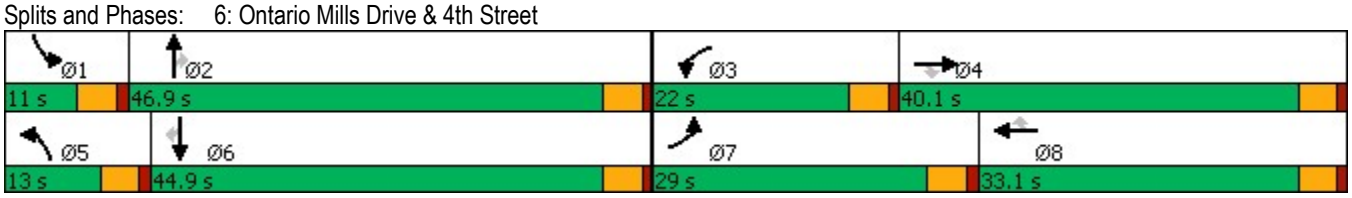
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	730	1067	156	410	880	420	182	318	488	68	632	775
Future Volume (vph)	730	1067	156	410	880	420	182	318	488	68	632	775
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	760	1111	163	427	917	438	190	331	508	71	658	807
Shared Lane Traffic (%)												44%
Lane Group Flow (vph)	760	1111	163	427	917	438	190	331	508	71	1013	452

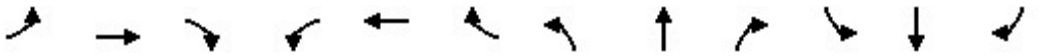
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	730	1067	156	410	880	420	182	318	488	68	632	775
Future Volume (vph)	730	1067	156	410	880	420	182	318	488	68	632	775
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	35.0	35.0	17.5	28.0	28.0	8.5	42.2	42.2	6.5	40.2	40.2
Actuated g/C Ratio	0.21	0.29	0.29	0.15	0.23	0.23	0.07	0.35	0.35	0.05	0.34	0.34
v/c Ratio	1.28	0.79	0.29	1.01	0.81	0.78	1.68	0.28	0.66	0.83	0.94	0.62
Control Delay	177.7	43.4	6.2	96.5	49.8	25.9	378.5	28.5	12.9	115.0	51.9	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	177.7	43.4	6.2	96.5	49.8	25.9	378.5	28.5	12.9	115.0	51.9	9.0
LOS	F	D	A	F	D	C	F	C	B	F	D	A
Approach Delay		90.6			55.1			85.4			42.2	
Approach LOS		F			E			F			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.68	
Intersection Signal Delay: 68.2	Intersection LOS: E
Intersection Capacity Utilization 96.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



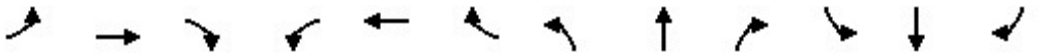


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	760	1111	163	427	917	438	190	331	508	71	1013	452
v/c Ratio	1.28	0.79	0.29	1.01	0.81	0.78	1.68	0.28	0.66	0.83	0.94	0.62
Control Delay	177.7	43.4	6.2	96.5	49.8	25.9	378.5	28.5	12.9	115.0	51.9	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	177.7	43.4	6.2	96.5	49.8	25.9	378.5	28.5	12.9	115.0	51.9	9.0
Queue Length 50th (ft)	~386	287	0	~175	246	118	~216	96	78	56	390	29
Queue Length 95th (ft)	#508	344	50	#283	299	254	#366	134	205	#144	#536	141
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	594	1438	562	424	1155	570	113	1192	774	86	1083	728
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.28	0.77	0.29	1.01	0.79	0.77	1.68	0.28	0.66	0.83	0.94	0.62

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



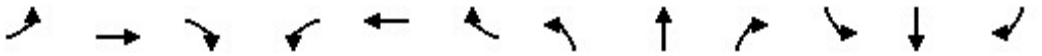
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	730	1067	156	410	880	420	182	318	488	68	632	775
Future Volume (veh/h)	730	1067	156	410	880	420	182	318	488	68	632	775
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	760	1111	162	427	917	438	190	331	508	71	648	814
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	760	1111	162	427	917	438	190	331	508	71	648	814
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	24.5	25.2	10.2	17.5	21.4	28.6	8.5	8.5	39.7	5.3	40.4	29.6
Cycle Q Clear(g_c), s	24.5	25.2	10.2	17.5	21.4	28.6	8.5	8.5	39.7	5.3	40.4	29.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
V/C Ratio(X)	1.28	0.77	0.36	1.01	0.80	1.22	1.68	0.28	0.96	0.82	1.09	0.81
Avail Cap(c_a), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	38.5	33.3	51.3	43.0	45.7	55.8	27.8	37.9	56.2	39.8	36.2
Incr Delay (d2), s/veh	138.2	2.7	0.5	45.2	4.0	123.2	342.6	0.1	28.6	44.7	62.4	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.2	10.2	3.8	9.0	8.9	22.8	14.2	3.4	18.5	3.2	27.6	11.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	186.0	41.2	33.8	96.5	46.9	168.9	398.3	28.0	66.5	100.9	102.2	41.1
LnGrp LOS	F	D	C	F	D	F	F	C	E	F	F	D
Approach Vol, veh/h		2033			1782			1029			1533	
Approach Delay, s/veh		94.8			88.8			115.4			69.7	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	46.9	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	7.3	41.7	19.5	27.2	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	0.3	0.0	5.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	90.4
HCM 6th LOS	F

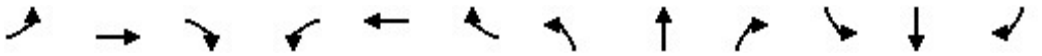
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.981			0.939				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (prot)	2891	4818	1500	1583	4726	0	1583	3148	0	1504	1670	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (perm)	2891	4818	1500	1583	4726	0	1583	3148	0	1504	1670	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			99		19			50				428
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



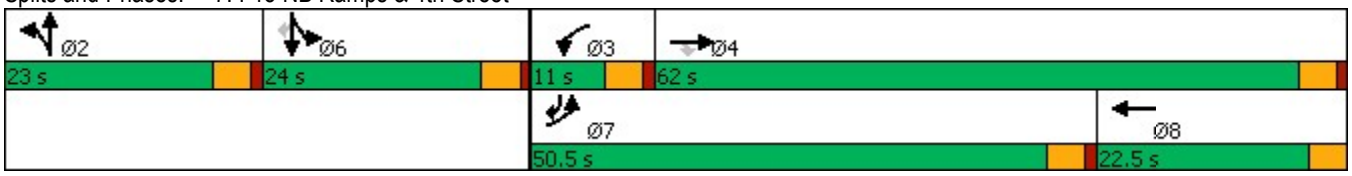
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1014	478	93	32	508	73	95	68	47	71	76	1134
Future Volume (vph)	1014	478	93	32	508	73	95	68	47	71	76	1134
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1079	509	99	34	540	78	101	72	50	76	81	1206
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	1079	509	99	34	618	0	101	122	0	68	89	1206

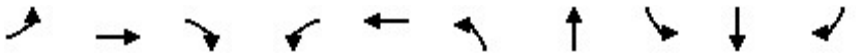
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1014	478	93	32	508	95	68	71	76	1134
Future Volume (vph)	1014	478	93	32	508	95	68	71	76	1134
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	44.9	59.8	59.8	6.3	17.6	12.0	12.0	10.9	10.9	60.3
Actuated g/C Ratio	0.44	0.58	0.58	0.06	0.17	0.12	0.12	0.11	0.11	0.59
v/c Ratio	0.85	0.18	0.11	0.35	0.75	0.55	0.30	0.43	0.50	0.70
Control Delay	35.2	11.9	3.3	60.2	46.5	55.8	28.1	53.4	55.2	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	11.9	3.3	60.2	46.5	55.8	28.1	53.4	55.2	11.8
LOS	D	B	A	E	D	E	C	D	E	B
Approach Delay		26.3			47.2		40.6		16.7	
Approach LOS		C			D		D		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 102.5	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1079	509	99	34	618	101	122	68	89	1206
v/c Ratio	0.85	0.18	0.11	0.35	0.75	0.55	0.30	0.43	0.50	0.70
Control Delay	35.2	11.9	3.3	60.2	46.5	55.8	28.1	53.4	55.2	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	11.9	3.3	60.2	46.5	55.8	28.1	53.4	55.2	11.8
Queue Length 50th (ft)	326	60	0	22	139	65	23	46	60	193
Queue Length 95th (ft)	#534	98	27	60	203	125	53	97	120	314
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1312	2826	920	101	901	289	615	289	321	1766
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.18	0.11	0.34	0.69	0.35	0.20	0.24	0.28	0.68

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1014	478	93	32	508	73	95	68	47	71	76	1134
Future Volume (veh/h)	1014	478	93	32	508	73	95	68	47	71	76	1134
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1079	509	99	34	540	78	101	72	50	76	81	1206
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1161	2544	790	48	671	95	139	171	109	296	329	1756
Arrive On Green	0.40	0.53	0.53	0.03	0.16	0.16	0.09	0.09	0.09	0.19	0.19	0.19
Sat Flow, veh/h	2910	4837	1502	1594	4279	608	1594	1973	1256	1594	1772	3003
Grp Volume(v), veh/h	1079	509	99	34	405	213	101	60	62	76	81	1206
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1662	1594	1683	1546	1594	1772	1502
Q Serve(g_s), s	37.2	5.9	3.5	2.2	12.7	13.0	6.5	3.6	4.0	4.3	4.1	19.5
Cycle Q Clear(g_c), s	37.2	5.9	3.5	2.2	12.7	13.0	6.5	3.6	4.0	4.3	4.1	19.5
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.81	1.00		1.00
Lane Grp Cap(c), veh/h	1161	2544	790	48	506	261	139	146	134	296	329	1756
V/C Ratio(X)	0.93	0.20	0.13	0.71	0.80	0.82	0.73	0.41	0.46	0.26	0.25	0.69
Avail Cap(c_a), veh/h	1275	2650	823	99	584	301	281	297	272	296	329	1756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.1	13.2	12.6	50.5	42.7	42.8	46.7	45.4	45.6	36.5	36.5	15.1
Incr Delay (d2), s/veh	11.4	0.0	0.1	17.7	6.9	14.2	7.1	1.9	2.4	0.5	0.4	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.4	2.1	1.2	1.1	5.5	6.3	2.8	1.6	1.6	1.7	1.8	9.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.5	13.2	12.7	68.2	49.5	57.0	53.9	47.2	48.0	37.0	36.8	16.3
LnGrp LOS	D	B	B	E	D	E	D	D	D	D	D	B
Approach Vol, veh/h		1687			652			223			1363	
Approach Delay, s/veh		31.3			53.0			50.4			18.6	
Approach LOS		C			D			D			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.6	7.6	59.7		24.0	46.4	21.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.5	6.5	57.5		19.5	46.0	* 19				
Max Q Clear Time (g_c+I1), s		8.5	4.2	7.9		21.5	39.2	15.0				
Green Ext Time (p_c), s		0.6	0.0	4.3		0.0	2.7	1.5				

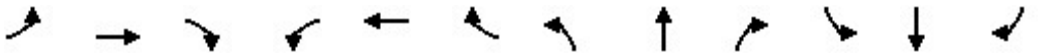
Intersection Summary	
HCM 6th Ctrl Delay	31.6
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

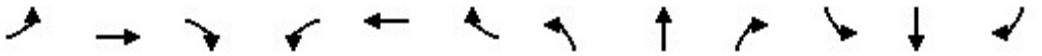
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50				236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



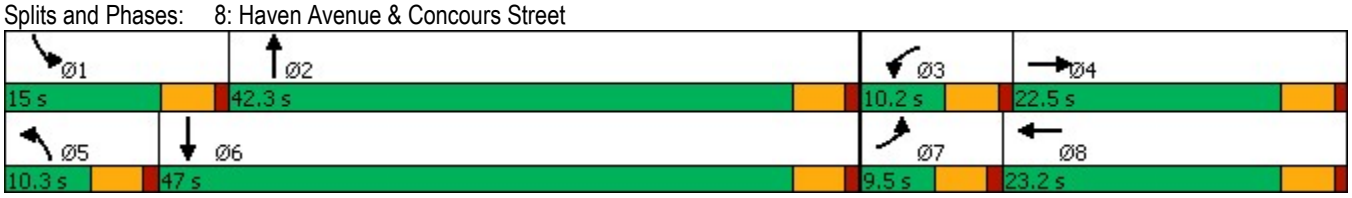
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	12	25	47	126	54	60	45	1585	200	43	1473	31
Future Volume (vph)	12	25	47	126	54	60	45	1585	200	43	1473	31
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	27	50	134	57	64	48	1686	213	46	1567	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	77	0	134	57	64	48	1686	213	46	1567	33

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	12	25	126	54	60	45	1585	200	43	1473	31
Future Volume (vph)	12	25	126	54	60	45	1585	200	43	1473	31
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.4	6.7	6.1	12.8	64.2	6.2	39.0	64.2	6.9	39.8	64.2
Actuated g/C Ratio	0.08	0.10	0.10	0.20	1.00	0.10	0.61	1.00	0.11	0.62	1.00
v/c Ratio	0.05	0.21	0.36	0.09	0.04	0.17	0.46	0.14	0.15	0.42	0.02
Control Delay	34.8	17.7	35.5	26.7	0.1	34.5	11.0	0.2	32.6	10.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	17.7	35.5	26.7	0.1	34.5	11.0	0.2	32.6	10.0	0.0
LOS	C	B	D	C	A	C	B	A	C	A	A
Approach Delay		20.1		24.6			10.4			10.4	
Approach LOS		C		C			B			B	

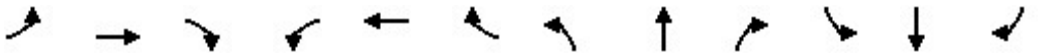
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 64.2	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 41.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	77	134	57	64	48	1686	213	46	1567	33
v/c Ratio	0.05	0.21	0.36	0.09	0.04	0.17	0.46	0.14	0.15	0.42	0.02
Control Delay	34.8	17.7	35.5	26.7	0.1	34.5	11.0	0.2	32.6	10.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	17.7	35.5	26.7	0.1	34.5	11.0	0.2	32.6	10.0	0.0
Queue Length 50th (ft)	3	6	21	11	0	10	143	0	10	126	0
Queue Length 95th (ft)	11	26	42	31	0	28	192	0	26	163	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	242	950	377	1053	1500	281	3892	1500	510	4223	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.08	0.36	0.05	0.04	0.17	0.43	0.14	0.09	0.37	0.02

Intersection Summary



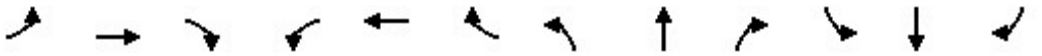
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	25	47	126	54	60	45	1585	200	43	1473	31
Future Volume (veh/h)	12	25	47	126	54	60	45	1585	200	43	1473	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	13	27	50	134	57	0	48	1686	0	46	1567	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	133	119	305	470		136	2951		132	2943	
Arrive On Green	0.02	0.08	0.08	0.08	0.14	0.00	0.05	0.48	0.00	0.05	0.48	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	13	27	50	134	57	0	48	1686	0	46	1567	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.3	0.9	1.8	1.8	0.8	0.0	0.9	11.3	0.0	0.9	10.2	0.0
Cycle Q Clear(g_c), s	0.3	0.9	1.8	1.8	0.8	0.0	0.9	11.3	0.0	0.9	10.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	47	133	119	305	470		136	2951		132	2943	
V/C Ratio(X)	0.27	0.20	0.42	0.44	0.12		0.35	0.57		0.35	0.53	
Avail Cap(c_a), veh/h	254	530	472	395	1100		295	4027		534	4528	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.8	24.7	25.1	25.2	21.5	0.0	26.4	10.5	0.0	26.5	10.3	0.0
Incr Delay (d2), s/veh	3.1	0.7	2.4	1.0	0.1	0.0	1.6	0.2	0.0	1.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	0.7	0.6	0.3	0.0	0.3	3.1	0.0	0.3	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.9	25.4	27.5	26.2	21.7	0.0	28.0	10.7	0.0	28.1	10.5	0.0
LnGrp LOS	C	C	C	C	C		C	B		C	B	
Approach Vol, veh/h		90			191	A		1734	A		1613	A
Approach Delay, s/veh		27.3			24.9			11.2			11.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	32.2	8.9	9.0	7.2	32.1	5.4	12.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	2.9	13.3	3.8	3.8	2.9	12.2	2.3	2.8
Green Ext Time (p_c), s	0.0	14.4	0.1	0.3	0.0	14.9	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

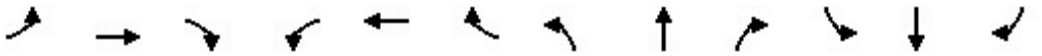
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.936									0.990	
Flt Protected	0.950	0.972					0.950					
Satd. Flow (prot)	1593	1525	0	0	1765	0	1676	4818	0	1765	4769	0
Flt Permitted	0.950	0.972					0.950					
Satd. Flow (perm)	1593	1525	0	0	1765	0	1676	4818	0	1765	4769	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143									13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



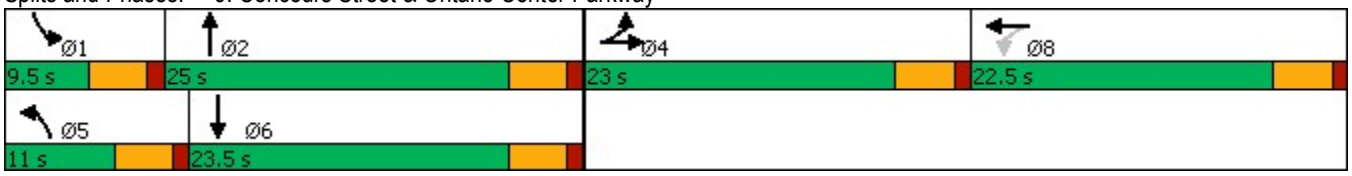
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	0	3	0	0	0	5	303	1	0	226	16
Future Volume (vph)	11	0	3	0	0	0	5	303	1	0	226	16
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	12	0	3	0	0	0	6	337	1	0	251	18
Shared Lane Traffic (%)	36%											
Lane Group Flow (vph)	8	7	0	0	0	0	6	338	0	0	269	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	11	0	5	303	226		
Future Volume (vph)	11	0	5	303	226		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	6.0	6.0	5.9	27.2	25.7		
Actuated g/C Ratio	0.21	0.21	0.20	0.93	0.88		
v/c Ratio	0.02	0.02	0.02	0.08	0.06		
Control Delay	13.0	0.0	13.0	1.0	2.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	13.0	0.0	13.0	1.0	2.9		
LOS	B	A	B	A	A		
Approach Delay		6.9		1.2	2.9		
Approach LOS		A		A	A		

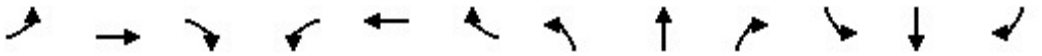
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 29.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.08	
Intersection Signal Delay: 2.1	Intersection LOS: A
Intersection Capacity Utilization 17.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	8	7	6	338	269
v/c Ratio	0.02	0.02	0.02	0.08	0.06
Control Delay	13.0	0.0	13.0	1.0	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	0.0	13.0	1.0	2.9
Queue Length 50th (ft)	1	0	1	0	0
Queue Length 95th (ft)	10	0	9	14	25
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	1058	1061	391	4482	4229
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.02	0.08	0.06

Intersection Summary



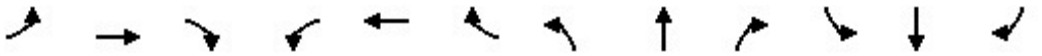
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	0	3	0	0	0	5	303	1	0	226	16
Future Volume (veh/h)	11	0	3	0	0	0	5	303	1	0	226	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	8	6	3	0	0	0	6	337	1	0	251	18
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	38	25	13	0	9	0	14	2519	7	9	1208	85
Arrive On Green	0.02	0.02	0.02	0.00	0.00	0.00	0.01	0.51	0.51	0.00	0.26	0.26
Sat Flow, veh/h	1688	1114	557	0	1772	0	1688	4979	15	1688	4613	326
Grp Volume(v), veh/h	8	0	9	0	0	0	6	218	120	0	174	95
Grp Sat Flow(s),veh/h/ln	1688	0	1672	0	1772	0	1688	1612	1769	1688	1612	1713
Q Serve(g_s), s	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.7	0.7	0.0	0.8	0.8
Cycle Q Clear(g_c), s	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.7	0.7	0.0	0.8	0.8
Prop In Lane	1.00		0.33	0.00		0.00	1.00		0.01	1.00		0.19
Lane Grp Cap(c), veh/h	38	0	38	0	9	0	14	1632	895	9	845	449
V/C Ratio(X)	0.21	0.00	0.24	0.00	0.00	0.00	0.43	0.13	0.13	0.00	0.21	0.21
Avail Cap(c_a), veh/h	1636	0	1620	0	1671	0	575	3464	1900	442	3210	1705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	9.2	0.0	0.0	0.0	9.4	2.5	2.5	0.0	5.5	5.5
Incr Delay (d2), s/veh	2.7	0.0	3.2	0.0	0.0	0.0	19.9	0.0	0.1	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.9	0.0	12.4	0.0	0.0	0.0	29.4	2.5	2.6	0.0	5.6	5.7
LnGrp LOS	B	A	B	A	A	A	C	A	A	A	A	A
Approach Vol, veh/h		17			0			344			269	
Approach Delay, s/veh		12.1			0.0			3.0			5.7	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	14.2		4.9	4.7	9.5		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	2.7		2.1	2.1	2.8		0.0				
Green Ext Time (p_c), s	0.0	1.9		0.0	0.0	1.4		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		4.4
HCM 6th LOS		A

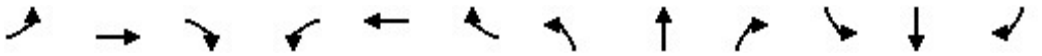
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			194			182			213			238
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



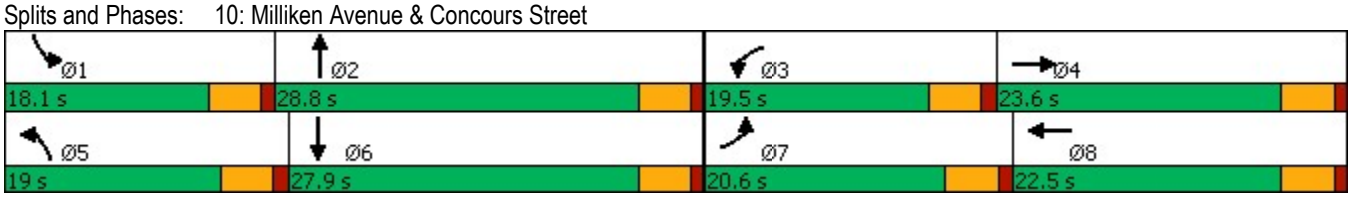
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	302	156	180	261	102	161	223	1000	243	281	1004	235
Future Volume (vph)	302	156	180	261	102	161	223	1000	243	281	1004	235
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	325	168	194	281	110	173	240	1075	261	302	1080	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	325	168	194	281	110	173	240	1075	261	302	1080	253

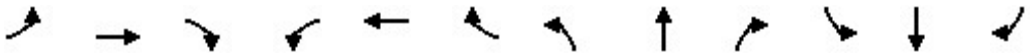
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	156	180	261	102	161	223	1000	243	281	1004	235
Future Volume (vph)	302	156	180	261	102	161	223	1000	243	281	1004	235
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	15.9	9.2	73.1	12.2	8.2	73.1	11.3	21.3	73.1	12.1	22.0	73.1
Actuated g/C Ratio	0.22	0.13	1.00	0.17	0.11	1.00	0.15	0.29	1.00	0.17	0.30	1.00
v/c Ratio	0.52	0.40	0.13	0.58	0.29	0.12	0.54	0.61	0.17	0.63	0.59	0.17
Control Delay	31.2	34.0	0.2	34.6	34.1	0.2	34.5	24.5	0.3	36.4	23.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	34.0	0.2	34.6	34.1	0.2	34.5	24.5	0.3	36.4	23.9	0.2
LOS	C	C	A	C	C	A	C	C	A	D	C	A
Approach Delay		23.1			23.9			22.0			22.5	
Approach LOS		C			C			C			C	

Intersection Summary			
Cycle Length: 90			
Actuated Cycle Length: 73.1			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 22.6		Intersection LOS: C	
Intersection Capacity Utilization 54.2%		ICU Level of Service A	
Analysis Period (min) 15			

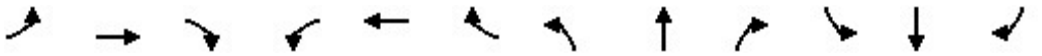
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	325	168	194	281	110	173	240	1075	261	302	1080	253
v/c Ratio	0.52	0.40	0.13	0.58	0.29	0.12	0.54	0.61	0.17	0.63	0.59	0.17
Control Delay	31.2	34.0	0.2	34.6	34.1	0.2	34.5	24.5	0.3	36.4	23.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	34.0	0.2	34.6	34.1	0.2	34.5	24.5	0.3	36.4	23.9	0.2
Queue Length 50th (ft)	73	39	0	63	25	0	54	125	0	68	121	0
Queue Length 95th (ft)	121	72	0	108	52	0	93	173	0	118	177	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	682	892	1500	604	841	1500	584	2055	1500	547	2016	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.19	0.13	0.47	0.13	0.12	0.41	0.52	0.17	0.55	0.54	0.17

Intersection Summary



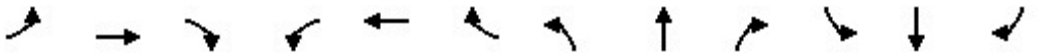
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	302	156	180	261	102	161	223	1000	243	281	1004	235
Future Volume (veh/h)	302	156	180	261	102	161	223	1000	243	281	1004	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	325	168	0	281	110	0	240	1075	0	302	1080	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	447	355		397	297		350	1816		416	1954	
Arrive On Green	0.15	0.11	0.00	0.14	0.09	0.00	0.12	0.30	0.00	0.14	0.32	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	325	168	0	281	110	0	240	1075	0	302	1080	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	6.0	2.7	0.0	5.2	1.7	0.0	4.5	8.5	0.0	5.6	8.3	0.0
Cycle Q Clear(g_c), s	6.0	2.7	0.0	5.2	1.7	0.0	4.5	8.5	0.0	5.6	8.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	447	355		397	297		350	1816		416	1954	
V/C Ratio(X)	0.73	0.47		0.71	0.37		0.69	0.59		0.73	0.55	
Avail Cap(c_a), veh/h	826	1134		770	1069		744	2612		698	2515	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.9	23.9	0.0	23.4	24.4	0.0	23.9	17.0	0.0	23.2	15.9	0.0
Incr Delay (d2), s/veh	2.3	1.0	0.0	2.3	0.8	0.0	2.4	0.3	0.0	2.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	1.0	0.0	1.8	0.7	0.0	1.5	2.7	0.0	1.9	2.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	24.9	0.0	25.7	25.1	0.0	26.3	17.3	0.0	25.7	16.2	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		493	A		391	A		1315	A		1382	A
Approach Delay, s/veh		25.0			25.6			18.9			18.2	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	21.4	12.2	10.5	11.3	22.7	13.2	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	7.6	10.5	7.2	4.7	6.5	10.3	8.0	3.7
Green Ext Time (p_c), s	0.5	6.4	0.6	0.8	0.5	6.2	0.7	0.4

Intersection Summary	
HCM 6th Ctrl Delay	20.2
HCM 6th LOS	C

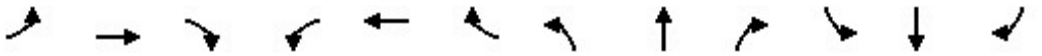
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			473			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



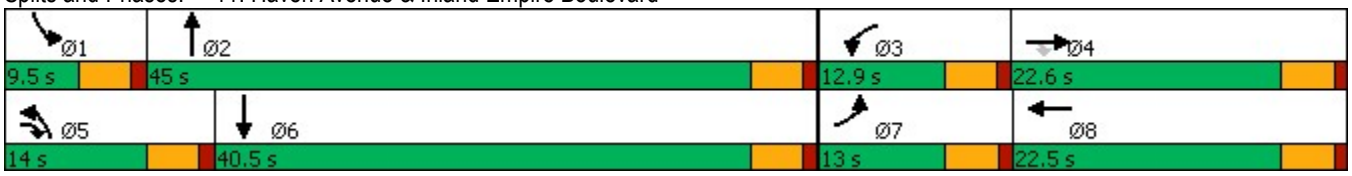
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	72	126	262	189	124	71	170	1691	570	55	1485	47
Future Volume (vph)	72	126	262	189	124	71	170	1691	570	55	1485	47
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	74	130	270	195	128	73	175	1743	588	57	1531	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	130	270	195	128	73	175	1743	588	57	1531	48

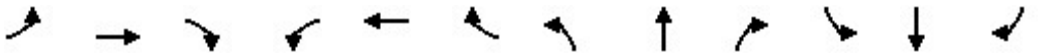
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	126	262	189	124	71	170	1691	570	55	1485	47
Future Volume (vph)	72	126	262	189	124	71	170	1691	570	55	1485	47
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	7.3	8.5	19.0	8.2	9.2	73.2	8.9	40.5	73.2	5.2	32.1	73.2
Actuated g/C Ratio	0.10	0.12	0.26	0.11	0.13	1.00	0.12	0.55	1.00	0.07	0.44	1.00
v/c Ratio	0.26	0.33	0.61	0.44	0.30	0.05	0.50	0.52	0.39	0.28	0.58	0.03
Control Delay	36.1	35.1	23.8	36.7	34.2	0.1	38.2	12.6	0.8	40.0	17.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	35.1	23.8	36.7	34.2	0.1	38.2	12.6	0.8	40.0	17.1	0.0
LOS	D	D	C	D	C	A	D	B	A	D	B	A
Approach Delay		28.8			29.2			11.6			17.4	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.2	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 55.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	74	130	270	195	128	73	175	1743	588	57	1531	48
v/c Ratio	0.26	0.33	0.61	0.44	0.30	0.05	0.50	0.52	0.39	0.28	0.58	0.03
Control Delay	36.1	35.1	23.8	36.7	34.2	0.1	38.2	12.6	0.8	40.0	17.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	35.1	23.8	36.7	34.2	0.1	38.2	12.6	0.8	40.0	17.1	0.0
Queue Length 50th (ft)	18	32	83	33	31	0	43	167	0	14	158	0
Queue Length 95th (ft)	38	59	159	57	58	0	76	213	0	33	203	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	348	859	460	468	854	1500	389	3516	1500	204	3095	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.15	0.59	0.42	0.15	0.05	0.45	0.50	0.39	0.28	0.49	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	126	262	189	124	71	170	1691	570	55	1485	47
Future Volume (veh/h)	72	126	262	189	124	71	170	1691	570	55	1485	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	74	130	270	195	128	0	175	1743	0	57	1531	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	154	656	421	301	733		248	2678		136	2442	
Arrive On Green	0.05	0.19	0.19	0.08	0.22	0.00	0.09	0.44	0.00	0.05	0.40	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	74	130	270	195	128	0	175	1743	0	57	1531	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.8	2.4	11.7	3.5	2.3	0.0	4.3	16.6	0.0	1.4	14.9	0.0
Cycle Q Clear(g_c), s	1.8	2.4	11.7	3.5	2.3	0.0	4.3	16.6	0.0	1.4	14.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	154	656	421	301	733		248	2678		136	2442	
V/C Ratio(X)	0.48	0.20	0.64	0.65	0.17		0.71	0.65		0.42	0.63	
Avail Cap(c_a), veh/h	335	824	496	451	820		374	3339		197	2968	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.0	24.9	23.4	33.2	23.5	0.0	32.9	16.3	0.0	34.3	17.7	0.0
Incr Delay (d2), s/veh	2.3	0.1	2.2	2.4	0.1	0.0	3.6	0.3	0.0	2.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.9	4.2	1.2	0.9	0.0	1.6	5.3	0.0	0.5	4.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.4	25.1	25.5	35.6	23.6	0.0	36.6	16.6	0.0	36.3	18.0	0.0
LnGrp LOS	D	C	C	D	C		D	B		D	B	
Approach Vol, veh/h		474			323	A		1918	A		1588	A
Approach Delay, s/veh		27.1			30.8			18.4			18.7	
Approach LOS		C			C			B			B	

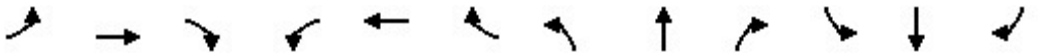
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.9	37.0	10.1	18.9	10.8	34.1	8.4	20.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	3.4	18.6	5.5	13.7	6.3	16.9	3.8	4.3
Green Ext Time (p_c), s	0.0	13.9	0.2	0.7	0.2	11.1	0.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

Notes

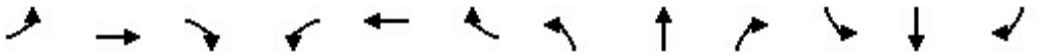
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			281			193			596			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



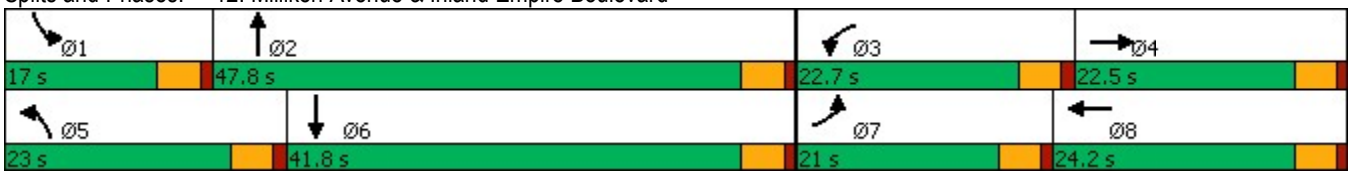
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	179	298	273	360	139	136	349	1112	794	143	1331	112
Future Volume (vph)	179	298	273	360	139	136	349	1112	794	143	1331	112
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	185	307	281	371	143	140	360	1146	819	147	1372	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	307	281	371	143	140	360	1146	819	147	1372	115

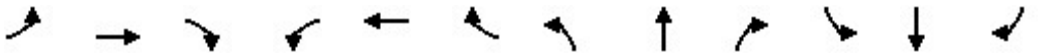
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	298	273	360	139	136	349	1112	794	143	1331	112
Future Volume (vph)	179	298	273	360	139	136	349	1112	794	143	1331	112
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	11.8	14.3	98.8	16.5	19.0	98.8	16.4	39.5	98.8	10.2	33.2	98.8
Actuated g/C Ratio	0.12	0.14	1.00	0.17	0.19	1.00	0.17	0.40	1.00	0.10	0.34	1.00
v/c Ratio	0.54	0.63	0.19	0.77	0.22	0.09	0.75	0.47	0.55	0.49	0.67	0.08
Control Delay	48.7	47.5	0.3	52.5	36.8	0.1	51.3	23.2	1.4	50.1	30.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	47.5	0.3	52.5	36.8	0.1	51.3	23.2	1.4	50.1	30.5	0.1
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		30.6			37.9			19.9			30.1	
Approach LOS		C			D			B			C	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 98.8		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.77		
Intersection Signal Delay: 26.7	Intersection LOS: C	
Intersection Capacity Utilization 68.1%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	185	307	281	371	143	140	360	1146	819	147	1372	115
v/c Ratio	0.54	0.63	0.19	0.77	0.22	0.09	0.75	0.47	0.55	0.49	0.67	0.08
Control Delay	48.7	47.5	0.3	52.5	36.8	0.1	51.3	23.2	1.4	50.1	30.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	47.5	0.3	52.5	36.8	0.1	51.3	23.2	1.4	50.1	30.5	0.1
Queue Length 50th (ft)	62	105	0	124	43	0	120	159	0	49	228	0
Queue Length 95th (ft)	98	153	0	#195	75	0	178	206	0	84	280	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	492	622	1500	543	703	1500	551	2728	1500	373	2337	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.49	0.19	0.68	0.20	0.09	0.65	0.42	0.55	0.39	0.59	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	298	273	360	139	136	349	1112	794	143	1331	112
Future Volume (veh/h)	179	298	273	360	139	136	349	1112	794	143	1331	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	185	307	0	371	143	0	360	1146	0	147	1372	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	261	429		456	654		446	2562		215	2077	
Arrive On Green	0.09	0.13	0.00	0.16	0.19	0.00	0.15	0.42	0.00	0.07	0.34	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	185	307	0	371	143	0	360	1146	0	147	1372	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	5.0	7.1	0.0	10.0	2.9	0.0	9.7	10.9	0.0	4.0	15.5	0.0
Cycle Q Clear(g_c), s	5.0	7.1	0.0	10.0	2.9	0.0	9.7	10.9	0.0	4.0	15.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	429		456	654		446	2562		215	2077	
V/C Ratio(X)	0.71	0.72		0.81	0.22		0.81	0.45		0.68	0.66	
Avail Cap(c_a), veh/h	592	747		653	817		663	3252		448	2801	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.9	34.0	0.0	33.1	27.5	0.0	33.2	16.8	0.0	36.7	22.8	0.0
Incr Delay (d2), s/veh	3.5	2.2	0.0	5.2	0.2	0.0	4.5	0.1	0.0	3.8	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	3.0	0.0	3.8	1.2	0.0	3.6	3.6	0.0	1.5	5.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.4	36.3	0.0	38.3	27.7	0.0	37.7	16.9	0.0	40.5	23.1	0.0
LnGrp LOS	D	D		D	C		D	B		D	C	
Approach Vol, veh/h		492	A		514	A		1506	A		1519	A
Approach Delay, s/veh		37.4			35.3			21.9			24.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.5	38.6	17.2	14.8	16.9	32.2	11.8	20.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	6.0	12.9	12.0	9.1	11.7	17.5	7.0	4.9
Green Ext Time (p_c), s	0.2	9.9	0.7	1.2	0.7	10.1	0.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	26.6
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.925	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	2919	1365	6071	0	0	6071
Flt Permitted	0.976					
Satd. Flow (perm)	2919	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	6	6				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

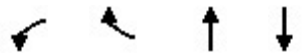
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	242	484	1908	0	0	1297
Future Volume (vph)	242	484	1908	0	0	1297
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	247	494	1947	0	0	1323
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	494	247	1947	0	0	1323

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	242	484	1908	1297
Future Volume (vph)	242	484	1908	1297
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	14.9	14.9	30.2	30.2
Actuated g/C Ratio	0.27	0.27	0.56	0.56
v/c Ratio	0.61	0.65	0.58	0.39
Control Delay	20.6	26.1	9.2	7.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.6	26.1	9.2	7.7
LOS	C	C	A	A
Approach Delay	22.4		9.2	7.7
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.3	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 11.1	Intersection LOS: B
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	494	247	1947	1323
v/c Ratio	0.61	0.65	0.58	0.39
Control Delay	20.6	26.1	9.2	7.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.6	26.1	9.2	7.7
Queue Length 50th (ft)	72	76	108	63
Queue Length 95th (ft)	112	147	163	99
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1068	501	3577	3577
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.46	0.49	0.54	0.37

Intersection Summary

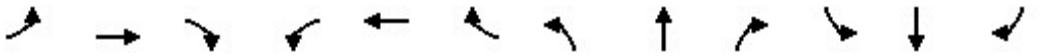
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	242	484	1908	0	0	1297
Future Volume (veh/h)	242	484	1908	0	0	1297
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	247	494	1947	0	0	1323
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	385	726	3431	0	0	3431
Arrive On Green	0.24	0.24	0.56	0.00	0.00	0.56
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	247	494	1947	0	0	1323
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	6.4	6.9	9.4	0.0	0.0	5.6
Cycle Q Clear(g_c), s	6.4	6.9	9.4	0.0	0.0	5.6
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	385	726	3431	0	0	3431
V/C Ratio(X)	0.64	0.68	0.57	0.00	0.00	0.39
Avail Cap(c_a), veh/h	675	1272	4169	0	0	4169
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	15.9	6.5	0.0	0.0	5.6
Incr Delay (d2), s/veh	1.8	1.1	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.1	2.0	0.0	0.0	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.5	17.0	6.6	0.0	0.0	5.7
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	741		1947			1323
Approach Delay, s/veh	17.1		6.6			5.7
Approach LOS	B		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		30.4			30.4	15.6
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s		11.4			7.6	8.9
Green Ext Time (p_c), s		14.5			10.8	2.3

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

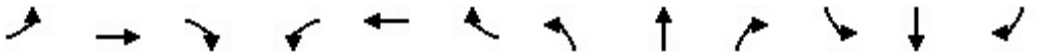
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			218			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



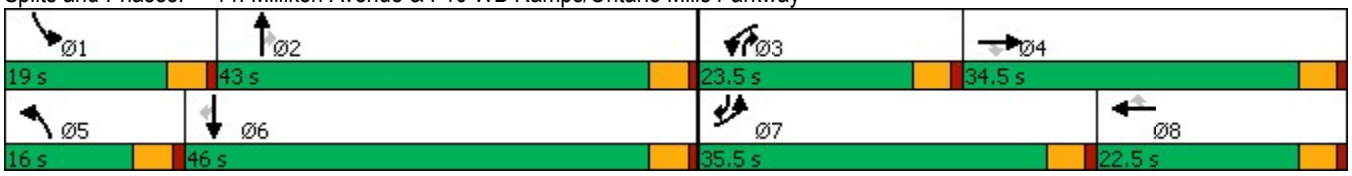
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	619	229	130	277	345	103	210	1354	420	305	1003	798
Future Volume (vph)	619	229	130	277	345	103	210	1354	420	305	1003	798
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	666	246	140	298	371	111	226	1456	452	328	1078	858
Shared Lane Traffic (%)												
Lane Group Flow (vph)	666	246	140	298	371	111	226	1456	452	328	1078	858

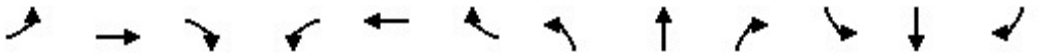
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	619	229	130	277	345	103	210	1354	420	305	1003	798
Future Volume (vph)	619	229	130	277	345	103	210	1354	420	305	1003	798
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	29.9	29.8	29.8	16.6	16.6	16.6	11.3	36.8	58.0	14.6	40.1	74.5
Actuated g/C Ratio	0.26	0.26	0.26	0.14	0.14	0.14	0.10	0.32	0.50	0.13	0.35	0.64
v/c Ratio	0.90	0.54	0.31	0.72	0.78	0.34	0.80	0.76	0.53	0.90	0.51	0.87
Control Delay	57.9	43.3	15.4	58.3	60.3	7.2	73.5	38.7	11.8	79.5	31.4	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	43.3	15.4	58.3	60.3	7.2	73.5	38.7	11.8	79.5	31.4	27.7
LOS	E	D	B	E	E	A	E	D	B	E	C	C
Approach Delay		48.8			52.0			36.7			37.0	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 40.7	Intersection LOS: D
Intersection Capacity Utilization 80.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	666	246	140	298	371	111	226	1456	452	328	1078	858
v/c Ratio	0.90	0.54	0.31	0.72	0.78	0.34	0.80	0.76	0.53	0.90	0.51	0.87
Control Delay	57.9	43.3	15.4	58.3	60.3	7.2	73.5	38.7	11.8	79.5	31.4	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	43.3	15.4	58.3	60.3	7.2	73.5	38.7	11.8	79.5	31.4	27.7
Queue Length 50th (ft)	257	166	27	113	146	0	90	292	109	131	191	477
Queue Length 95th (ft)	#361	253	82	161	201	34	#155	336	199	#222	227	#821
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	776	466	466	476	522	348	288	2025	886	363	2183	999
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.53	0.30	0.63	0.71	0.32	0.78	0.72	0.51	0.90	0.49	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	619	229	130	277	345	103	210	1354	420	305	1003	798
Future Volume (veh/h)	619	229	130	277	345	103	210	1354	420	305	1003	798
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	666	246	140	298	371	111	226	1456	452	328	1078	858
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	725	462	391	356	450	201	275	2021	681	371	2223	922
Arrive On Green	0.25	0.26	0.26	0.12	0.13	0.13	0.09	0.33	0.33	0.13	0.36	0.36
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	666	246	140	298	371	111	226	1456	452	328	1078	858
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	25.4	13.6	8.7	11.4	12.2	7.9	8.7	23.9	26.8	12.6	15.5	41.5
Cycle Q Clear(g_c), s	25.4	13.6	8.7	11.4	12.2	7.9	8.7	23.9	26.8	12.6	15.5	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	725	462	391	356	450	201	275	2021	681	371	2223	922
V/C Ratio(X)	0.92	0.53	0.36	0.84	0.82	0.55	0.82	0.72	0.66	0.88	0.48	0.93
Avail Cap(c_a), veh/h	793	467	396	486	533	238	294	2062	692	371	2223	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.6	36.1	34.3	48.8	48.0	46.1	50.6	33.4	24.3	48.8	27.9	19.8
Incr Delay (d2), s/veh	14.9	1.1	0.6	9.2	8.9	2.4	16.2	1.2	2.3	21.5	0.2	15.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	6.0	3.2	4.6	5.7	3.1	3.8	8.9	9.7	5.7	5.7	22.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.5	37.3	34.9	58.0	56.9	48.5	66.8	34.6	26.6	70.4	28.1	35.4
LnGrp LOS	E	D	C	E	E	D	E	C	C	E	C	D
Approach Vol, veh/h		1052			780			2134			2264	
Approach Delay, s/veh		49.1			56.1			36.3			37.0	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	42.2	18.4	34.2	15.2	46.0	32.9	19.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	14.6	28.8	13.4	15.6	10.7	43.5	27.4	14.2
Green Ext Time (p_c), s	0.0	7.3	0.5	1.6	0.1	0.0	1.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	41.2
HCM 6th LOS	D

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.992	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.955					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9	9				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

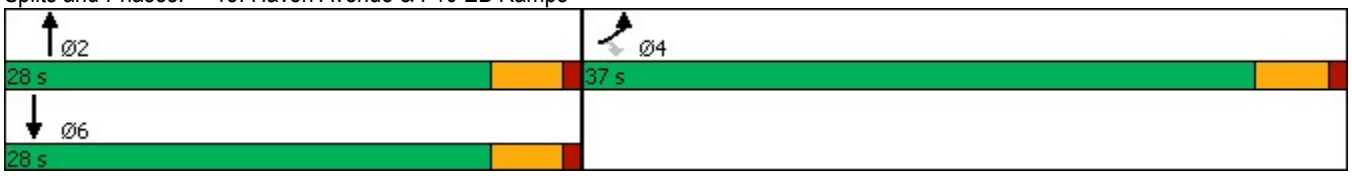
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1000	537	0	1485	1217	0
Future Volume (vph)	1000	537	0	1485	1217	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1031	554	0	1531	1255	0
Shared Lane Traffic (%)		11%				
Lane Group Flow (vph)	1092	493	0	1531	1255	0

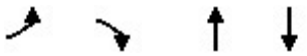
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1000	537	1485	1217
Future Volume (vph)	1000	537	1485	1217
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	27.4	27.4	22.7	22.7
Actuated g/C Ratio	0.46	0.46	0.38	0.38
v/c Ratio	0.77	0.78	0.66	0.54
Control Delay	17.3	23.0	17.4	15.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.3	23.0	17.4	15.9
LOS	B	C	B	B
Approach Delay	19.1		17.4	15.9
Approach LOS	B		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 59.2	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1092	493	1531	1255
v/c Ratio	0.77	0.78	0.66	0.54
Control Delay	17.3	23.0	17.4	15.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.3	23.0	17.4	15.9
Queue Length 50th (ft)	159	152	137	106
Queue Length 95th (ft)	226	#279	184	145
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1714	766	2450	2450
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.64	0.64	0.62	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1000	537	0	1485	1217	0
Future Volume (veh/h)	1000	537	0	1485	1217	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1055	528	0	1531	1255	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1431	674	0	2324	2324	0
Arrive On Green	0.45	0.45	0.00	0.38	0.38	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1055	528	0	1531	1255	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	14.5	15.9	0.0	11.0	8.5	0.0
Cycle Q Clear(g_c), s	14.5	15.9	0.0	11.0	8.5	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1431	674	0	2324	2324	0
V/C Ratio(X)	0.74	0.78	0.00	0.66	0.54	0.00
Avail Cap(c_a), veh/h	1953	920	0	2700	2700	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.0	12.4	0.0	13.6	12.8	0.0
Incr Delay (d2), s/veh	1.0	3.1	0.0	0.5	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	4.8	0.0	3.3	2.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.0	15.5	0.0	14.0	13.0	0.0
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	1583			1531	1255	
Approach Delay, s/veh	13.8			14.0	13.0	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		24.7		28.3		24.7
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		13.0		17.9		10.5
Green Ext Time (p_c), s		7.2		6.0		7.1

Intersection Summary	
HCM 6th Ctrl Delay	13.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		12				127
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	887	222	158	1147	836	599
Future Volume (vph)	887	222	158	1147	836	599
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	914	229	163	1182	862	618
Shared Lane Traffic (%)						
Lane Group Flow (vph)	914	229	163	1182	862	618

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	887	222	158	1147	836	599
Future Volume (vph)	887	222	158	1147	836	599
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	27.4	39.4	7.4	28.2	16.2	48.2
Actuated g/C Ratio	0.42	0.61	0.11	0.44	0.25	0.74
v/c Ratio	0.75	0.25	0.50	0.45	0.57	0.54
Control Delay	20.4	6.6	35.5	14.2	23.6	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	6.6	35.5	14.2	23.6	4.4
LOS	C	A	D	B	C	A
Approach Delay	17.6			16.8	15.6	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 64.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	914	229	163	1182	862	618
v/c Ratio	0.75	0.25	0.50	0.45	0.57	0.54
Control Delay	20.4	6.6	35.5	14.2	23.6	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	6.6	35.5	14.2	23.6	4.4
Queue Length 50th (ft)	154	36	32	93	88	53
Queue Length 95th (ft)	230	71	67	140	130	97
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1580	923	343	3030	1875	1309
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.25	0.48	0.39	0.46	0.47

Intersection Summary

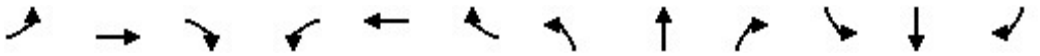
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	887	222	158	1147	836	599
Future Volume (veh/h)	887	222	158	1147	836	599
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	914	229	163	1182	862	618
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1123	705	243	2821	1850	1035
Arrive On Green	0.39	0.39	0.08	0.46	0.30	0.30
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	914	229	163	1182	862	618
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	16.7	5.7	3.2	7.7	6.8	12.9
Cycle Q Clear(g_c), s	16.7	5.7	3.2	7.7	6.8	12.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1123	705	243	2821	1850	1035
V/C Ratio(X)	0.81	0.32	0.67	0.42	0.47	0.60
Avail Cap(c_a), veh/h	1688	996	367	3227	1998	1072
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	9.9	26.5	10.7	16.8	4.9
Incr Delay (d2), s/veh	1.9	0.3	3.2	0.1	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	5.8	1.2	2.2	2.2	8.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.3	10.1	29.6	10.8	17.0	5.7
LnGrp LOS	B	B	C	B	B	A
Approach Vol, veh/h	1143			1345	1480	
Approach Delay, s/veh	16.6			13.0	12.3	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		32.0		27.5	9.5	22.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		9.7		18.7	5.2	14.9
Green Ext Time (p_c), s		9.0		4.2	0.1	3.1

Intersection Summary		
HCM 6th Ctrl Delay		13.8
HCM 6th LOS		B

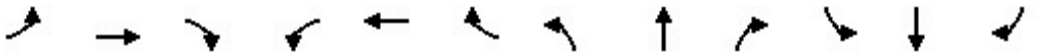
Appendix E

Intersection LOS Analysis Sheets
Opening Year Without Related Projects With Project Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.962				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4635	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65				149			238		9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



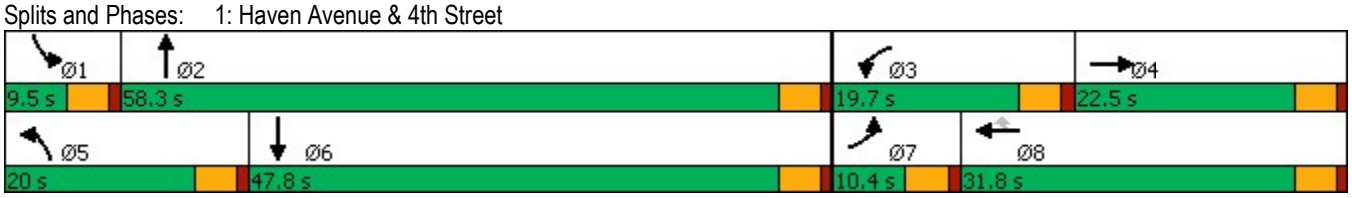
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	93	305	102	274	532	152	209	1539	488	98	1234	55
Future Volume (vph)	93	305	102	274	532	152	209	1539	488	98	1234	55
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	102	335	112	301	585	167	230	1691	536	108	1356	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	102	447	0	301	585	167	230	1691	536	108	1416	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	93	305	274	532	152	209	1539	488	98	1234
Future Volume (vph)	93	305	274	532	152	209	1539	488	98	1234
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	15.7	14.3	24.1	24.1	13.2	53.8	106.9	5.0	45.6
Actuated g/C Ratio	0.06	0.15	0.13	0.23	0.23	0.12	0.50	1.00	0.05	0.43
v/c Ratio	0.64	0.61	0.78	0.77	0.37	0.65	0.70	0.36	0.80	0.55
Control Delay	69.1	40.1	59.8	46.4	9.8	53.6	22.6	0.7	89.9	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.1	40.1	59.8	46.4	9.8	53.6	22.6	0.7	89.9	24.5
LOS	E	D	E	D	A	D	C	A	F	C
Approach Delay		45.5		44.4			20.7			29.1
Approach LOS		D		D			C			C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 106.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 29.9	Intersection LOS: C
Intersection Capacity Utilization 70.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	102	447	301	585	167	230	1691	536	108	1416
v/c Ratio	0.64	0.61	0.78	0.77	0.37	0.65	0.70	0.36	0.80	0.55
Control Delay	69.1	40.1	59.8	46.4	9.8	53.6	22.6	0.7	89.9	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.1	40.1	59.8	46.4	9.8	53.6	22.6	0.7	89.9	24.5
Queue Length 50th (ft)	36	91	104	198	10	78	321	0	39	212
Queue Length 95th (ft)	#75	127	#165	262	64	120	390	0	#90	263
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	159	834	411	856	494	419	2426	1500	135	2581
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.54	0.73	0.68	0.34	0.55	0.70	0.36	0.80	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

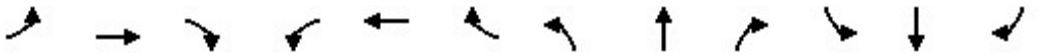
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	305	102	274	532	152	209	1539	488	98	1234	55
Future Volume (veh/h)	93	305	102	274	532	152	209	1539	488	98	1234	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	102	335	112	301	585	167	230	1691	0	108	1356	60
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	508	161	358	714	318	290	2497		140	2801	124
Arrive On Green	0.05	0.14	0.14	0.12	0.21	0.21	0.10	0.52	0.00	0.05	0.46	0.46
Sat Flow, veh/h	2910	3635	1154	2910	3367	1502	2910	4837	1502	2910	6029	266
Grp Volume(v), veh/h	102	295	152	301	585	167	230	1691	0	108	1028	388
Grp Sat Flow(s),veh/h/ln	1455	1612	1564	1455	1683	1502	1455	1612	1502	1455	1524	1724
Q Serve(g_s), s	3.6	9.0	9.6	10.5	17.3	10.3	8.1	27.1	0.0	3.8	16.2	16.2
Cycle Q Clear(g_c), s	3.6	9.0	9.6	10.5	17.3	10.3	8.1	27.1	0.0	3.8	16.2	16.2
Prop In Lane	1.00		0.74	1.00		1.00	1.00		1.00	1.00		0.15
Lane Grp Cap(c), veh/h	148	451	219	358	714	318	290	2497		140	2124	801
V/C Ratio(X)	0.69	0.65	0.69	0.84	0.82	0.52	0.79	0.68		0.77	0.48	0.48
Avail Cap(c_a), veh/h	165	557	270	424	882	393	433	2497		140	2124	801
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.6	42.4	42.7	44.7	39.2	36.4	45.9	18.7	0.0	49.0	19.3	19.3
Incr Delay (d2), s/veh	10.1	2.0	5.6	12.3	5.1	1.3	5.9	1.5	0.0	23.1	0.8	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	3.7	4.0	4.4	7.6	3.9	3.1	10.0	0.0	1.8	5.7	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	44.4	48.3	57.0	44.2	37.7	51.8	20.2	0.0	72.2	20.1	21.4
LnGrp LOS	E	D	D	E	D	D	D	C		E	C	C
Approach Vol, veh/h		549			1053			1921	A		1524	
Approach Delay, s/veh		48.1			46.8			24.0			24.1	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	58.3	17.3	19.1	14.9	52.9	9.8	26.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	5.8	29.1	12.5	11.6	10.1	18.2	5.6	19.3
Green Ext Time (p_c), s	0.0	14.5	0.3	1.5	0.4	11.3	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

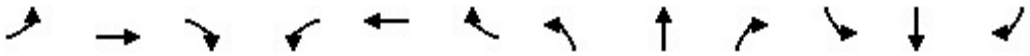
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.988				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	5998	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Flt Permitted	0.950			0.950			0.950					
Satd. Flow (perm)	1583	5998	0	1583	4818	1500	1583	1765	1500	1667	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25				164			164		325	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	38	495	41	1	703	56	43	1	1	0	0	3
Future Volume (vph)	38	495	41	1	703	56	43	1	1	0	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	42	550	46	1	781	62	48	1	1	0	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	596	0	1	781	62	48	1	1	0	3	0

Intersection Summary

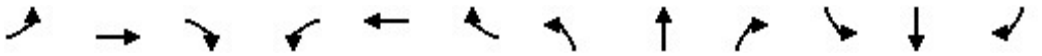
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT	Ø1
Lane Configurations										
Traffic Volume (vph)	38	495	1	703	56	43	1	1	0	
Future Volume (vph)	38	495	1	703	56	43	1	1	0	
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	NA	
Protected Phases	7	4	3	8		5	2		6	1
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	6	
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	22.5	9.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	26.7	15.0
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	38.1%	21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	Min	None
Act Effct Green (s)	5.7	15.9	5.7	14.6	14.6	7.0	9.4	9.4	6.3	
Actuated g/C Ratio	0.15	0.43	0.15	0.40	0.40	0.19	0.25	0.25	0.17	
v/c Ratio	0.17	0.23	0.00	0.41	0.09	0.16	0.00	0.00	0.00	
Control Delay	21.9	7.6	21.0	10.5	0.2	19.8	12.0	0.0	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.9	7.6	21.0	10.5	0.2	19.8	12.0	0.0	0.0	
LOS	C	A	C	B	A	B	B	A	A	
Approach Delay		8.5		9.7			19.3			
Approach LOS		A		A			B			

Intersection Summary			
Cycle Length: 70			
Actuated Cycle Length: 36.9			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 9.5		Intersection LOS: A	
Intersection Capacity Utilization 39.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBT
Lane Group Flow (vph)	42	596	1	781	62	48	1	1	3
v/c Ratio	0.17	0.23	0.00	0.41	0.09	0.16	0.00	0.00	0.00
Control Delay	21.9	7.6	21.0	10.5	0.2	19.8	12.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	7.6	21.0	10.5	0.2	19.8	12.0	0.0	0.0
Queue Length 50th (ft)	6	11	0	20	0	6	0	0	0
Queue Length 95th (ft)	37	55	4	99	0	39	3	0	0
Internal Link Dist (ft)		2546		362			269		358
Turn Bay Length (ft)	130		130		145	165		165	
Base Capacity (vph)	244	3559	244	2679	907	332	1077	979	2057
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.17	0.00	0.29	0.07	0.14	0.00	0.00	0.00

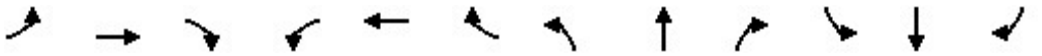
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	495	41	1	703	56	43	1	1	0	0	3
Future Volume (veh/h)	38	495	41	1	703	56	43	1	1	0	0	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	42	550	46	1	781	62	48	1	1	0	0	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	1982	163	4	1437	446	83	534	453	4	221	197
Arrive On Green	0.05	0.34	0.34	0.00	0.30	0.30	0.05	0.30	0.30	0.00	0.00	0.13
Sat Flow, veh/h	1594	5783	475	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	42	433	163	1	781	62	48	1	1	0	0	3
Grp Sat Flow(s),veh/h/ln	1594	1524	1686	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	1.0	2.6	2.7	0.0	5.2	1.2	1.1	0.0	0.0	0.0	0.0	0.1
Cycle Q Clear(g_c), s	1.0	2.6	2.7	0.0	5.2	1.2	1.1	0.0	0.0	0.0	0.0	0.1
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	75	1567	578	4	1437	446	83	534	453	4	221	197
V/C Ratio(X)	0.56	0.28	0.28	0.24	0.54	0.14	0.58	0.00	0.00	0.00	0.00	0.02
Avail Cap(c_a), veh/h	209	2160	797	209	2285	709	284	860	729	439	981	875
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	17.8	9.1	9.1	19.0	11.2	9.8	17.6	9.3	9.3	0.0	0.0	14.4
Incr Delay (d2), s/veh	6.4	0.1	0.3	27.1	0.3	0.1	6.1	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.7	0.8	0.0	1.5	0.3	0.5	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.1	9.2	9.4	46.1	11.6	10.0	23.8	9.3	9.3	0.0	0.0	14.4
LnGrp LOS	C	A	A	D	B	A	C	A	A	A	A	B
Approach Vol, veh/h		638			844			50			3	
Approach Delay, s/veh		10.2			11.5			23.2			14.4	
Approach LOS		B			B			C			B	

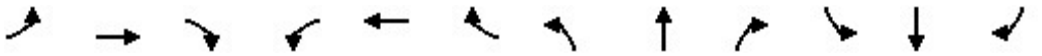
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	16.0	4.6	17.6	6.5	9.5	6.3	15.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	0.0	2.0	2.0	4.7	3.1	2.1	3.0	7.2
Green Ext Time (p_c), s	0.0	0.0	0.0	3.3	0.0	0.0	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	11.3
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	2891	6065	0	1583	4798	0	1583	1765	1500	0	1687	1500
Flt Permitted	0.950			0.950			0.731				0.740	
Satd. Flow (perm)	2891	6065	0	1583	4798	0	1218	1765	1500	0	1306	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			8				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



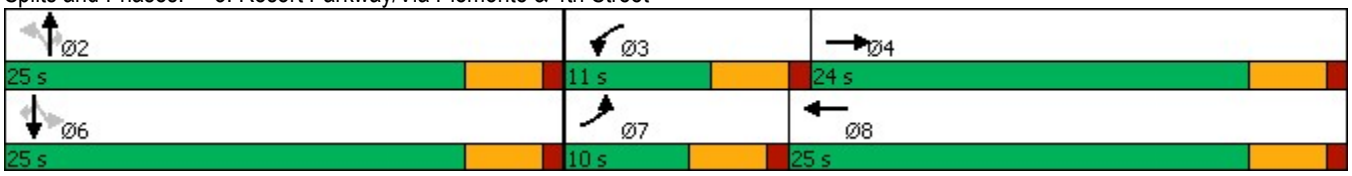
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	15	491	4	36	702	20	28	3	31	34	3	17
Future Volume (vph)	15	491	4	36	702	20	28	3	31	34	3	17
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	16	528	4	39	755	22	30	3	33	37	3	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	532	0	39	777	0	30	3	33	0	40	18

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	15	491	36	702	28	3	31	34	3	17
Future Volume (vph)	15	491	36	702	28	3	31	34	3	17
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.9	12.3	6.4	12.4	6.8	6.8	6.8		6.8	6.8
Actuated g/C Ratio	0.20	0.41	0.21	0.41	0.23	0.23	0.23		0.23	0.23
v/c Ratio	0.03	0.21	0.12	0.39	0.11	0.01	0.08		0.14	0.04
Control Delay	14.3	6.6	14.1	7.2	13.4	12.7	0.4		13.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	14.3	6.6	14.1	7.2	13.4	12.7	0.4		13.4	0.2
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		6.8		7.6		6.8			9.3	
Approach LOS		A		A		A			A	

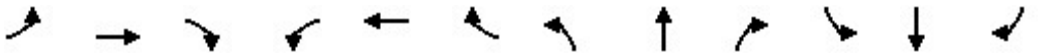
Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 30.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 39.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	16	532	39	777	30	3	33	40	18
v/c Ratio	0.03	0.21	0.12	0.39	0.11	0.01	0.08	0.14	0.04
Control Delay	14.3	6.6	14.1	7.2	13.4	12.7	0.4	13.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	6.6	14.1	7.2	13.4	12.7	0.4	13.4	0.2
Queue Length 50th (ft)	1	10	4	21	3	0	0	4	0
Queue Length 95th (ft)	8	40	30	74	24	6	0	29	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	562	4185	364	3482	883	1280	1118	947	1118
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.13	0.11	0.22	0.03	0.00	0.03	0.04	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	491	4	36	702	20	28	3	31	34	3	17
Future Volume (veh/h)	15	491	4	36	702	20	28	3	31	34	3	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	16	528	4	39	755	22	30	3	33	37	3	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	61	2002	15	74	1662	48	443	304	258	452	27	258
Arrive On Green	0.02	0.32	0.32	0.05	0.34	0.34	0.17	0.17	0.17	0.17	0.17	0.17
Sat Flow, veh/h	2910	6287	48	1594	4831	140	1314	1772	1502	1249	159	1502
Grp Volume(v), veh/h	16	384	148	39	503	274	30	3	33	40	0	18
Grp Sat Flow(s),veh/h/ln	1455	1524	1763	1594	1612	1747	1314	1772	1502	1408	0	1502
Q Serve(g_s), s	0.2	1.8	1.8	0.7	3.5	3.5	0.6	0.0	0.5	0.5	0.0	0.3
Cycle Q Clear(g_c), s	0.2	1.8	1.8	0.7	3.5	3.5	1.2	0.0	0.5	0.7	0.0	0.3
Prop In Lane	1.00		0.03	1.00		0.08	1.00		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	61	1456	562	74	1110	601	443	304	258	480	0	258
V/C Ratio(X)	0.26	0.26	0.26	0.53	0.45	0.46	0.07	0.01	0.13	0.08	0.00	0.07
Avail Cap(c_a), veh/h	549	3060	1180	356	2269	1229	1142	1247	1057	1222	0	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.0	7.4	7.4	13.6	7.4	7.4	10.8	10.0	10.2	10.3	0.0	10.1
Incr Delay (d2), s/veh	2.3	0.1	0.2	5.7	0.3	0.5	0.1	0.0	0.2	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.5	0.3	0.8	0.9	0.1	0.0	0.1	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	7.5	7.6	19.3	7.7	8.0	10.9	10.0	10.4	10.3	0.0	10.2
LnGrp LOS	B	A	A	B	A	A	B	B	B	B	A	B
Approach Vol, veh/h		548			816			66			58	
Approach Delay, s/veh		7.8			8.4			10.6			10.3	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.9	13.8		9.5	5.1	14.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		3.2	2.7	3.8		2.7	2.2	5.5				
Green Ext Time (p_c), s		0.1	0.0	3.1		0.2	0.0	4.5				

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.994					0.865
Flt Protected						
Satd. Flow (prot)	4789	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4789	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	549	21	0	715	0	23
Future Volume (vph)	549	21	0	715	0	23
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	597	23	0	777	0	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	620	0	0	777	0	25

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	549	21	0	715	0	23
Future Vol, veh/h	549	21	0	715	0	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	597	23	0	777	0	25

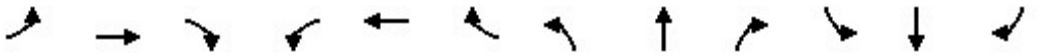
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	310
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	585
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	585
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	585	-	-	-
HCM Lane V/C Ratio	0.043	-	-	-
HCM Control Delay (s)	11.4	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5980	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5980	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			286			73		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



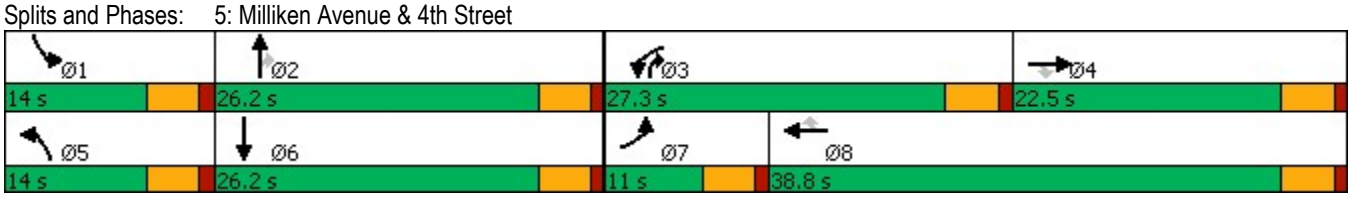
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	147	420	102	466	1198	392	199	953	156	198	827	95
Future Volume (vph)	147	420	102	466	1198	392	199	953	156	198	827	95
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	158	452	110	501	1288	422	214	1025	168	213	889	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	452	110	501	1288	422	214	1025	168	213	991	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	147	420	102	466	1198	392	199	953	156	198	827
Future Volume (vph)	147	420	102	466	1198	392	199	953	156	198	827
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	19.8	19.8	19.6	32.8	32.8	9.2	20.6	44.7	9.2	20.6
Actuated g/C Ratio	0.07	0.23	0.23	0.22	0.38	0.38	0.11	0.24	0.51	0.11	0.24
v/c Ratio	0.73	0.41	0.23	0.77	0.71	0.57	0.70	0.71	0.21	0.70	0.69
Control Delay	61.7	31.2	1.8	40.7	25.9	10.3	51.8	34.0	6.9	51.7	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	31.2	1.8	40.7	25.9	10.3	51.8	34.0	6.9	51.7	32.6
LOS	E	C	A	D	C	B	D	C	A	D	C
Approach Delay		33.4			26.3			33.5			36.0
Approach LOS		C			C			C			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 87.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 31.1	Intersection LOS: C
Intersection Capacity Utilization 65.7%	ICU Level of Service C
Analysis Period (min) 15	

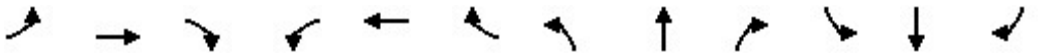
Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	158	452	110	501	1288	422	214	1025	168	213	991
v/c Ratio	0.73	0.41	0.23	0.77	0.71	0.57	0.70	0.71	0.21	0.70	0.69
Control Delay	61.7	31.2	1.8	40.7	25.9	10.3	51.8	34.0	6.9	51.7	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	31.2	1.8	40.7	25.9	10.3	51.8	34.0	6.9	51.7	32.6
Queue Length 50th (ft)	46	80	0	137	222	52	61	155	26	61	144
Queue Length 95th (ft)	#95	116	7	187	273	140	#108	192	56	#108	181
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	215	1091	480	758	1900	764	316	1514	858	316	1513
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.41	0.23	0.66	0.68	0.55	0.68	0.68	0.20	0.67	0.65

Intersection Summary

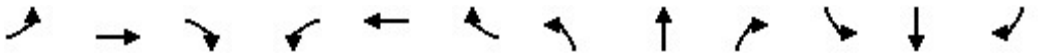
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	420	102	466	1198	392	199	953	156	198	827	95
Future Volume (veh/h)	147	420	102	466	1198	392	199	953	156	198	827	95
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	158	452	110	501	1288	422	214	1025	168	213	889	102
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	220	1174	365	596	1799	558	283	1414	656	282	1296	147
Arrive On Green	0.08	0.24	0.24	0.20	0.37	0.37	0.10	0.23	0.23	0.10	0.23	0.23
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5596	634
Grp Volume(v), veh/h	158	452	110	501	1288	422	214	1025	168	213	724	267
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1658
Q Serve(g_s), s	4.3	6.3	4.8	13.3	18.4	19.8	5.8	12.5	5.7	5.7	11.6	11.9
Cycle Q Clear(g_c), s	4.3	6.3	4.8	13.3	18.4	19.8	5.8	12.5	5.7	5.7	11.6	11.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.38
Lane Grp Cap(c), veh/h	220	1174	365	596	1799	558	283	1414	656	282	1059	384
V/C Ratio(X)	0.72	0.38	0.30	0.84	0.72	0.76	0.76	0.73	0.26	0.76	0.68	0.69
Avail Cap(c_a), veh/h	235	1174	365	824	2060	640	343	1643	712	343	1232	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.4	25.5	24.9	30.7	21.6	22.1	35.4	28.6	14.4	35.4	28.2	28.3
Incr Delay (d2), s/veh	9.4	0.2	0.5	5.7	1.0	4.5	7.6	1.4	0.2	7.5	1.3	3.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	2.4	1.7	5.0	6.7	7.2	2.3	4.5	1.9	2.3	4.2	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.7	25.7	25.4	36.4	22.7	26.6	43.0	29.9	14.6	42.9	29.5	32.2
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	C	C
Approach Vol, veh/h		720			2211			1407			1204	
Approach Delay, s/veh		30.0			26.5			30.1			32.5	
Approach LOS		C			C			C			C	

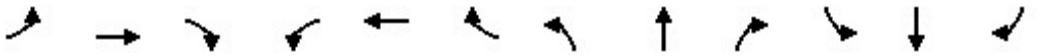
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	23.2	21.0	24.0	12.3	23.2	10.6	34.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	7.7	14.5	15.3	8.3	7.8	13.9	6.3	21.8
Green Ext Time (p_c), s	0.1	4.2	1.2	2.4	0.1	3.9	0.0	8.2

Intersection Summary	
HCM 6th Ctrl Delay	29.2
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.900	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2891	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2891	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		215	215
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



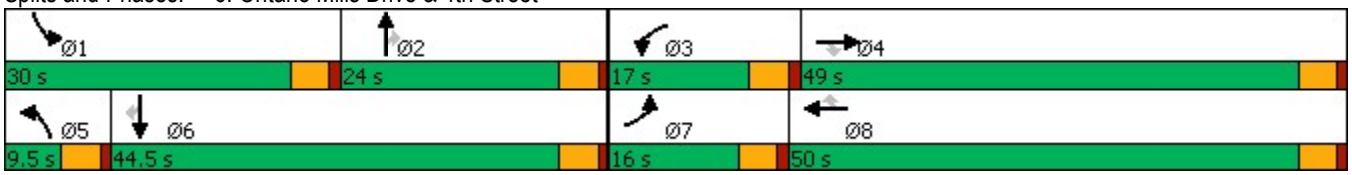
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	286	383	59	110	1303	131	72	71	78	147	223	881
Future Volume (vph)	286	383	59	110	1303	131	72	71	78	147	223	881
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	329	440	68	126	1498	151	83	82	90	169	256	1013
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	329	440	68	126	1498	151	83	82	90	169	763	506

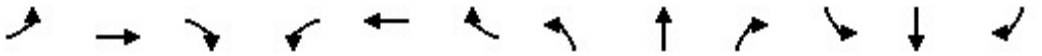
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	286	383	59	110	1303	131	72	71	78	147	223	881
Future Volume (vph)	286	383	59	110	1303	131	72	71	78	147	223	881
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.7	44.7	44.7	10.1	43.1	43.1	5.1	22.3	22.3	17.4	34.6	34.6
Actuated g/C Ratio	0.10	0.40	0.40	0.09	0.38	0.38	0.05	0.20	0.20	0.15	0.31	0.31
v/c Ratio	1.10	0.23	0.10	0.49	0.81	0.23	1.19	0.12	0.22	0.70	0.87dr	0.89
Control Delay	129.9	24.1	0.3	57.1	36.0	6.3	212.2	40.1	3.3	61.1	29.2	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	129.9	24.1	0.3	57.1	36.0	6.3	212.2	40.1	3.3	61.1	29.2	40.5
LOS	F	C	A	E	D	A	F	D	A	E	C	D
Approach Delay		63.7			35.0			83.1			36.9	
Approach LOS		E			C			F			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 44.1	Intersection LOS: D
Intersection Capacity Utilization 80.7%	ICU Level of Service D
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 6: Ontario Mills Drive & 4th Street





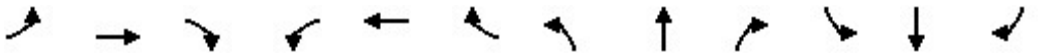
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	329	440	68	126	1498	151	83	82	90	169	763	506
v/c Ratio	1.10	0.23	0.10	0.49	0.81	0.23	1.19	0.12	0.22	0.70	0.87dr	0.89
Control Delay	129.9	24.1	0.3	57.1	36.0	6.3	212.2	40.1	3.3	61.1	29.2	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	129.9	24.1	0.3	57.1	36.0	6.3	212.2	40.1	3.3	61.1	29.2	40.5
Queue Length 50th (ft)	~158	83	0	48	379	7	~81	26	0	126	203	246
Queue Length 95th (ft)	#240	109	0	76	420	47	#179	51	11	183	263	#431
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	299	1976	695	325	1970	694	70	687	415	362	1177	628
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.22	0.10	0.39	0.76	0.22	1.19	0.12	0.22	0.47	0.65	0.81

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.



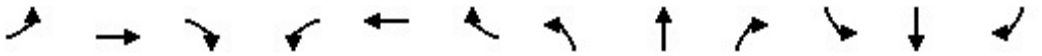
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	286	383	59	110	1303	131	72	71	78	147	223	881
Future Volume (veh/h)	286	383	59	110	1303	131	72	71	78	147	223	881
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	329	440	68	126	1498	151	83	82	90	169	256	1013
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	286	1944	603	174	1759	546	68	879	392	197	606	1026
Arrive On Green	0.10	0.40	0.40	0.06	0.36	0.36	0.04	0.26	0.26	0.12	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	329	440	68	126	1498	151	83	82	90	169	256	1013
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	11.5	7.0	3.3	5.0	33.4	8.3	5.0	2.2	5.5	12.2	13.0	39.2
Cycle Q Clear(g_c), s	11.5	7.0	3.3	5.0	33.4	8.3	5.0	2.2	5.5	12.2	13.0	39.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	286	1944	603	174	1759	546	68	879	392	197	606	1026
V/C Ratio(X)	1.15	0.23	0.11	0.72	0.85	0.28	1.22	0.09	0.23	0.86	0.42	0.99
Avail Cap(c_a), veh/h	286	1944	603	311	1880	584	68	879	392	347	606	1026
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.8	23.0	21.9	54.1	34.3	26.4	56.0	32.8	34.0	50.3	29.6	38.3
Incr Delay (d2), s/veh	100.3	0.1	0.1	5.6	3.8	0.3	179.4	0.0	0.3	10.4	0.5	24.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	2.7	1.2	2.0	13.5	3.0	5.4	0.9	2.1	5.4	5.6	17.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	153.1	23.1	22.0	59.6	38.1	26.6	235.5	32.8	34.3	60.7	30.1	63.1
LnGrp LOS	F	C	C	E	D	C	F	C	C	E	C	E
Approach Vol, veh/h		837			1775			255			1438	
Approach Delay, s/veh		74.1			38.7			99.3			57.0	
Approach LOS		E			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.9	35.1	11.5	51.5	9.5	44.5	16.0	47.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	14.2	7.5	7.0	9.0	7.0	41.2	13.5	35.4
Green Ext Time (p_c), s	0.3	0.5	0.2	3.5	0.0	0.0	0.0	7.1

Intersection Summary	
HCM 6th Ctrl Delay	55.3
HCM 6th LOS	E

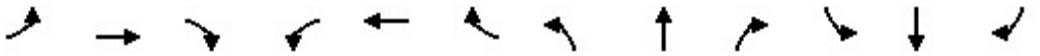
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.983			0.892				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (prot)	2891	4818	1500	1583	4736	0	1583	2991	0	1504	1619	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (perm)	2891	4818	1500	1583	4736	0	1583	2991	0	1504	1619	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		24			60				492
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



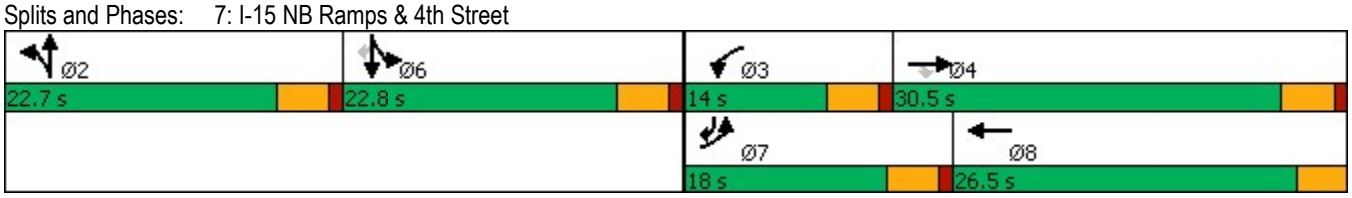
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	212	347	77	45	478	62	110	22	57	370	66	961
Future Volume (vph)	212	347	77	45	478	62	110	22	57	370	66	961
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	223	365	81	47	503	65	116	23	60	389	69	1012
Shared Lane Traffic (%)										42%		
Lane Group Flow (vph)	223	365	81	47	568	0	116	83	0	226	232	1012

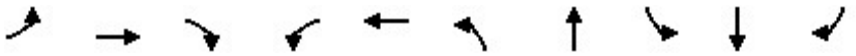
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	212	347	77	45	478	110	22	370	66	961
Future Volume (vph)	212	347	77	45	478	110	22	370	66	961
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	18.0	30.5	30.5	14.0	26.5	22.7	22.7	22.8	22.8	18.0
Total Split (%)	20.0%	33.9%	33.9%	15.6%	29.4%	25.2%	25.2%	25.3%	25.3%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	12.0	23.2	23.2	7.5	14.6	10.7	10.7	15.2	15.2	31.8
Actuated g/C Ratio	0.17	0.33	0.33	0.11	0.21	0.15	0.15	0.22	0.22	0.45
v/c Ratio	0.45	0.23	0.14	0.28	0.57	0.48	0.16	0.69	0.66	0.69
Control Delay	31.7	20.4	2.2	36.9	27.1	36.6	13.1	39.9	37.2	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	20.4	2.2	36.9	27.1	36.6	13.1	39.9	37.2	10.8
LOS	C	C	A	D	C	D	B	D	D	B
Approach Delay		22.0			27.8		26.8		19.4	
Approach LOS		C			C		C		B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 22.2	Intersection LOS: C
Intersection Capacity Utilization 64.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street

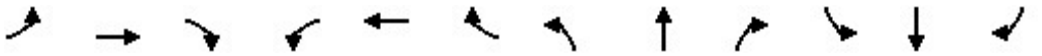




Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	223	365	81	47	568	116	83	226	232	1012
v/c Ratio	0.45	0.23	0.14	0.28	0.57	0.48	0.16	0.69	0.66	0.69
Control Delay	31.7	20.4	2.2	36.9	27.1	36.6	13.1	39.9	37.2	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.7	20.4	2.2	36.9	27.1	36.6	13.1	39.9	37.2	10.8
Queue Length 50th (ft)	45	47	0	20	81	49	4	96	98	86
Queue Length 95th (ft)	91	81	13	56	126	105	24	#220	#207	204
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	575	1868	659	221	1621	424	846	405	436	1528
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.20	0.12	0.21	0.35	0.27	0.10	0.56	0.53	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	212	347	77	45	478	62	110	22	57	370	66	961
Future Volume (veh/h)	212	347	77	45	478	62	110	22	57	370	66	961
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	223	365	81	47	503	65	116	23	60	438	0	1012
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	1241	385	71	830	106	177	187	167	944	0	1220
Arrive On Green	0.11	0.26	0.26	0.04	0.19	0.19	0.11	0.11	0.11	0.30	0.00	0.30
Sat Flow, veh/h	2910	4837	1502	1594	4345	553	1594	1683	1502	3188	0	3003
Grp Volume(v), veh/h	223	365	81	47	371	197	116	23	60	438	0	1012
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1672	1594	1683	1502	1594	0	1502
Q Serve(g_s), s	4.6	3.8	2.6	1.8	6.5	6.7	4.3	0.8	2.3	6.9	0.0	18.3
Cycle Q Clear(g_c), s	4.6	3.8	2.6	1.8	6.5	6.7	4.3	0.8	2.3	6.9	0.0	18.3
Prop In Lane	1.00		1.00	1.00		0.33	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	321	1241	385	71	616	319	177	187	167	944	0	1220
V/C Ratio(X)	0.69	0.29	0.21	0.66	0.60	0.62	0.65	0.12	0.36	0.46	0.00	0.83
Avail Cap(c_a), veh/h	636	2035	632	245	1200	622	469	496	442	944	0	1220
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.5	18.5	18.1	29.1	22.9	22.9	26.3	24.7	25.4	17.8	0.0	16.4
Incr Delay (d2), s/veh	2.7	0.1	0.3	9.9	1.0	1.9	4.0	0.3	1.3	0.4	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	1.3	0.9	0.8	2.4	2.6	1.7	0.3	0.8	2.4	0.0	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	18.6	18.3	38.9	23.8	24.8	30.3	25.0	26.7	18.1	0.0	21.3
LnGrp LOS	C	B	B	D	C	C	C	C	C	B	A	C
Approach Vol, veh/h		669			615			199			1450	
Approach Delay, s/veh		22.1			25.3			28.6			20.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		11.4	7.3	20.4		22.8	11.3	16.3				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	13.5	* 23				
Max Q Clear Time (g_c+I1), s		6.3	3.8	5.8		20.3	6.6	8.7				
Green Ext Time (p_c), s		0.6	0.0	2.6		0.0	0.4	3.1				

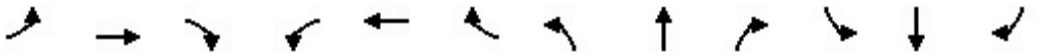
Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

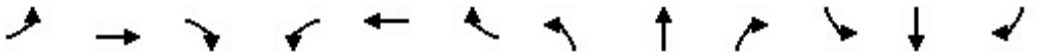
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.904				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



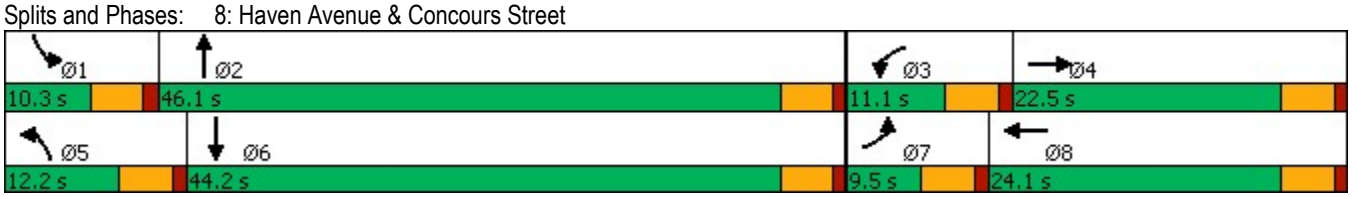
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	21	45	81	163	59	18	71	1812	146	97	1405	44
Future Volume (vph)	21	45	81	163	59	18	71	1812	146	97	1405	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	23	50	90	181	66	20	79	2013	162	108	1561	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	140	0	181	66	20	79	2013	162	108	1561	49

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	21	45	163	59	18	71	1812	146	97	1405	44
Future Volume (vph)	21	45	163	59	18	71	1812	146	97	1405	44
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	7.0	6.7	14.7	75.5	7.0	40.3	75.5	5.9	39.1	75.5
Actuated g/C Ratio	0.07	0.09	0.09	0.19	1.00	0.09	0.53	1.00	0.08	0.52	1.00
v/c Ratio	0.12	0.39	0.52	0.10	0.01	0.29	0.62	0.11	0.48	0.50	0.03
Control Delay	37.1	17.9	40.4	29.7	0.0	36.9	13.8	0.1	43.3	13.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	17.9	40.4	29.7	0.0	36.9	13.8	0.1	43.3	13.1	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.6		34.7			13.7			14.7	
Approach LOS		C		C			B			B	

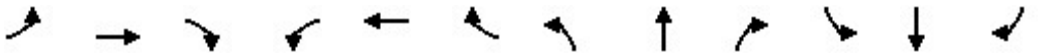
Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 75.5		
Natural Cycle: 70		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.62		
Intersection Signal Delay: 15.6	Intersection LOS: B	
Intersection Capacity Utilization 55.2%	ICU Level of Service B	
Analysis Period (min) 15		

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	23	140	181	66	20	79	2013	162	108	1561	49
v/c Ratio	0.12	0.39	0.52	0.10	0.01	0.29	0.62	0.11	0.48	0.50	0.03
Control Delay	37.1	17.9	40.4	29.7	0.0	36.9	13.8	0.1	43.3	13.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	17.9	40.4	29.7	0.0	36.9	13.8	0.1	43.3	13.1	0.0
Queue Length 50th (ft)	5	12	30	13	0	19	189	0	26	139	0
Queue Length 95th (ft)	17	38	53	34	0	40	244	0	53	183	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	194	800	348	882	1500	298	3389	1500	225	3253	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.17	0.52	0.07	0.01	0.27	0.59	0.11	0.48	0.48	0.03

Intersection Summary



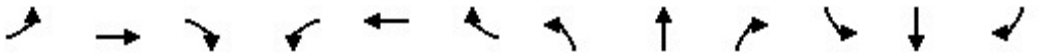
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	45	81	163	59	18	71	1812	146	97	1405	44
Future Volume (veh/h)	21	45	81	163	59	18	71	1812	146	97	1405	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	23	50	90	181	66	0	79	2013	0	108	1561	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	157	140	287	471		165	3109		184	3150	
Arrive On Green	0.03	0.09	0.09	0.07	0.14	0.00	0.06	0.51	0.00	0.06	0.52	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	23	50	90	181	66	0	79	2013	0	108	1561	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.5	1.9	4.0	3.1	1.2	0.0	1.8	16.7	0.0	2.5	11.5	0.0
Cycle Q Clear(g_c), s	0.5	1.9	4.0	3.1	1.2	0.0	1.8	16.7	0.0	2.5	11.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	75	157	140	287	471		165	3109		184	3150	
V/C Ratio(X)	0.31	0.32	0.64	0.63	0.14		0.48	0.65		0.59	0.50	
Avail Cap(c_a), veh/h	211	439	392	380	957		325	3677		245	3509	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.0	29.2	30.2	31.1	26.0	0.0	31.6	12.4	0.0	31.4	10.8	0.0
Incr Delay (d2), s/veh	2.3	1.2	4.8	2.3	0.1	0.0	2.2	0.3	0.0	2.9	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.8	1.6	1.0	0.5	0.0	0.7	4.9	0.0	0.9	3.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.2	30.4	35.0	33.4	26.2	0.0	33.7	12.7	0.0	34.4	10.9	0.0
LnGrp LOS	D	C	D	C	C		C	B		C	B	
Approach Vol, veh/h		163			247	A		2092	A		1669	A
Approach Delay, s/veh		33.6			31.5			13.5			12.5	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	39.7	9.5	10.9	8.4	40.1	6.3	14.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	4.5	18.7	5.1	6.0	3.8	13.5	2.5	3.2
Green Ext Time (p_c), s	0.0	16.5	0.1	0.5	0.1	13.7	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	14.9
HCM 6th LOS	B

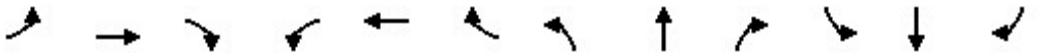
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.992			0.973			0.994			0.980	
Flt Protected	0.950	0.955			0.971		0.950			0.950		
Satd. Flow (prot)	1593	1588	0	0	1667	0	1676	4789	0	1676	4721	0
Flt Permitted	0.950	0.955					0.950			0.950		
Satd. Flow (perm)	1593	1588	0	0	1717	0	1676	4789	0	1676	4721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143			1			8			35	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



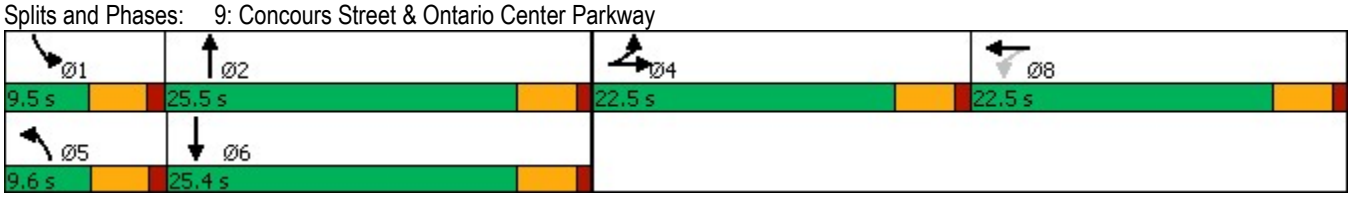
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	99	0	3	3	1	1	48	495	21	1	683	106
Future Volume (vph)	99	0	3	3	1	1	48	495	21	1	683	106
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	110	0	3	3	1	1	53	550	23	1	759	118
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	57	56	0	0	5	0	53	573	0	1	877	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	99	0	3	1	48	495	1	683
Future Volume (vph)	99	0	3	1	48	495	1	683
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.4	7.4		6.1	5.5	26.2	5.3	24.3
Actuated g/C Ratio	0.18	0.18		0.15	0.13	0.63	0.13	0.58
v/c Ratio	0.20	0.14		0.02	0.24	0.19	0.00	0.32
Control Delay	19.7	0.7		19.5	23.7	6.7	22.0	8.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	0.7		19.5	23.7	6.7	22.0	8.4
LOS	B	A		B	C	A	C	A
Approach Delay		10.3		19.5		8.2		8.4
Approach LOS		B		B		A		A

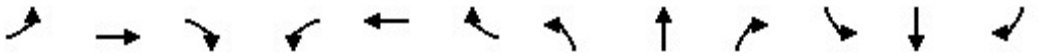
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 41.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.32	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 36.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	56	5	53	573	1	877
v/c Ratio	0.20	0.14	0.02	0.24	0.19	0.00	0.32
Control Delay	19.7	0.7	19.5	23.7	6.7	22.0	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	0.7	19.5	23.7	6.7	22.0	8.4
Queue Length 50th (ft)	9	0	1	10	16	0	26
Queue Length 95th (ft)	48	0	10	48	78	5	120
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	737	811	794	219	3042	215	2880
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.01	0.24	0.19	0.00	0.30

Intersection Summary



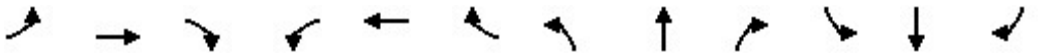
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	0	3	3	1	1	48	495	21	1	683	106
Future Volume (veh/h)	99	0	3	3	1	1	48	495	21	1	683	106
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	113	0	0	3	1	1	53	550	23	1	759	118
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	318	167	0	7	2	2	97	1883	78	5	1435	221
Arrive On Green	0.09	0.00	0.00	0.01	0.01	0.01	0.06	0.40	0.40	0.00	0.34	0.34
Sat Flow, veh/h	3375	1772	0	997	332	332	1688	4763	198	1688	4228	652
Grp Volume(v), veh/h	113	0	0	5	0	0	53	371	202	1	578	299
Grp Sat Flow(s),veh/h/ln	1688	1772	0	1662	0	0	1688	1612	1736	1688	1612	1655
Q Serve(g_s), s	1.1	0.0	0.0	0.1	0.0	0.0	1.1	2.8	2.8	0.0	5.2	5.2
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.1	0.0	0.0	1.1	2.8	2.8	0.0	5.2	5.2
Prop In Lane	1.00		0.00	0.60		0.20	1.00		0.11	1.00		0.39
Lane Grp Cap(c), veh/h	318	167	0	11	0	0	97	1275	686	5	1095	562
V/C Ratio(X)	0.36	0.00	0.00	0.44	0.00	0.00	0.55	0.29	0.29	0.21	0.53	0.53
Avail Cap(c_a), veh/h	1695	890	0	835	0	0	240	1890	1018	235	1881	965
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	0.0	17.7	0.0	0.0	16.4	7.4	7.4	17.9	9.5	9.5
Incr Delay (d2), s/veh	0.7	0.0	0.0	25.1	0.0	0.0	4.8	0.1	0.2	21.0	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.1	0.0	0.0	0.5	0.7	0.8	0.0	1.4	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	0.0	0.0	42.8	0.0	0.0	21.2	7.5	7.6	38.9	9.9	10.3
LnGrp LOS	B	A	A	D	A	A	C	A	A	D	A	B
Approach Vol, veh/h		113			5			626			878	
Approach Delay, s/veh		15.9			42.8			8.7			10.1	
Approach LOS		B			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	18.7		7.9	6.5	16.7		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	4.8		3.1	3.1	7.2		2.1				
Green Ext Time (p_c), s	0.0	3.3		0.3	0.0	4.9		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		10.1
HCM 6th LOS		B

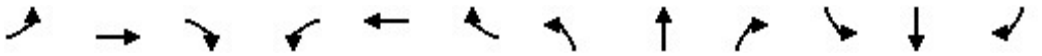
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			291
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



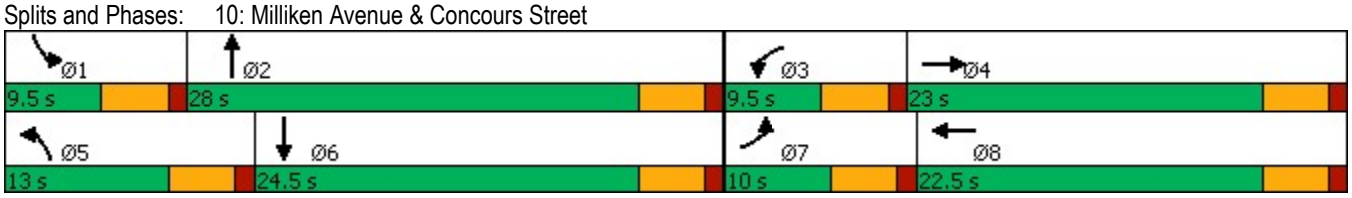
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	100	24	121	49	78	40	190	938	59	53	899	250
Future Volume (vph)	100	24	121	49	78	40	190	938	59	53	899	250
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	116	28	141	57	91	47	221	1091	69	62	1045	291
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	28	141	57	91	47	221	1091	69	62	1045	291

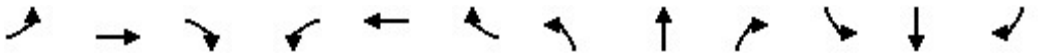
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	24	121	49	78	40	190	938	59	53	899	250
Future Volume (vph)	100	24	121	49	78	40	190	938	59	53	899	250
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.7	11.0	54.3	5.1	7.0	54.3	8.2	29.5	54.3	5.1	20.5	54.3
Actuated g/C Ratio	0.10	0.20	1.00	0.09	0.13	1.00	0.15	0.54	1.00	0.09	0.38	1.00
v/c Ratio	0.39	0.04	0.09	0.21	0.21	0.03	0.50	0.33	0.05	0.23	0.46	0.19
Control Delay	29.5	20.9	0.1	27.4	24.4	0.1	27.6	11.2	0.1	27.7	15.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	20.9	0.1	27.4	24.4	0.1	27.6	11.2	0.1	27.7	15.4	0.3
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		14.1			19.4			13.3			12.8	
Approach LOS		B			B			B			B	

Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 54.3		
Natural Cycle: 65		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.50		
Intersection Signal Delay: 13.5	Intersection LOS: B	
Intersection Capacity Utilization 41.5%	ICU Level of Service A	
Analysis Period (min) 15		

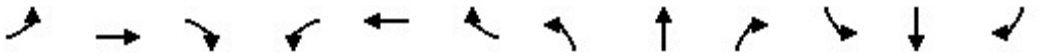
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	116	28	141	57	91	47	221	1091	69	62	1045	291
v/c Ratio	0.39	0.04	0.09	0.21	0.21	0.03	0.50	0.33	0.05	0.23	0.46	0.19
Control Delay	29.5	20.9	0.1	27.4	24.4	0.1	27.6	11.2	0.1	27.7	15.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	20.9	0.1	27.4	24.4	0.1	27.6	11.2	0.1	27.7	15.4	0.3
Queue Length 50th (ft)	20	3	0	9	15	0	37	79	0	10	84	0
Queue Length 95th (ft)	41	14	0	24	32	0	66	103	0	25	109	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	301	1175	1500	273	1143	1500	465	3312	1500	273	2383	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.02	0.09	0.21	0.08	0.03	0.48	0.33	0.05	0.23	0.44	0.19

Intersection Summary



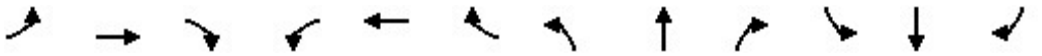
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	24	121	49	78	40	190	938	59	53	899	250
Future Volume (veh/h)	100	24	121	49	78	40	190	938	59	53	899	250
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	116	28	0	57	91	0	221	1091	0	62	1045	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	246	424		164	330		332	2211		174	1879	
Arrive On Green	0.08	0.13	0.00	0.06	0.10	0.00	0.11	0.36	0.00	0.06	0.31	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	116	28	0	57	91	0	221	1091	0	62	1045	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.7	0.3	0.0	0.9	1.1	0.0	3.3	6.3	0.0	0.9	6.5	0.0
Cycle Q Clear(g_c), s	1.7	0.3	0.0	0.9	1.1	0.0	3.3	6.3	0.0	0.9	6.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	246	424		164	330		332	2211		174	1879	
V/C Ratio(X)	0.47	0.07		0.35	0.28		0.67	0.49		0.36	0.56	
Avail Cap(c_a), veh/h	351	1368		319	1331		543	3145		319	2677	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.9	17.5	0.0	20.7	19.0	0.0	19.3	11.3	0.0	20.6	13.2	0.0
Incr Delay (d2), s/veh	1.4	0.1	0.0	1.3	0.4	0.0	2.3	0.2	0.0	1.2	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.1	0.0	0.3	0.4	0.0	1.1	1.7	0.0	0.3	1.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	17.6	0.0	21.9	19.5	0.0	21.6	11.4	0.0	21.8	13.4	0.0
LnGrp LOS	C	B		C	B		C	B		C	B	
Approach Vol, veh/h		144	A		148	A		1312	A		1107	A
Approach Delay, s/veh		20.6			20.4			13.2			13.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	21.0	7.1	10.2	9.7	18.5	8.3	9.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	2.9	8.3	2.9	2.3	5.3	8.5	3.7	3.1
Green Ext Time (p_c), s	0.0	6.8	0.0	0.1	0.2	5.5	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

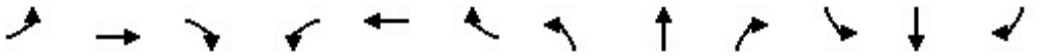
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			434			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



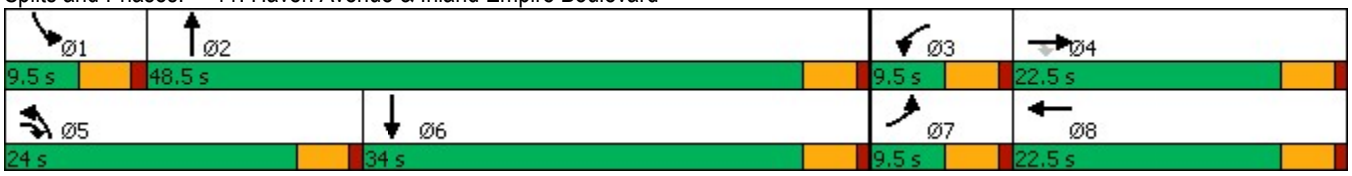
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	53	98	239	118	103	21	460	2095	647	52	1384	75
Future Volume (vph)	53	98	239	118	103	21	460	2095	647	52	1384	75
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	57	105	257	127	111	23	495	2253	696	56	1488	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	105	257	127	111	23	495	2253	696	56	1488	81

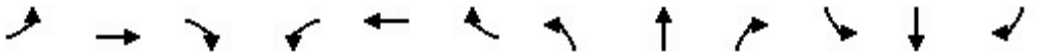
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	98	239	118	103	21	460	2095	647	52	1384	75
Future Volume (vph)	53	98	239	118	103	21	460	2095	647	52	1384	75
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.3	8.1	27.1	5.3	10.0	72.2	17.7	47.6	72.2	5.3	28.6	72.2
Actuated g/C Ratio	0.07	0.11	0.38	0.07	0.14	1.00	0.25	0.66	1.00	0.07	0.40	1.00
v/c Ratio	0.27	0.28	0.42	0.44	0.24	0.02	0.70	0.56	0.46	0.26	0.62	0.05
Control Delay	39.7	35.1	14.4	41.7	33.4	0.0	33.0	11.2	1.0	39.6	20.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	35.1	14.4	41.7	33.4	0.0	33.0	11.2	1.0	39.6	20.7	0.1
LOS	D	D	B	D	C	A	C	B	A	D	C	A
Approach Delay		23.0			34.5			12.3			20.3	
Approach LOS		C			C			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 57.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	57	105	257	127	111	23	495	2253	696	56	1488	81
v/c Ratio	0.27	0.28	0.42	0.44	0.24	0.02	0.70	0.56	0.46	0.26	0.62	0.05
Control Delay	39.7	35.1	14.4	41.7	33.4	0.0	33.0	11.2	1.0	39.6	20.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	35.1	14.4	41.7	33.4	0.0	33.0	11.2	1.0	39.6	20.7	0.1
Queue Length 50th (ft)	14	26	61	22	27	0	116	217	0	13	177	0
Queue Length 95th (ft)	32	50	120	41	52	0	174	274	0	32	225	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	213	892	670	291	892	1500	833	3999	1500	213	2647	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.12	0.38	0.44	0.12	0.02	0.59	0.56	0.46	0.26	0.56	0.05

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	98	239	118	103	21	460	2095	647	52	1384	75
Future Volume (veh/h)	53	98	239	118	103	21	460	2095	647	52	1384	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	57	105	257	127	111	0	495	2253	0	56	1488	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	131	557	548	233	604		580	3089		129	2146	
Arrive On Green	0.04	0.17	0.17	0.06	0.18	0.00	0.20	0.51	0.00	0.04	0.35	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	57	105	257	127	111	0	495	2253	0	56	1488	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.5	2.2	10.5	2.5	2.2	0.0	13.2	23.2	0.0	1.5	16.8	0.0
Cycle Q Clear(g_c), s	1.5	2.2	10.5	2.5	2.2	0.0	13.2	23.2	0.0	1.5	16.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	131	557	548	233	604		580	3089		129	2146	
V/C Ratio(X)	0.44	0.19	0.47	0.55	0.18		0.85	0.73		0.43	0.69	
Avail Cap(c_a), veh/h	182	756	636	247	756		708	3346		182	2243	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.3	28.8	19.5	36.7	27.9	0.0	31.0	15.5	0.0	37.3	22.3	0.0
Incr Delay (d2), s/veh	2.3	0.2	0.6	2.2	0.1	0.0	8.5	0.8	0.0	2.3	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.9	3.6	0.8	0.9	0.0	5.1	7.4	0.0	0.6	5.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	29.0	20.1	38.9	28.1	0.0	39.5	16.2	0.0	39.6	23.1	0.0
LnGrp LOS	D	C	C	D	C		D	B		D	C	
Approach Vol, veh/h		419			238	A		2748	A		1544	A
Approach Delay, s/veh		25.0			33.8			20.4			23.7	
Approach LOS		C			C			C			C	

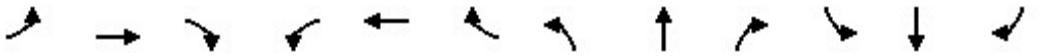
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	45.1	9.2	17.8	20.5	32.7	8.1	18.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.5	25.2	4.5	12.5	15.2	18.8	3.5	4.2
Green Ext Time (p_c), s	0.0	15.4	0.0	0.7	0.8	7.2	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	22.5
HCM 6th LOS	C

Notes

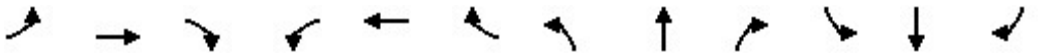
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



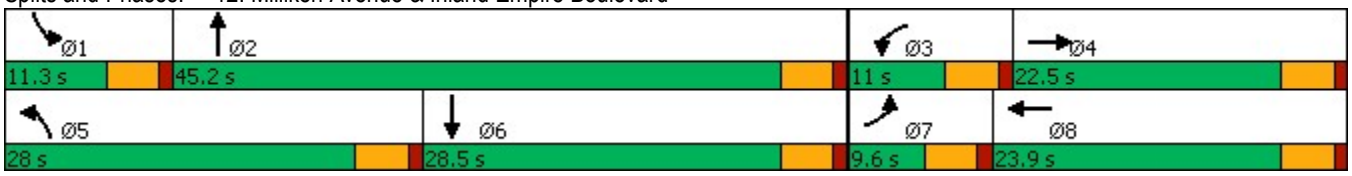
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	63	33	52	99	78	20	406	1085	110	32	894	130
Future Volume (vph)	63	33	52	99	78	20	406	1085	110	32	894	130
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	73	38	60	115	91	23	472	1262	128	37	1040	151
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	38	60	115	91	23	472	1262	128	37	1040	151

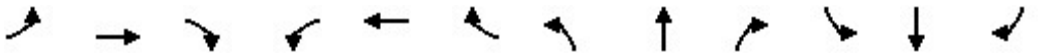
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	33	52	99	78	20	406	1085	110	32	894	130
Future Volume (vph)	63	33	52	99	78	20	406	1085	110	32	894	130
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	7.0	62.8	9.0	8.0	62.8	16.4	38.2	62.8	6.9	20.5	62.8
Actuated g/C Ratio	0.09	0.11	1.00	0.14	0.13	1.00	0.26	0.61	1.00	0.11	0.33	1.00
v/c Ratio	0.28	0.10	0.04	0.28	0.21	0.02	0.63	0.34	0.09	0.12	0.52	0.10
Control Delay	35.7	31.6	0.1	32.8	31.2	0.0	26.8	10.2	0.1	32.4	20.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	31.6	0.1	32.8	31.2	0.0	26.8	10.2	0.1	32.4	20.2	0.1
LOS	D	C	A	C	C	A	C	B	A	C	C	A
Approach Delay		22.3			28.8			13.7			18.1	
Approach LOS		C			C			B			B	

Intersection Summary		
Cycle Length: 90		
Actuated Cycle Length: 62.8		
Natural Cycle: 70		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.63		
Intersection Signal Delay: 16.7	Intersection LOS: B	
Intersection Capacity Utilization 48.7%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	73	38	60	115	91	23	472	1262	128	37	1040	151
v/c Ratio	0.28	0.10	0.04	0.28	0.21	0.02	0.63	0.34	0.09	0.12	0.52	0.10
Control Delay	35.7	31.6	0.1	32.8	31.2	0.0	26.8	10.2	0.1	32.4	20.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	31.6	0.1	32.8	31.2	0.0	26.8	10.2	0.1	32.4	20.2	0.1
Queue Length 50th (ft)	15	7	0	24	18	0	92	100	0	7	104	0
Queue Length 95th (ft)	36	22	0	51	41	0	140	125	0	22	147	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	265	1088	1500	428	1172	1500	1225	4022	1500	354	2627	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.03	0.04	0.27	0.08	0.02	0.39	0.31	0.09	0.10	0.40	0.10

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	63	33	52	99	78	20	406	1085	110	32	894	130
Future Volume (veh/h)	63	33	52	99	78	20	406	1085	110	32	894	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	73	38	0	115	91	0	472	1262	0	37	1040	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	178	293		219	340		626	2869		114	1798	
Arrive On Green	0.06	0.09	0.00	0.08	0.10	0.00	0.21	0.47	0.00	0.04	0.29	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	73	38	0	115	91	0	472	1262	0	37	1040	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.3	0.6	0.0	2.1	1.4	0.0	8.3	7.6	0.0	0.7	8.0	0.0
Cycle Q Clear(g_c), s	1.3	0.6	0.0	2.1	1.4	0.0	8.3	7.6	0.0	0.7	8.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	178	293		219	340		626	2869		114	1798	
V/C Ratio(X)	0.41	0.13		0.52	0.27		0.75	0.44		0.32	0.58	
Avail Cap(c_a), veh/h	270	1104		345	1190		1246	4519		360	2665	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.8	23.1	0.0	24.4	22.8	0.0	20.2	9.7	0.0	25.7	16.5	0.0
Incr Delay (d2), s/veh	1.5	0.2	0.0	1.9	0.4	0.0	1.9	0.1	0.0	1.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.0	0.7	0.5	0.0	2.7	2.1	0.0	0.2	2.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.3	23.3	0.0	26.4	23.2	0.0	22.1	9.8	0.0	27.3	16.7	0.0
LnGrp LOS	C	C		C	C		C	A		C	B	
Approach Vol, veh/h		111	A		206	A		1734	A		1077	A
Approach Delay, s/veh		25.3			25.0			13.1			17.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	30.3	8.6	9.3	16.3	20.7	7.9	10.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	2.7	9.6	4.1	2.6	10.3	10.0	3.3	3.4
Green Ext Time (p_c), s	0.0	11.3	0.1	0.1	1.5	6.2	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.943	0.850				
Flt Protected	0.970					
Satd. Flow (prot)	2958	1365	6071	0	0	6071
Flt Permitted	0.970					
Satd. Flow (perm)	2958	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

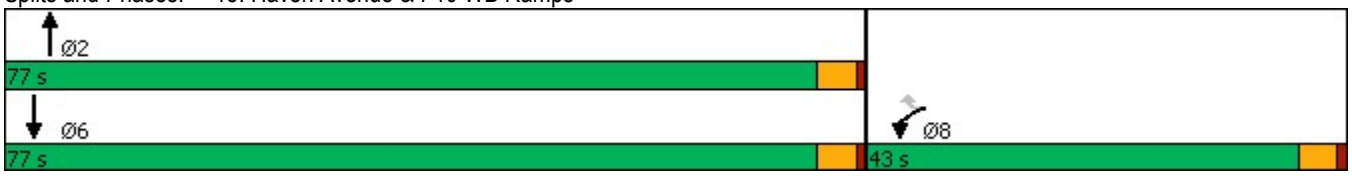
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	496	679	2619	0	0	1538
Future Volume (vph)	496	679	2619	0	0	1538
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	545	746	2878	0	0	1690
Shared Lane Traffic (%)		45%				
Lane Group Flow (vph)	881	410	2878	0	0	1690

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	496	679	2619	1538
Future Volume (vph)	496	679	2619	1538
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	37.6	37.6	72.5	72.5
Actuated g/C Ratio	0.32	0.32	0.61	0.61
v/c Ratio	0.94	0.95	0.78	0.46
Control Delay	58.7	73.4	19.4	13.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	58.7	73.4	19.4	13.2
LOS	E	E	B	B
Approach Delay	63.4		19.4	13.2
Approach LOS	E		B	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.1	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 80.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	881	410	2878	1690
v/c Ratio	0.94	0.95	0.78	0.46
Control Delay	58.7	73.4	19.4	13.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	58.7	73.4	19.4	13.2
Queue Length 50th (ft)	338	337	459	196
Queue Length 95th (ft)	#464	#558	505	223
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	957	442	3696	3696
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.92	0.93	0.78	0.46

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

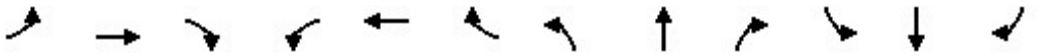
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	496	679	2619	0	0	1538
Future Volume (veh/h)	496	679	2619	0	0	1538
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	430	869	2878	0	0	1690
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	504	949	3692	0	0	3692
Arrive On Green	0.32	0.32	0.61	0.00	0.00	0.61
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	430	869	2878	0	0	1690
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	29.1	32.0	40.6	0.0	0.0	17.4
Cycle Q Clear(g_c), s	29.1	32.0	40.6	0.0	0.0	17.4
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	504	949	3692	0	0	3692
V/C Ratio(X)	0.85	0.92	0.78	0.00	0.00	0.46
Avail Cap(c_a), veh/h	533	1005	3841	0	0	3841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	36.8	37.9	16.9	0.0	0.0	12.4
Incr Delay (d2), s/veh	12.2	12.2	1.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	13.2	13.5	0.0	0.0	5.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	49.1	50.1	18.0	0.0	0.0	12.5
LnGrp LOS	D	D	B	A	A	B
Approach Vol, veh/h	1299		2878			1690
Approach Delay, s/veh	49.8		18.0			12.5
Approach LOS	D		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		74.2			74.2	40.9
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s		42.6			19.4	34.0
Green Ext Time (p_c), s		27.1			21.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	23.4
HCM 6th LOS	C

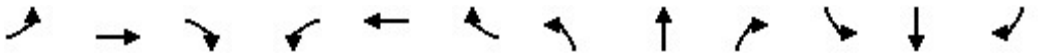
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			182			338			235
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



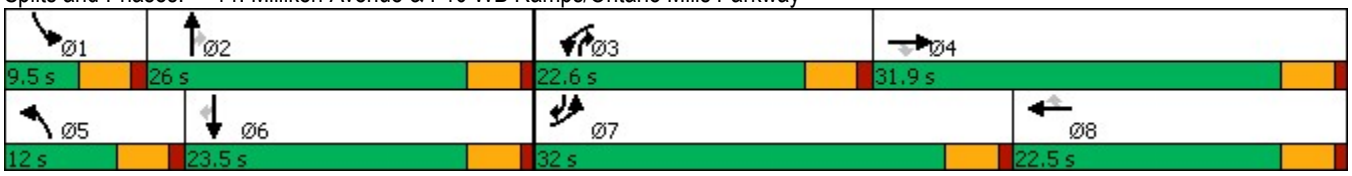
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	617	89	237	162	185	34	154	899	301	83	616	253
Future Volume (vph)	617	89	237	162	185	34	154	899	301	83	616	253
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	693	100	266	182	208	38	173	1010	338	93	692	284
Shared Lane Traffic (%)												
Lane Group Flow (vph)	693	100	266	182	208	38	173	1010	338	93	692	284

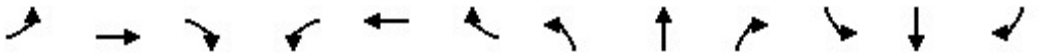
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	617	89	237	162	185	34	154	899	301	83	616	253
Future Volume (vph)	617	89	237	162	185	34	154	899	301	83	616	253
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	23.1	22.9	22.9	10.4	10.2	10.2	7.6	21.9	36.9	5.1	16.9	44.6
Actuated g/C Ratio	0.30	0.30	0.30	0.14	0.13	0.13	0.10	0.29	0.48	0.07	0.22	0.59
v/c Ratio	0.79	0.19	0.42	0.46	0.46	0.11	0.60	0.58	0.38	0.48	0.51	0.29
Control Delay	32.2	21.9	5.3	35.6	35.4	0.6	45.5	26.5	3.0	46.4	28.1	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	21.9	5.3	35.6	35.4	0.6	45.5	26.5	3.0	46.4	28.1	2.6
LOS	C	C	A	D	D	A	D	C	A	D	C	A
Approach Delay		24.5			32.4			23.4			22.9	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 76.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 24.5	Intersection LOS: C
Intersection Capacity Utilization 59.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	693	100	266	182	208	38	173	1010	338	93	692	284
v/c Ratio	0.79	0.19	0.42	0.46	0.46	0.11	0.60	0.58	0.38	0.48	0.51	0.29
Control Delay	32.2	21.9	5.3	35.6	35.4	0.6	45.5	26.5	3.0	46.4	28.1	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	21.9	5.3	35.6	35.4	0.6	45.5	26.5	3.0	46.4	28.1	2.6
Queue Length 50th (ft)	159	36	0	43	51	0	43	127	0	23	86	9
Queue Length 95th (ft)	229	76	51	74	85	0	#88	175	41	#52	123	40
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1063	646	718	699	807	499	290	1773	1022	193	1543	1057
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.15	0.37	0.26	0.26	0.08	0.60	0.57	0.33	0.48	0.45	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	617	89	237	162	185	34	154	899	301	83	616	253
Future Volume (veh/h)	617	89	237	162	185	34	154	899	301	83	616	253
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	693	100	266	182	208	38	173	1010	338	93	692	284
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	829	524	444	273	352	157	249	1703	560	179	1558	811
Arrive On Green	0.28	0.30	0.30	0.09	0.10	0.10	0.09	0.28	0.28	0.06	0.26	0.26
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	693	100	266	182	208	38	173	1010	338	93	692	284
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	14.9	2.8	10.1	4.0	3.9	1.6	3.9	9.6	12.2	2.1	6.4	7.2
Cycle Q Clear(g_c), s	14.9	2.8	10.1	4.0	3.9	1.6	3.9	9.6	12.2	2.1	6.4	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	829	524	444	273	352	157	249	1703	560	179	1558	811
V/C Ratio(X)	0.84	0.19	0.60	0.67	0.59	0.24	0.70	0.59	0.60	0.52	0.44	0.35
Avail Cap(c_a), veh/h	1199	727	616	789	908	405	327	1963	624	218	1735	855
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.4	17.5	20.1	29.2	28.5	27.5	29.7	20.8	16.9	30.4	20.9	8.7
Incr Delay (d2), s/veh	3.6	0.2	1.3	2.8	1.6	0.8	4.2	0.4	1.4	2.3	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	1.1	3.4	1.5	1.6	0.6	1.4	3.2	4.0	0.8	2.2	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.0	17.7	21.4	32.1	30.1	28.2	33.9	21.1	18.3	32.7	21.1	9.0
LnGrp LOS	C	B	C	C	C	C	C	C	B	C	C	A
Approach Vol, veh/h		1059			428			1521			1069	
Approach Delay, s/veh		24.1			30.8			22.0			18.9	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	23.2	10.8	24.2	10.2	21.6	23.5	11.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	4.1	14.2	6.0	12.1	5.9	9.2	16.9	5.9
Green Ext Time (p_c), s	0.0	4.5	0.4	1.3	0.1	4.1	2.1	1.0

Intersection Summary	
HCM 6th Ctrl Delay	22.6
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

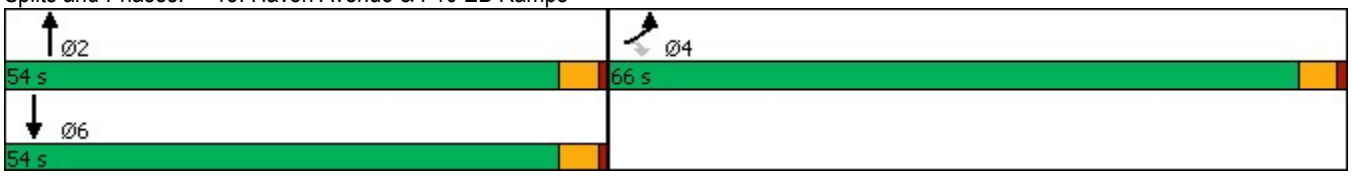
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1253	583	0	1695	1526	0
Future Volume (vph)	1253	583	0	1695	1526	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1408	655	0	1904	1715	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1474	589	0	1904	1715	0

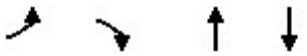
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1253	583	1695	1526
Future Volume (vph)	1253	583	1695	1526
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	59.4	59.4	48.2	48.2
Actuated g/C Ratio	0.51	0.51	0.41	0.41
v/c Ratio	0.94	0.85	0.76	0.68
Control Delay	40.5	37.9	31.9	29.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	40.5	37.9	31.9	29.9
LOS	D	D	C	C
Approach Delay	39.7		31.9	29.9
Approach LOS	D		C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 34.2	Intersection LOS: C
Intersection Capacity Utilization 80.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1474	589	1904	1715
v/c Ratio	0.94	0.85	0.76	0.68
Control Delay	40.5	37.9	31.9	29.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	40.5	37.9	31.9	29.9
Queue Length 50th (ft)	532	413	361	311
Queue Length 95th (ft)	#693	#651	401	348
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1622	724	2586	2586
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.91	0.81	0.74	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1253	583	0	1695	1526	0
Future Volume (veh/h)	1253	583	0	1695	1526	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1408	655	0	1904	1715	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1594	751	0	2530	2530	0
Arrive On Green	0.50	0.50	0.00	0.42	0.42	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1408	655	0	1904	1715	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	41.9	41.0	0.0	28.1	24.3	0.0
Cycle Q Clear(g_c), s	41.9	41.0	0.0	28.1	24.3	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1594	751	0	2530	2530	0
V/C Ratio(X)	0.88	0.87	0.00	0.75	0.68	0.00
Avail Cap(c_a), veh/h	1851	872	0	2848	2848	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.7	23.5	0.0	26.4	25.2	0.0
Incr Delay (d2), s/veh	4.9	8.7	0.0	1.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.0	15.5	0.0	10.1	8.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.6	32.2	0.0	27.4	25.8	0.0
LnGrp LOS	C	C	A	C	C	A
Approach Vol, veh/h	2063			1904	1715	
Approach Delay, s/veh	29.7			27.4	25.8	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		48.5		57.5		48.5
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		30.1		43.9		26.3
Green Ext Time (p_c), s		13.8		9.1		14.2

Intersection Summary		
HCM 6th Ctrl Delay	27.8	
HCM 6th LOS	C	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		6				333
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	654	587	159	703	737	290
Future Volume (vph)	654	587	159	703	737	290
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	752	675	183	808	847	333
Shared Lane Traffic (%)						
Lane Group Flow (vph)	752	675	183	808	847	333

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	654	587	159	703	737	290
Future Volume (vph)	654	587	159	703	737	290
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	27.0	27.0	52.0	25.0	38.0
Total Split (%)	42.2%	30.0%	30.0%	57.8%	27.8%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	23.9	40.9	12.2	33.8	16.9	45.5
Actuated g/C Ratio	0.36	0.61	0.18	0.50	0.25	0.68
v/c Ratio	0.73	0.74	0.35	0.26	0.56	0.30
Control Delay	24.5	15.1	27.7	10.2	24.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	15.1	27.7	10.2	24.9	1.4
LOS	C	B	C	B	C	A
Approach Delay	20.1			13.4	18.2	
Approach LOS	C			B	B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.2	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 57.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

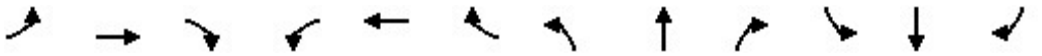
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	752	675	183	808	847	333
v/c Ratio	0.73	0.74	0.35	0.26	0.56	0.30
Control Delay	24.5	15.1	27.7	10.2	24.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	15.1	27.7	10.2	24.9	1.4
Queue Length 50th (ft)	129	172	34	50	84	0
Queue Length 95th (ft)	237	295	69	84	153	24
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1515	1168	1017	4503	1946	1309
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.58	0.18	0.18	0.44	0.25

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	654	587	159	703	737	290
Future Volume (veh/h)	654	587	159	703	737	290
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	752	675	183	808	847	333
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1330	831	280	2451	1435	1040
Arrive On Green	0.46	0.46	0.10	0.40	0.24	0.24
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	752	675	183	808	847	333
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	12.1	23.3	3.9	5.8	7.9	5.6
Cycle Q Clear(g_c), s	12.1	23.3	3.9	5.8	7.9	5.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1330	831	280	2451	1435	1040
V/C Ratio(X)	0.57	0.81	0.65	0.33	0.59	0.32
Avail Cap(c_a), veh/h	1526	932	1025	4532	1956	1168
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	11.6	27.8	13.2	21.7	3.9
Incr Delay (d2), s/veh	0.4	5.0	2.6	0.1	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	18.5	1.4	1.8	2.7	4.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.1	16.6	30.4	13.2	22.1	4.1
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	1427			991	1180	
Approach Delay, s/veh	14.8			16.4	17.0	
Approach LOS	B			B	B	

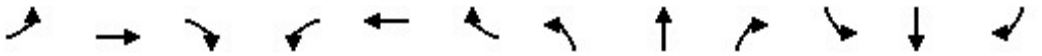
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		30.2		33.7	10.6	19.5
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	22.5	20.5
Max Q Clear Time (g_c+I1), s		7.8		25.3	5.9	9.9
Green Ext Time (p_c), s		6.8		3.9	0.5	5.2

Intersection Summary	
HCM 6th Ctrl Delay	15.9
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.965				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4649	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4649	0	2891	3353	1500	2891	4818	1500	2891	5888	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		64				136			177		65	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	364	702	216	160	600	127	252	1527	193	176	1469	370
Future Volume (vph)	364	702	216	160	600	127	252	1527	193	176	1469	370
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	396	763	235	174	652	138	274	1660	210	191	1597	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	396	998	0	174	652	138	274	1660	210	191	1999	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	364	702	160	600	127	252	1527	193	176	1469
Future Volume (vph)	364	702	160	600	127	252	1527	193	176	1469
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.5	32.6	9.4	24.5	24.5	9.5	52.5	120.0	7.5	50.5
Actuated g/C Ratio	0.15	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	0.94	0.76	0.77	0.95	0.33	1.20	0.79	0.14	1.06	0.79
Control Delay	82.3	42.0	76.5	72.2	9.2	171.6	32.4	0.2	137.6	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	42.0	76.5	72.2	9.2	171.6	32.4	0.2	137.6	32.1
LOS	F	D	E	E	A	F	C	A	F	C
Approach Delay		53.4		63.9			47.0			41.3
Approach LOS		D		E			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 48.9	Intersection LOS: D
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

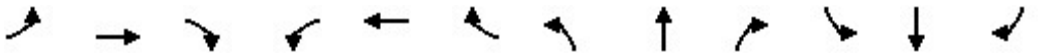
Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	396	998	174	652	138	274	1660	210	191	1999
v/c Ratio	0.94	0.76	0.77	0.95	0.33	1.20	0.79	0.14	1.06	0.79
Control Delay	82.3	42.0	76.5	72.2	9.2	171.6	32.4	0.2	137.6	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	42.0	76.5	72.2	9.2	171.6	32.4	0.2	137.6	32.1
Queue Length 50th (ft)	158	245	69	264	1	~132	396	0	~83	374
Queue Length 95th (ft)	#255	299	#124	#383	55	#221	458	0	#160	423
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	421	1308	228	684	414	228	2107	1500	180	2515
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.76	0.76	0.95	0.33	1.20	0.79	0.14	1.06	0.79

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



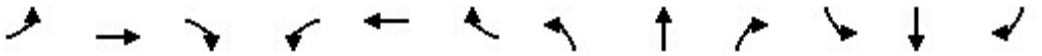
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	364	702	216	160	600	127	252	1527	193	176	1469	370
Future Volume (veh/h)	364	702	216	160	600	127	252	1527	193	176	1469	370
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	396	763	235	174	652	138	274	1660	0	191	1597	402
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	424	1009	308	220	687	307	230	2116		182	2058	518
Arrive On Green	0.15	0.27	0.27	0.08	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	2910	3675	1120	2910	3367	1502	2910	4837	1502	2910	4891	1231
Grp Volume(v), veh/h	396	669	329	174	652	138	274	1660	0	191	1493	506
Grp Sat Flow(s),veh/h/ln	1455	1612	1570	1455	1683	1502	1455	1612	1502	1455	1524	1550
Q Serve(g_s), s	16.1	22.8	23.1	7.1	22.9	9.7	9.5	35.3	0.0	7.5	33.7	33.7
Cycle Q Clear(g_c), s	16.1	22.8	23.1	7.1	22.9	9.7	9.5	35.3	0.0	7.5	33.7	33.7
Prop In Lane	1.00		0.71	1.00		1.00	1.00		1.00	1.00		0.79
Lane Grp Cap(c), veh/h	424	885	431	220	687	307	230	2116		182	1924	652
V/C Ratio(X)	0.93	0.76	0.76	0.79	0.95	0.45	1.19	0.78		1.05	0.78	0.78
Avail Cap(c_a), veh/h	424	885	431	230	687	307	230	2116		182	1924	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	39.8	40.0	54.6	47.1	41.8	55.3	28.9	0.0	56.3	29.9	29.9
Incr Delay (d2), s/veh	27.6	3.7	7.9	16.4	22.5	1.0	120.0	3.0	0.0	80.6	3.1	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	9.4	9.8	3.1	11.7	3.7	7.3	13.9	0.0	4.8	12.7	13.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.3	43.6	47.9	71.0	69.6	42.9	175.3	31.9	0.0	136.8	33.0	38.7
LnGrp LOS	E	D	D	E	E	D	F	C		F	C	D
Approach Vol, veh/h		1394			964			1934	A		2190	
Approach Delay, s/veh		54.5			66.0			52.2			43.4	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	13.6	37.4	14.0	55.0	22.0	29.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	9.5	37.3	9.1	25.1	11.5	35.7	18.1	24.9
Green Ext Time (p_c), s	0.0	10.3	0.0	3.8	0.0	11.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	51.8
HCM 6th LOS	D

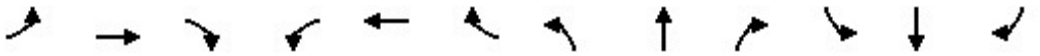
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.995				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6040	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6040	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				127			200		182	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	1801	65	1	1111	15	64	0	9	47	0	12
Future Volume (vph)	4	1801	65	1	1111	15	64	0	9	47	0	12
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	1896	68	1	1169	16	67	0	9	49	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	1964	0	1	1169	16	67	0	9	49	13	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	1801	1	1111	15	64	9	47	0
Future Volume (vph)	4	1801	1	1111	15	64	9	47	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.2	36.1	5.2	36.1	36.1	7.1	5.8	7.5	6.4
Actuated g/C Ratio	0.09	0.61	0.09	0.61	0.61	0.12	0.10	0.13	0.11
v/c Ratio	0.03	0.54	0.01	0.40	0.02	0.36	0.03	0.24	0.03
Control Delay	31.8	9.0	31.0	8.1	0.0	34.5	0.1	30.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	9.0	31.0	8.1	0.0	34.5	0.1	30.7	0.1
LOS	C	A	C	A	A	C	A	C	A
Approach Delay		9.0		8.0					24.3
Approach LOS		A		A					C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 59.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 48.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

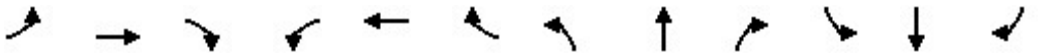
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	4	1964	1	1169	16	67	9	49	13
v/c Ratio	0.03	0.54	0.01	0.40	0.02	0.36	0.03	0.24	0.03
Control Delay	31.8	9.0	31.0	8.1	0.0	34.5	0.1	30.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.8	9.0	31.0	8.1	0.0	34.5	0.1	30.7	0.1
Queue Length 50th (ft)	2	119	0	79	0	25	0	18	0
Queue Length 95th (ft)	11	228	5	163	0	69	0	52	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	139	4033	139	3215	1043	203	639	276	1206
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.49	0.01	0.36	0.02	0.33	0.01	0.18	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1801	65	1	1111	15	64	0	9	47	0	12
Future Volume (veh/h)	4	1801	65	1	1111	15	64	0	9	47	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	4	1896	68	1	1169	16	67	0	9	49	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	3225	116	3	2544	790	92	176	149	76	150	134
Arrive On Green	0.01	0.53	0.53	0.00	0.53	0.53	0.06	0.00	0.10	0.05	0.00	0.09
Sat Flow, veh/h	1594	6086	218	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	4	1424	540	1	1169	16	67	0	9	49	0	13
Grp Sat Flow(s),veh/h/ln	1594	1524	1733	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.1	11.9	11.9	0.0	8.5	0.3	2.3	0.0	0.3	1.7	0.0	0.4
Cycle Q Clear(g_c), s	0.1	11.9	11.9	0.0	8.5	0.3	2.3	0.0	0.3	1.7	0.0	0.4
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	9	2422	918	3	2544	790	92	176	149	76	150	134
V/C Ratio(X)	0.47	0.59	0.59	0.35	0.46	0.02	0.73	0.00	0.06	0.65	0.00	0.10
Avail Cap(c_a), veh/h	142	3095	1173	142	3275	1017	208	608	515	282	656	585
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.8	9.0	9.0	27.9	8.3	6.4	25.9	0.0	22.8	26.2	0.0	23.4
Incr Delay (d2), s/veh	34.6	0.2	0.6	61.1	0.1	0.0	10.4	0.0	0.2	8.8	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	3.1	3.6	0.1	2.3	0.1	1.1	0.0	0.1	0.8	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.3	9.2	9.6	89.0	8.4	6.4	36.3	0.0	23.0	35.0	0.0	23.7
LnGrp LOS	E	A	A	F	A	A	D	A	C	D	A	C
Approach Vol, veh/h		1968			1186			76			62	
Approach Delay, s/veh		9.4			8.5			34.7			32.7	
Approach LOS		A			A			C			C	

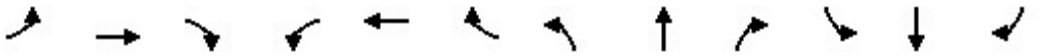
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.2	10.1	4.6	34.2	7.7	9.5	4.8	33.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	3.7	2.3	2.0	13.9	4.3	2.4	2.1	10.5
Green Ext Time (p_c), s	0.0	0.0	0.0	15.8	0.0	0.0	0.0	9.9

Intersection Summary	
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4794	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.727				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4794	0	1212	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			10				154			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



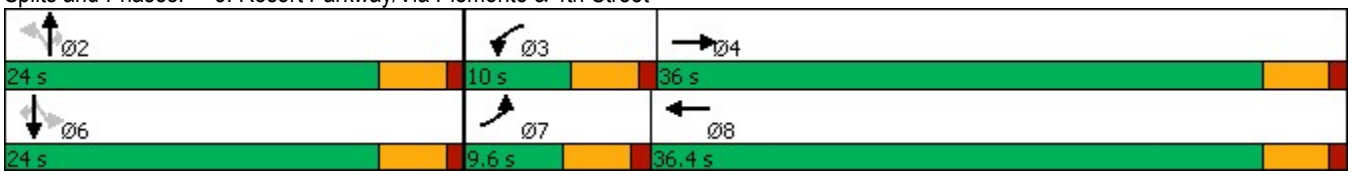
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	29	1818	8	65	1086	38	36	0	45	43	1	20
Future Volume (vph)	29	1818	8	65	1086	38	36	0	45	43	1	20
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	31	1914	8	68	1143	40	38	0	47	45	1	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	1922	0	68	1183	0	38	0	47	0	46	21

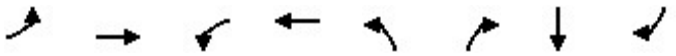
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	29	1818	65	1086	36	45	43	1	20
Future Volume (vph)	29	1818	65	1086	36	45	43	1	20
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.3	30.2	5.7	32.2	7.4	7.4		7.4	7.4
Actuated g/C Ratio	0.10	0.58	0.11	0.62	0.14	0.14		0.14	0.14
v/c Ratio	0.11	0.55	0.40	0.40	0.22	0.14		0.25	0.07
Control Delay	26.0	8.5	33.0	6.5	25.6	0.8		26.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.0	8.5	33.0	6.5	25.6	0.8		26.0	0.5
LOS	C	A	C	A	C	A		C	A
Approach Delay		8.8		7.9				18.0	
Approach LOS		A		A				B	

Intersection Summary			
Cycle Length: 70			
Actuated Cycle Length: 52.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 52.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	31	1922	68	1183	38	47	46	21
v/c Ratio	0.11	0.55	0.40	0.40	0.22	0.14	0.25	0.07
Control Delay	26.0	8.5	33.0	6.5	25.6	0.8	26.0	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	8.5	33.0	6.5	25.6	0.8	26.0	0.5
Queue Length 50th (ft)	5	115	23	40	12	0	15	0
Queue Length 95th (ft)	17	163	#66	119	35	0	41	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	291	3777	172	3185	467	673	497	636
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.51	0.40	0.37	0.08	0.07	0.09	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1818	8	65	1086	38	36	0	45	43	1	20
Future Volume (veh/h)	29	1818	8	65	1086	38	36	0	45	43	1	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	31	1914	8	68	1143	40	38	0	47	45	1	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	103	3397	14	100	2714	95	256	191	162	296	5	162
Arrive On Green	0.04	0.54	0.54	0.06	0.57	0.57	0.11	0.00	0.11	0.11	0.11	0.11
Sat Flow, veh/h	2910	6312	26	1594	4799	168	1312	1772	1502	1324	45	1502
Grp Volume(v), veh/h	31	1386	536	68	768	415	38	0	47	46	0	21
Grp Sat Flow(s),veh/h/ln	1455	1524	1767	1594	1612	1742	1312	1772	1502	1369	0	1502
Q Serve(g_s), s	0.5	9.3	9.3	1.9	6.3	6.3	1.3	0.0	1.3	1.4	0.0	0.6
Cycle Q Clear(g_c), s	0.5	9.3	9.3	1.9	6.3	6.3	2.7	0.0	1.3	1.4	0.0	0.6
Prop In Lane	1.00		0.01	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	103	2460	951	100	1824	985	256	191	162	301	0	162
V/C Ratio(X)	0.30	0.56	0.56	0.68	0.42	0.42	0.15	0.00	0.29	0.15	0.00	0.13
Avail Cap(c_a), veh/h	320	3105	1200	189	2218	1198	667	745	631	728	0	631
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.8	7.1	7.1	21.3	5.7	5.7	20.3	0.0	19.1	19.1	0.0	18.7
Incr Delay (d2), s/veh	1.6	0.2	0.5	7.8	0.2	0.3	0.3	0.0	1.0	0.2	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.1	2.5	0.9	1.4	1.6	0.4	0.0	0.5	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.4	7.3	7.6	29.0	5.9	6.0	20.6	0.0	20.0	19.3	0.0	19.1
LnGrp LOS	C	A	A	C	A	A	C	A	C	B	A	B
Approach Vol, veh/h		1953			1251			85			67	
Approach Delay, s/veh		7.6			7.2			20.3			19.2	
Approach LOS		A			A			C			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	7.4	29.5		9.5	6.1	30.7				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		4.7	3.9	11.3		3.4	2.5	8.3				
Green Ext Time (p_c), s		0.2	0.0	13.6		0.2	0.0	8.8				

Intersection Summary	
HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	4794	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4794	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1850	63	0	1163	0	52
Future Volume (vph)	1850	63	0	1163	0	52
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1927	66	0	1211	0	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1993	0	0	1211	0	54

Intersection Summary

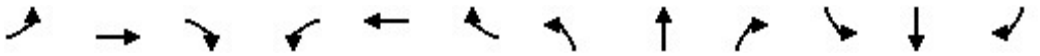
Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1850	63	0	1163	0	52
Future Vol, veh/h	1850	63	0	1163	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1927	66	0	1211	0	54

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	997
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	208
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	208
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

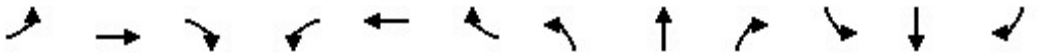
Approach	EB	WB	NB
HCM Control Delay, s	0	0	28.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	208	-	-	-
HCM Lane V/C Ratio	0.26	-	-	-
HCM Control Delay (s)	28.3	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	1	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5949	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180			285			55		31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



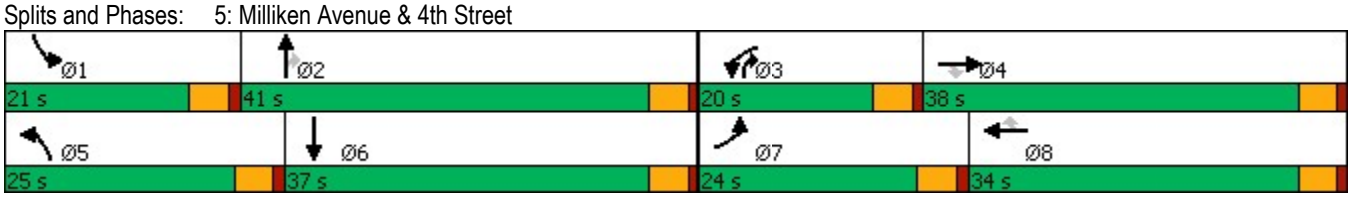
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	436	1121	206	383	906	275	302	1513	377	432	950	144
Future Volume (vph)	436	1121	206	383	906	275	302	1513	377	432	950	144
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	454	1168	215	399	944	286	315	1576	393	450	990	150
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	1168	215	399	944	286	315	1576	393	450	1140	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	436	1121	206	383	906	275	302	1513	377	432	950
Future Volume (vph)	436	1121	206	383	906	275	302	1513	377	432	950
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.5	33.2	33.2	15.5	29.2	29.2	17.6	36.5	56.5	16.5	35.3
Actuated g/C Ratio	0.16	0.28	0.28	0.13	0.24	0.24	0.15	0.30	0.47	0.14	0.29
v/c Ratio	0.97	0.87	0.39	1.07	0.80	0.49	0.74	0.85	0.53	1.13	0.64
Control Delay	84.0	49.7	10.0	115.1	48.6	7.4	59.6	44.6	22.1	132.4	38.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.0	49.7	10.0	115.1	48.6	7.4	59.6	44.6	22.1	132.4	38.1
LOS	F	D	B	F	D	A	E	D	C	F	D
Approach Delay		53.5			57.7			42.8			64.8
Approach LOS		D			E			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 53.5	Intersection LOS: D
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	454	1168	215	399	944	286	315	1576	393	450	1140
v/c Ratio	0.97	0.87	0.39	1.07	0.80	0.49	0.74	0.85	0.53	1.13	0.64
Control Delay	84.0	49.7	10.0	115.1	48.6	7.4	59.6	44.6	22.1	132.4	38.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.0	49.7	10.0	115.1	48.6	7.4	59.6	44.6	22.1	132.4	38.1
Queue Length 50th (ft)	182	315	20	~176	252	1	121	332	180	~208	218
Queue Length 95th (ft)	#287	375	84	#277	305	71	168	381	276	#314	266
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	470	1348	549	374	1187	584	494	1850	736	398	1778
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.87	0.39	1.07	0.80	0.49	0.64	0.85	0.53	1.13	0.64

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

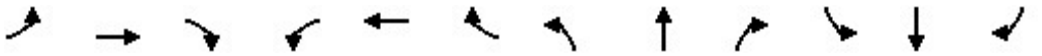
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	436	1121	206	383	906	275	302	1513	377	432	950	144
Future Volume (veh/h)	436	1121	206	383	906	275	302	1513	377	432	950	144
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	454	1168	215	399	944	286	315	1576	393	450	990	150
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	1324	411	383	1160	360	372	1838	650	408	1692	253
Arrive On Green	0.17	0.27	0.27	0.13	0.24	0.24	0.13	0.30	0.30	0.14	0.31	0.31
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5391	807
Grp Volume(v), veh/h	454	1168	215	399	944	286	315	1576	393	450	838	302
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1627
Q Serve(g_s), s	18.2	27.2	14.3	15.5	21.7	21.1	12.5	28.7	23.7	16.5	18.1	18.4
Cycle Q Clear(g_c), s	18.2	27.2	14.3	15.5	21.7	21.1	12.5	28.7	23.7	16.5	18.1	18.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	482	1324	411	383	1160	360	372	1838	650	408	1435	511
V/C Ratio(X)	0.94	0.88	0.52	1.04	0.81	0.79	0.85	0.86	0.60	1.10	0.58	0.59
Avail Cap(c_a), veh/h	482	1377	427	383	1212	376	507	1890	663	408	1435	511
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.5	40.9	36.2	51.1	42.3	42.0	50.2	38.7	25.6	50.6	33.9	34.0
Incr Delay (d2), s/veh	27.0	6.9	1.1	57.1	4.2	10.8	9.6	4.1	1.5	75.5	0.6	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	11.5	5.4	8.7	9.0	8.8	5.0	11.1	8.6	10.3	6.8	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.6	47.8	37.3	108.2	46.5	52.8	59.8	42.8	27.1	126.1	34.5	35.9
LnGrp LOS	E	D	D	F	D	D	E	D	C	F	C	D
Approach Vol, veh/h		1837			1629			2284			1590	
Approach Delay, s/veh		53.4			62.7			42.5			60.7	
Approach LOS		D			E			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	40.0	20.0	36.7	19.5	41.4	24.0	32.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	30.7	17.5	29.2	14.5	20.4	20.2	23.7
Green Ext Time (p_c), s	0.0	4.8	0.0	3.0	0.6	6.0	0.0	3.5

Intersection Summary	
HCM 6th Ctrl Delay	53.6
HCM 6th LOS	D

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.925	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2971	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2971	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			130			186			273		200	341
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



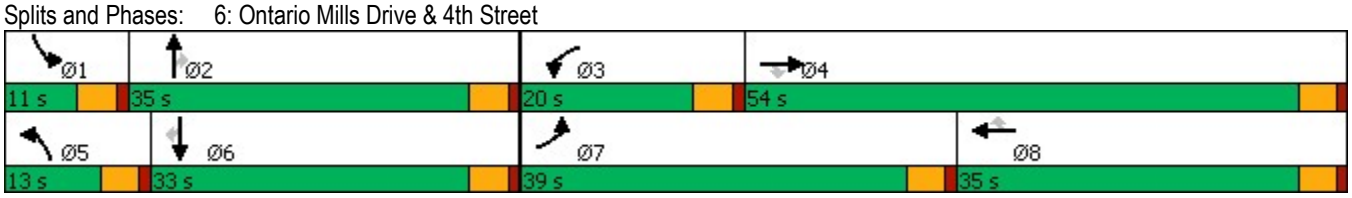
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	956	1263	120	226	991	312	141	310	352	78	312	627
Future Volume (vph)	956	1263	120	226	991	312	141	310	352	78	312	627
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1039	1373	130	246	1077	339	153	337	383	85	339	682
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	1039	1373	130	246	1077	339	153	337	383	85	680	341

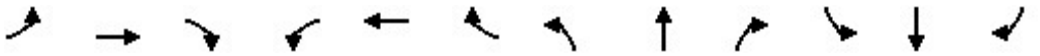
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	956	1263	120	226	991	312	141	310	352	78	312	627
Future Volume (vph)	956	1263	120	226	991	312	141	310	352	78	312	627
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.6	50.7	50.7	14.0	30.1	30.1	8.5	27.7	27.7	6.5	25.7	25.7
Actuated g/C Ratio	0.30	0.43	0.43	0.12	0.26	0.26	0.07	0.24	0.24	0.06	0.22	0.22
v/c Ratio	1.22	0.66	0.18	0.71	0.87	0.65	1.33	0.42	0.68	0.98	0.84	0.60
Control Delay	144.6	28.8	4.3	61.8	50.4	23.7	238.6	39.5	18.4	145.6	40.9	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	144.6	28.8	4.3	61.8	50.4	23.7	238.6	39.5	18.4	145.6	40.9	8.9
LOS	F	C	A	E	D	C	F	D	B	F	D	A
Approach Delay		74.9			46.7			65.2			39.1	
Approach LOS		E			D			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.9	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.33	
Intersection Signal Delay: 59.5	Intersection LOS: E
Intersection Capacity Utilization 92.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



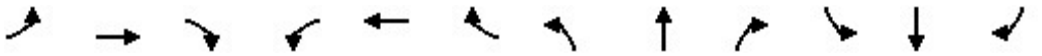


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1039	1373	130	246	1077	339	153	337	383	85	680	341
v/c Ratio	1.22	0.66	0.18	0.71	0.87	0.65	1.33	0.42	0.68	0.98	0.84	0.60
Control Delay	144.6	28.8	4.3	61.8	50.4	23.7	238.6	39.5	18.4	145.6	40.9	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	144.6	28.8	4.3	61.8	50.4	23.7	238.6	39.5	18.4	145.6	40.9	8.9
Queue Length 50th (ft)	~518	314	0	94	294	105	~156	114	71	67	197	0
Queue Length 95th (ft)	#648	369	38	139	#357	213	#293	159	184	#174	275	89
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	854	2089	724	383	1258	529	115	876	593	87	876	591
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.66	0.18	0.64	0.86	0.64	1.33	0.38	0.65	0.98	0.78	0.58

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



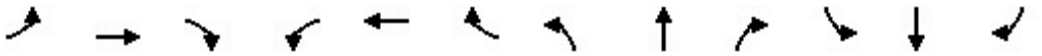
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	956	1263	120	226	991	312	141	310	352	78	312	627
Future Volume (veh/h)	956	1263	120	226	991	312	141	310	352	78	312	627
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1039	1373	130	246	1077	339	153	337	383	85	339	682
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	841	2115	657	297	1210	376	113	860	384	87	423	717
Arrive On Green	0.29	0.44	0.44	0.10	0.25	0.25	0.07	0.26	0.26	0.05	0.24	0.24
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	1039	1373	130	246	1077	339	153	337	383	85	339	682
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	34.5	26.6	6.4	9.9	25.6	26.1	8.5	9.9	30.4	6.4	21.5	26.7
Cycle Q Clear(g_c), s	34.5	26.6	6.4	9.9	25.6	26.1	8.5	9.9	30.4	6.4	21.5	26.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	841	2115	657	297	1210	376	113	860	384	87	423	717
V/C Ratio(X)	1.24	0.65	0.20	0.83	0.89	0.90	1.35	0.39	1.00	0.98	0.80	0.95
Avail Cap(c_a), veh/h	841	2115	657	378	1236	384	113	860	384	87	423	717
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	26.4	20.7	52.6	43.2	43.3	55.4	36.8	44.4	56.4	42.8	44.7
Incr Delay (d2), s/veh	116.1	0.7	0.1	11.6	8.2	23.5	203.9	0.3	45.4	89.5	10.6	22.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.8	10.2	2.3	4.1	11.1	12.1	9.8	4.1	16.0	4.7	10.6	12.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	158.6	27.1	20.8	64.1	51.4	66.9	259.3	37.1	89.8	145.9	53.3	67.1
LnGrp LOS	F	C	C	E	D	E	F	D	F	F	D	E
Approach Vol, veh/h		2542			1662			873			1106	
Approach Delay, s/veh		80.5			56.4			99.2			68.9	
Approach LOS		F			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	16.7	56.7	13.0	33.0	39.0	34.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.4	32.4	11.9	28.6	10.5	28.7	36.5	28.1
Green Ext Time (p_c), s	0.0	0.0	0.3	10.9	0.0	0.0	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay	74.6
HCM 6th LOS	E

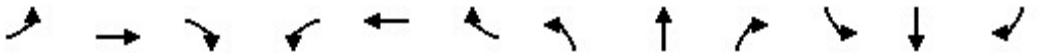
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.973			0.936				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	2891	4818	1500	1583	4688	0	1583	3138	0	1504	1646	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	2891	4818	1500	1583	4688	0	1583	3138	0	1504	1646	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101		38			60				296
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



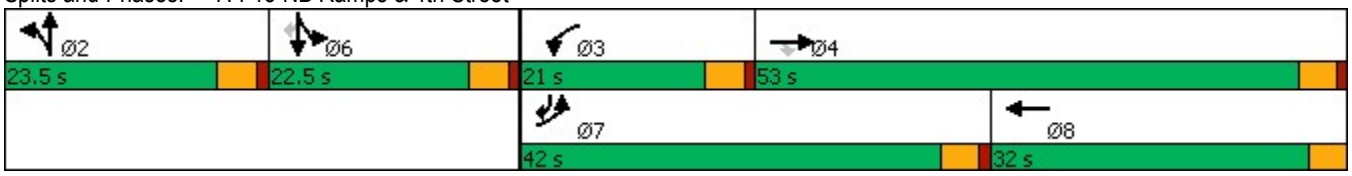
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	861	725	97	79	772	171	119	77	58	144	68	625
Future Volume (vph)	861	725	97	79	772	171	119	77	58	144	68	625
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	897	755	101	82	804	178	124	80	60	150	71	651
Shared Lane Traffic (%)										27%		
Lane Group Flow (vph)	897	755	101	82	982	0	124	140	0	109	112	651

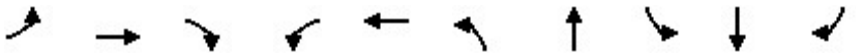
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	861	725	97	79	772	119	77	144	68	625
Future Volume (vph)	861	725	97	79	772	119	77	144	68	625
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	37.6	55.0	55.0	11.0	26.8	13.6	13.6	12.9	12.9	55.1
Actuated g/C Ratio	0.35	0.51	0.51	0.10	0.25	0.13	0.13	0.12	0.12	0.51
v/c Ratio	0.89	0.31	0.12	0.51	0.83	0.63	0.31	0.61	0.57	0.44
Control Delay	47.1	18.4	4.6	58.9	44.4	60.3	27.5	61.3	58.1	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	18.4	4.6	58.9	44.4	60.3	27.5	61.3	58.1	10.0
LOS	D	B	A	E	D	E	C	E	E	A
Approach Delay		32.3			45.6		42.9		22.5	
Approach LOS		C			D		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 108	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 34.4	Intersection LOS: C
Intersection Capacity Utilization 77.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	897	755	101	82	982	124	140	109	112	651
v/c Ratio	0.89	0.31	0.12	0.51	0.83	0.63	0.31	0.61	0.57	0.44
Control Delay	47.1	18.4	4.6	58.9	44.4	60.3	27.5	61.3	58.1	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	18.4	4.6	58.9	44.4	60.3	27.5	61.3	58.1	10.0
Queue Length 50th (ft)	309	114	0	56	228	84	26	77	80	81
Queue Length 95th (ft)	#496	184	34	111	315	153	59	146	147	141
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1012	2454	813	244	1276	281	606	252	276	1495
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.31	0.12	0.34	0.77	0.44	0.23	0.43	0.41	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	861	725	97	79	772	171	119	77	58	144	68	625
Future Volume (veh/h)	861	725	97	79	772	171	119	77	58	144	68	625
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	897	755	101	82	804	178	124	80	60	110	126	651
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	958	2445	759	102	954	210	161	193	132	259	288	1477
Arrive On Green	0.33	0.51	0.51	0.06	0.24	0.24	0.10	0.10	0.10	0.16	0.16	0.16
Sat Flow, veh/h	2910	4837	1502	1594	3968	872	1594	1910	1309	1594	1772	3003
Grp Volume(v), veh/h	897	755	101	82	652	330	124	70	70	110	126	651
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1615	1594	1683	1536	1594	1772	1502
Q Serve(g_s), s	32.3	9.9	3.9	5.5	20.8	21.0	8.2	4.2	4.7	6.7	6.9	15.2
Cycle Q Clear(g_c), s	32.3	9.9	3.9	5.5	20.8	21.0	8.2	4.2	4.7	6.7	6.9	15.2
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.85	1.00		1.00
Lane Grp Cap(c), veh/h	958	2445	759	102	776	388	161	170	155	259	288	1477
V/C Ratio(X)	0.94	0.31	0.13	0.80	0.84	0.85	0.77	0.41	0.45	0.42	0.44	0.44
Avail Cap(c_a), veh/h	1010	2445	759	243	851	426	280	296	270	266	295	1489
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	15.7	14.2	49.9	39.1	39.1	47.3	45.5	45.7	40.7	40.8	17.8
Incr Delay (d2), s/veh	15.0	0.1	0.1	13.3	7.1	13.9	7.5	1.6	2.1	1.1	1.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.2	3.6	1.3	2.6	8.9	9.7	3.6	1.8	1.9	2.7	3.1	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.1	15.7	14.2	63.2	46.1	53.1	54.9	47.1	47.8	41.8	41.8	18.0
LnGrp LOS	D	B	B	E	D	D	D	D	D	D	D	B
Approach Vol, veh/h		1753			1064			264			887	
Approach Delay, s/veh		33.2			49.6			50.9			24.3	
Approach LOS		C			D			D			C	

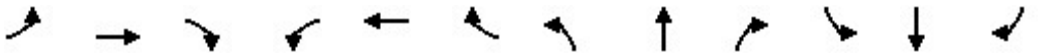
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.4	11.4	59.1		22.1	40.1	30.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		10.2	7.5	11.9		17.2	34.3	23.0				
Green Ext Time (p_c), s		0.7	0.1	6.6		0.4	1.3	2.9				

Intersection Summary	
HCM 6th Ctrl Delay	36.8
HCM 6th LOS	D

Notes

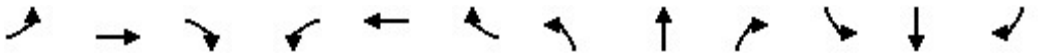
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



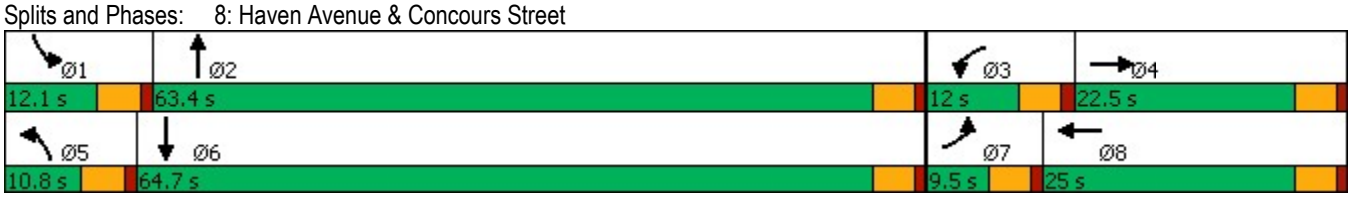
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	26	40	65	178	95	97	48	2366	213	44	1944	28
Future Volume (vph)	26	40	65	178	95	97	48	2366	213	44	1944	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	27	41	66	182	97	99	49	2414	217	45	1984	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	107	0	182	97	99	49	2414	217	45	1984	29

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	40	178	95	97	48	2366	213	44	1944	28
Future Volume (vph)	26	40	178	95	97	48	2366	213	44	1944	28
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	7.0	7.5	13.8	92.5	6.2	57.7	92.5	6.8	56.0	92.5
Actuated g/C Ratio	0.06	0.08	0.08	0.15	1.00	0.07	0.62	1.00	0.07	0.61	1.00
v/c Ratio	0.17	0.37	0.57	0.19	0.07	0.26	0.64	0.14	0.21	0.54	0.02
Control Delay	47.9	23.5	50.4	40.1	0.1	47.5	12.7	0.2	45.7	11.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	23.5	50.4	40.1	0.1	47.5	12.7	0.2	45.7	11.8	0.0
LOS	D	C	D	D	A	D	B	A	D	B	A
Approach Delay		28.4		34.6			12.3			12.4	
Approach LOS		C		C			B			B	

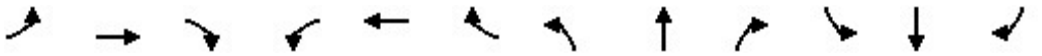
Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 92.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 14.4	Intersection LOS: B
Intersection Capacity Utilization 54.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	107	182	97	99	49	2414	217	45	1984	29
v/c Ratio	0.17	0.37	0.57	0.19	0.07	0.26	0.64	0.14	0.21	0.54	0.02
Control Delay	47.9	23.5	50.4	40.1	0.1	47.5	12.7	0.2	45.7	11.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	23.5	50.4	40.1	0.1	47.5	12.7	0.2	45.7	11.8	0.0
Queue Length 50th (ft)	8	13	39	30	0	15	268	0	13	194	0
Queue Length 95th (ft)	23	39	65	56	0	35	336	0	32	241	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	157	650	322	750	1500	198	3906	1500	239	3992	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.57	0.13	0.07	0.25	0.62	0.14	0.19	0.50	0.02

Intersection Summary



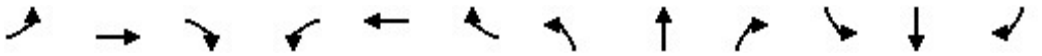
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	40	65	178	95	97	48	2366	213	44	1944	28
Future Volume (veh/h)	26	40	65	178	95	97	48	2366	213	44	1944	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	27	41	66	182	97	0	49	2414	0	45	1984	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	81	119	106	273	376		118	3701		113	3689	
Arrive On Green	0.03	0.07	0.07	0.07	0.11	0.00	0.04	0.61	0.00	0.04	0.61	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	27	41	66	182	97	0	49	2414	0	45	1984	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.8	1.9	3.6	3.8	2.2	0.0	1.4	21.6	0.0	1.3	16.0	0.0
Cycle Q Clear(g_c), s	0.8	1.9	3.6	3.8	2.2	0.0	1.4	21.6	0.0	1.3	16.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	81	119	106	273	376		118	3701		113	3689	
V/C Ratio(X)	0.33	0.34	0.62	0.67	0.26		0.41	0.65		0.40	0.54	
Avail Cap(c_a), veh/h	174	361	322	355	823		219	4281		264	4376	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	40.0	37.1	37.9	38.1	34.1	0.0	39.3	10.7	0.0	39.4	9.7	0.0
Incr Delay (d2), s/veh	2.4	1.7	5.8	3.1	0.4	0.0	2.3	0.3	0.0	2.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.8	1.5	1.3	0.9	0.0	0.5	6.3	0.0	0.5	4.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	38.8	43.7	41.2	34.4	0.0	41.6	11.0	0.0	41.6	9.8	0.0
LnGrp LOS	D	D	D	D	C		D	B		D	A	
Approach Vol, veh/h		134			279	A		2463	A		2029	A
Approach Delay, s/veh		41.9			38.8			11.6			10.5	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.7	55.4	10.3	10.4	7.9	55.3	6.8	13.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	3.3	23.6	5.8	5.6	3.4	18.0	2.8	4.2
Green Ext Time (p_c), s	0.0	27.3	0.1	0.4	0.0	24.3	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B

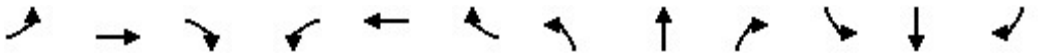
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.979			0.951						0.980	
Flt Protected	0.950	0.959			0.969		0.950			0.950		
Satd. Flow (prot)	1593	1574	0	0	1626	0	1676	4818	0	1676	4721	0
Flt Permitted	0.950	0.959					0.950			0.950		
Satd. Flow (perm)	1593	1574	0	0	1678	0	1676	4818	0	1676	4721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



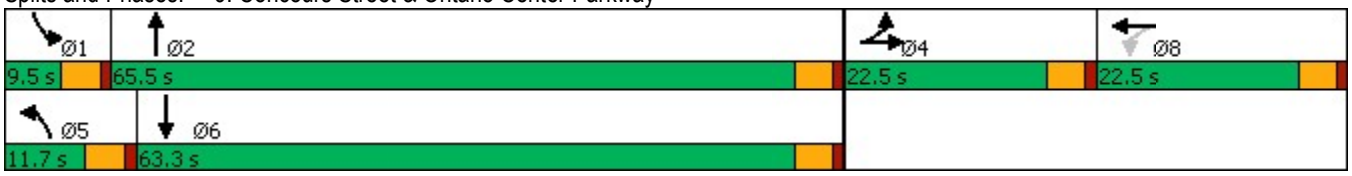
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	170	0	12	15	0	9	34	1801	5	1	1086	164
Future Volume (vph)	170	0	12	15	0	9	34	1801	5	1	1086	164
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	179	0	13	16	0	9	36	1896	5	1	1143	173
Shared Lane Traffic (%)	46%											
Lane Group Flow (vph)	97	95	0	0	25	0	36	1901	0	1	1316	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	170	0	15	0	34	1801	1	1086
Future Volume (vph)	170	0	15	0	34	1801	1	1086
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.9	10.9		5.8	6.9	52.5	5.3	47.6
Actuated g/C Ratio	0.14	0.14		0.07	0.09	0.68	0.07	0.61
v/c Ratio	0.43	0.31		0.12	0.24	0.58	0.01	0.45
Control Delay	41.1	11.7		1.1	44.3	9.2	45.0	10.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	11.7		1.1	44.3	9.2	45.0	10.3
LOS	D	B		A	D	A	D	B
Approach Delay		26.6		1.1		9.8		10.3
Approach LOS		C		A		A		B

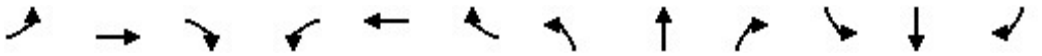
Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 77.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	97	95	25	36	1901	1	1316
v/c Ratio	0.43	0.31	0.12	0.24	0.58	0.01	0.45
Control Delay	41.1	11.7	1.1	44.3	9.2	45.0	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	11.7	1.1	44.3	9.2	45.0	10.3
Queue Length 50th (ft)	40	0	0	15	110	0	114
Queue Length 95th (ft)	118	48	0	58	362	7	222
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	390	457	482	164	3960	114	3785
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.21	0.05	0.22	0.48	0.01	0.35

Intersection Summary



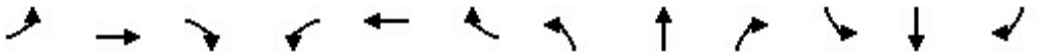
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	0	12	15	0	9	34	1801	5	1	1086	164
Future Volume (veh/h)	170	0	12	15	0	9	34	1801	5	1	1086	164
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	191	0	0	16	0	9	36	1896	5	1	1143	173
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	302	159	0	29	0	16	62	3019	8	3	2420	366
Arrive On Green	0.09	0.00	0.00	0.03	0.00	0.03	0.04	0.61	0.61	0.00	0.57	0.57
Sat Flow, veh/h	3375	1772	0	1034	0	582	1688	4981	13	1688	4240	641
Grp Volume(v), veh/h	191	0	0	25	0	0	36	1227	674	1	869	447
Grp Sat Flow(s),veh/h/ln	1688	1772	0	1616	0	0	1688	1612	1770	1688	1612	1656
Q Serve(g_s), s	3.6	0.0	0.0	1.0	0.0	0.0	1.4	15.8	15.8	0.0	10.4	10.4
Cycle Q Clear(g_c), s	3.6	0.0	0.0	1.0	0.0	0.0	1.4	15.8	15.8	0.0	10.4	10.4
Prop In Lane	1.00		0.00	0.64		0.36	1.00		0.01	1.00		0.39
Lane Grp Cap(c), veh/h	302	159	0	45	0	0	62	1954	1072	3	1840	945
V/C Ratio(X)	0.63	0.00	0.00	0.55	0.00	0.00	0.58	0.63	0.63	0.39	0.47	0.47
Avail Cap(c_a), veh/h	929	488	0	445	0	0	186	3007	1650	129	2899	1489
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.7	0.0	0.0	31.4	0.0	0.0	31.0	8.2	8.2	32.6	8.3	8.3
Incr Delay (d2), s/veh	2.2	0.0	0.0	10.2	0.0	0.0	8.3	0.3	0.6	75.0	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.5	0.0	0.0	0.7	4.3	4.8	0.1	3.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.9	0.0	0.0	41.6	0.0	0.0	39.4	8.5	8.8	107.6	8.4	8.6
LnGrp LOS	C	A	A	D	A	A	D	A	A	F	A	A
Approach Vol, veh/h		191			25			1937			1317	
Approach Delay, s/veh		30.9			41.6			9.2			8.6	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	44.1		10.4	6.9	41.8		6.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.0	17.8		5.6	3.4	12.4		3.0				
Green Ext Time (p_c), s	0.0	21.8		0.5	0.0	12.8		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		10.4	
HCM 6th LOS		B	

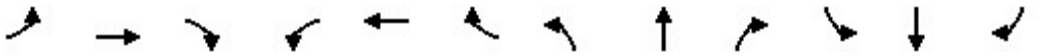
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			240			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



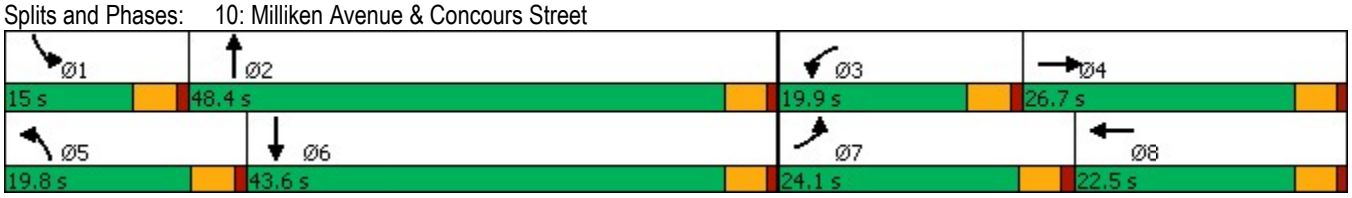
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	376	133	230	173	69	117	291	1664	130	184	1239	174
Future Volume (vph)	376	133	230	173	69	117	291	1664	130	184	1239	174
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	392	139	240	180	72	122	303	1733	135	192	1291	181
Shared Lane Traffic (%)												
Lane Group Flow (vph)	392	139	240	180	72	122	303	1733	135	192	1291	181

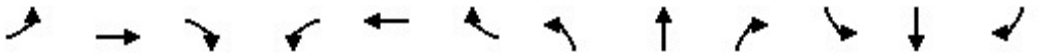
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	376	133	230	173	69	117	291	1664	130	184	1239	174
Future Volume (vph)	376	133	230	173	69	117	291	1664	130	184	1239	174
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.9	12.5	92.4	11.2	7.5	92.4	14.0	40.3	92.4	10.0	36.3	92.4
Actuated g/C Ratio	0.20	0.14	1.00	0.12	0.08	1.00	0.15	0.44	1.00	0.11	0.39	1.00
v/c Ratio	0.66	0.31	0.16	0.51	0.26	0.08	0.69	0.66	0.09	0.61	0.54	0.12
Control Delay	42.0	39.5	0.2	45.0	45.2	0.1	47.8	22.4	0.1	50.5	23.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	39.5	0.2	45.0	45.2	0.1	47.8	22.4	0.1	50.5	23.2	0.2
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		28.6			30.4			24.6			23.8	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 92.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 25.4	Intersection LOS: C
Intersection Capacity Utilization 63.6%	ICU Level of Service B
Analysis Period (min) 15	

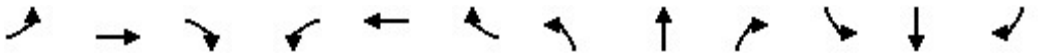
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	392	139	240	180	72	122	303	1733	135	192	1291	181
v/c Ratio	0.66	0.31	0.16	0.51	0.26	0.08	0.69	0.66	0.09	0.61	0.54	0.12
Control Delay	42.0	39.5	0.2	45.0	45.2	0.1	47.8	22.4	0.1	50.5	23.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	39.5	0.2	45.0	45.2	0.1	47.8	22.4	0.1	50.5	23.2	0.2
Queue Length 50th (ft)	120	41	0	55	22	0	93	238	0	60	176	0
Queue Length 95th (ft)	174	73	0	89	45	0	143	293	0	100	222	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	624	821	1500	490	665	1500	488	2939	1500	334	2617	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.17	0.16	0.37	0.11	0.08	0.62	0.59	0.09	0.57	0.49	0.12

Intersection Summary



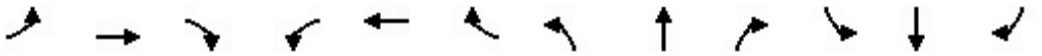
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	133	230	173	69	117	291	1664	130	184	1239	174
Future Volume (veh/h)	376	133	230	173	69	117	291	1664	130	184	1239	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	392	139	0	180	72	0	303	1733	0	192	1291	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	487	483		258	219		388	2697		265	2440	
Arrive On Green	0.17	0.14	0.00	0.09	0.07	0.00	0.13	0.44	0.00	0.09	0.40	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	392	139	0	180	72	0	303	1733	0	192	1291	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	10.0	2.8	0.0	4.6	1.6	0.0	7.7	17.0	0.0	4.9	12.4	0.0
Cycle Q Clear(g_c), s	10.0	2.8	0.0	4.6	1.6	0.0	7.7	17.0	0.0	4.9	12.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	487	483		258	219		388	2697		265	2440	
V/C Ratio(X)	0.81	0.29		0.70	0.33		0.78	0.64		0.72	0.53	
Avail Cap(c_a), veh/h	742	972		583	788		579	3480		397	3100	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.8	29.4	0.0	34.0	34.3	0.0	32.2	16.7	0.0	34.0	17.5	0.0
Incr Delay (d2), s/veh	3.8	0.3	0.0	3.4	0.9	0.0	4.0	0.3	0.0	3.7	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	1.1	0.0	1.7	0.7	0.0	2.9	5.5	0.0	1.8	4.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.6	29.7	0.0	37.4	35.2	0.0	36.3	17.0	0.0	37.7	17.7	0.0
LnGrp LOS	C	C		D	D		D	B		D	B	
Approach Vol, veh/h		531	A		252	A		2036	A		1483	A
Approach Delay, s/veh		33.4			36.8			19.8			20.3	
Approach LOS		C			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	38.5	11.3	15.5	14.7	35.3	17.4	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	6.9	19.0	6.6	4.8	9.7	14.4	12.0	3.6
Green Ext Time (p_c), s	0.2	15.0	0.4	0.7	0.5	10.6	0.9	0.2

Intersection Summary	
HCM 6th Ctrl Delay	22.7
HCM 6th LOS	C

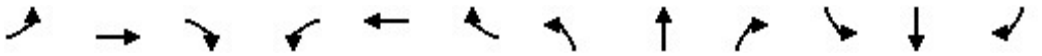
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			237			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



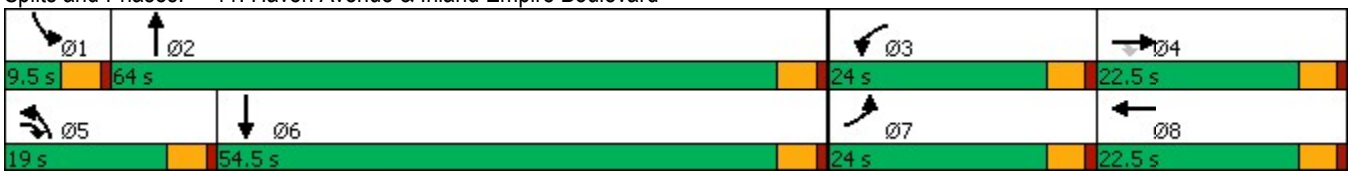
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	170	218	483	638	157	41	352	1934	435	42	2245	46
Future Volume (vph)	170	218	483	638	157	41	352	1934	435	42	2245	46
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	183	234	519	686	169	44	378	2080	468	45	2414	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	234	519	686	169	44	378	2080	468	45	2414	49

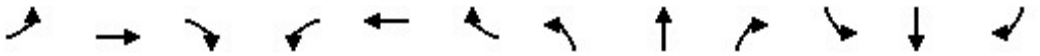
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	218	483	638	157	41	352	1934	435	42	2245	46
Future Volume (vph)	170	218	483	638	157	41	352	1934	435	42	2245	46
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	12.6	13.3	32.3	19.5	20.2	115.4	14.5	61.5	115.4	5.0	50.0	115.4
Actuated g/C Ratio	0.11	0.12	0.28	0.17	0.18	1.00	0.13	0.53	1.00	0.04	0.43	1.00
v/c Ratio	0.58	0.61	1.13	1.03	0.29	0.03	1.04	0.64	0.31	0.36	0.92	0.03
Control Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	21.0	0.5	62.9	37.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	21.0	0.5	62.9	37.7	0.0
LOS	E	E	F	F	D	A	F	C	A	E	D	A
Approach Delay		89.9			76.9			29.0			37.4	
Approach LOS		F			E			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 115.4	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 45.7	Intersection LOS: D
Intersection Capacity Utilization 92.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	183	234	519	686	169	44	378	2080	468	45	2414	49
v/c Ratio	0.58	0.61	1.13	1.03	0.29	0.03	1.04	0.64	0.31	0.36	0.92	0.03
Control Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	21.0	0.5	62.9	37.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	55.4	117.4	90.1	43.4	0.0	107.7	21.0	0.5	62.9	37.7	0.0
Queue Length 50th (ft)	67	88	~417	~193	57	0	~156	318	0	17	480	0
Queue Length 95th (ft)	105	130	#623	#289	94	0	#267	386	0	38	#581	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	488	523	459	666	587	1500	363	3236	1500	125	2632	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.45	1.13	1.03	0.29	0.03	1.04	0.64	0.31	0.36	0.92	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

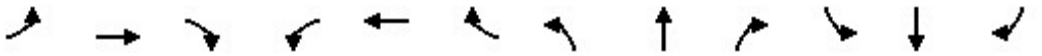
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	170	218	483	638	157	41	352	1934	435	42	2245	46
Future Volume (veh/h)	170	218	483	638	157	41	352	1934	435	42	2245	46
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	183	234	519	686	169	0	378	2080	0	45	2414	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	505	407	645	779		352	3077		94	2537	
Arrive On Green	0.08	0.15	0.15	0.16	0.23	0.00	0.12	0.50	0.00	0.03	0.42	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	183	234	519	686	169	0	378	2080	0	45	2414	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	7.4	7.6	18.0	19.5	4.9	0.0	14.5	30.8	0.0	1.8	45.9	0.0
Cycle Q Clear(g_c), s	7.4	7.6	18.0	19.5	4.9	0.0	14.5	30.8	0.0	1.8	45.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	505	407	645	779		352	3077		94	2537	
V/C Ratio(X)	0.77	0.46	1.28	1.06	0.22		1.07	0.68		0.48	0.95	
Avail Cap(c_a), veh/h	473	505	407	645	779		352	3077		121	2542	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.0	46.5	43.7	50.2	37.3	0.0	52.7	22.3	0.0	57.0	33.8	0.0
Incr Delay (d2), s/veh	5.3	0.7	141.7	53.6	0.1	0.0	69.1	0.6	0.0	3.7	9.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	3.2	28.0	9.6	2.0	0.0	8.7	10.9	0.0	0.7	18.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.3	47.2	185.4	103.8	37.4	0.0	121.8	22.9	0.0	60.7	42.9	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	D	
Approach Vol, veh/h		936			855	A		2458	A		2459	A
Approach Delay, s/veh		126.2			90.7			38.1			43.2	
Approach LOS		F			F			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	65.0	24.0	22.5	19.0	54.4	14.3	32.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	3.8	32.8	21.5	20.0	16.5	47.9	9.4	6.9
Green Ext Time (p_c), s	0.0	19.1	0.0	0.0	0.0	2.0	0.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	59.0
HCM 6th LOS	E

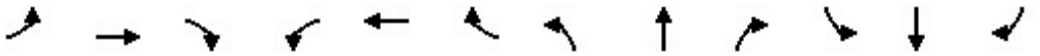
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			340			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



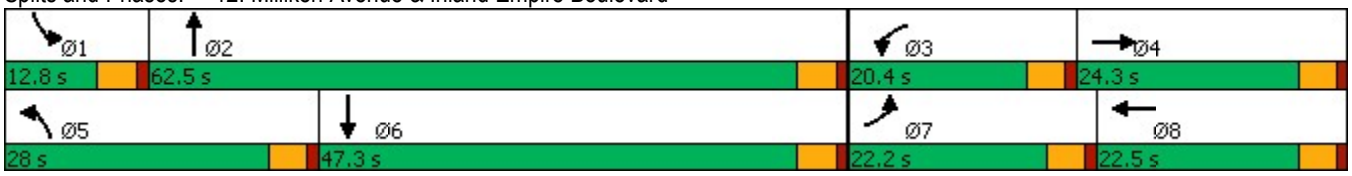
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	294	287	323	212	78	86	391	1680	365	97	1475	119
Future Volume (vph)	294	287	323	212	78	86	391	1680	365	97	1475	119
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	309	302	340	223	82	91	412	1768	384	102	1553	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	309	302	340	223	82	91	412	1768	384	102	1553	125

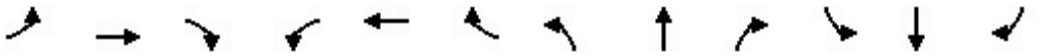
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	294	287	323	212	78	86	391	1680	365	97	1475	119
Future Volume (vph)	294	287	323	212	78	86	391	1680	365	97	1475	119
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.9	14.9	105.0	13.1	12.0	105.0	19.6	50.5	105.0	7.9	38.8	105.0
Actuated g/C Ratio	0.18	0.14	1.00	0.12	0.11	1.00	0.19	0.48	1.00	0.08	0.37	1.00
v/c Ratio	0.60	0.63	0.23	0.62	0.21	0.06	0.76	0.61	0.26	0.47	0.69	0.08
Control Delay	48.9	50.5	0.3	53.6	45.8	0.1	52.0	21.2	0.4	58.0	30.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	50.5	0.3	53.6	45.8	0.1	52.0	21.2	0.4	58.0	30.7	0.1
LOS	D	D	A	D	D	A	D	C	A	E	C	A
Approach Delay		32.0			39.7			23.0			30.1	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 105	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 27.9	Intersection LOS: C
Intersection Capacity Utilization 66.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	309	302	340	223	82	91	412	1768	384	102	1553	125
v/c Ratio	0.60	0.63	0.23	0.62	0.21	0.06	0.76	0.61	0.26	0.47	0.69	0.08
Control Delay	48.9	50.5	0.3	53.6	45.8	0.1	52.0	21.2	0.4	58.0	30.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	50.5	0.3	53.6	45.8	0.1	52.0	21.2	0.4	58.0	30.7	0.1
Queue Length 50th (ft)	108	108	0	78	28	0	144	249	0	36	262	0
Queue Length 95th (ft)	169	162	0	127	54	0	213	320	0	70	344	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	540	647	1500	448	588	1500	663	3435	1500	234	2534	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.47	0.23	0.50	0.14	0.06	0.62	0.51	0.26	0.44	0.61	0.08

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	294	287	323	212	78	86	391	1680	365	97	1475	119
Future Volume (veh/h)	294	287	323	212	78	86	391	1680	365	97	1475	119
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	309	302	0	223	82	0	412	1768	0	102	1553	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	390	424		299	319		504	3072		157	2344	
Arrive On Green	0.13	0.13	0.00	0.10	0.09	0.00	0.17	0.50	0.00	0.05	0.38	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	309	302	0	223	82	0	412	1768	0	102	1553	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	8.7	7.3	0.0	6.3	1.9	0.0	11.5	17.1	0.0	2.9	17.7	0.0
Cycle Q Clear(g_c), s	8.7	7.3	0.0	6.3	1.9	0.0	11.5	17.1	0.0	2.9	17.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	390	424		299	319		504	3072		157	2344	
V/C Ratio(X)	0.79	0.71		0.75	0.26		0.82	0.58		0.65	0.66	
Avail Cap(c_a), veh/h	611	791		549	719		812	4196		287	3096	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.4	35.4	0.0	36.7	35.4	0.0	33.6	14.6	0.0	39.1	21.4	0.0
Incr Delay (d2), s/veh	3.8	2.2	0.0	3.7	0.4	0.0	3.5	0.2	0.0	4.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	3.0	0.0	2.3	0.8	0.0	4.2	5.5	0.0	1.1	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.2	37.6	0.0	40.4	35.8	0.0	37.1	14.8	0.0	43.6	21.7	0.0
LnGrp LOS	D	D		D	D		D	B		D	C	
Approach Vol, veh/h		611	A		305	A		2180	A		1655	A
Approach Delay, s/veh		38.4			39.2			19.0			23.1	
Approach LOS		D			D			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	47.0	13.2	15.1	19.1	36.9	15.8	12.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	4.9	19.1	8.3	9.3	13.5	19.7	10.7	3.9
Green Ext Time (p_c), s	0.1	19.8	0.4	1.3	1.1	12.7	0.6	0.3

Intersection Summary	
HCM 6th Ctrl Delay	24.2
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.984	0.850				
Flt Protected	0.957					
Satd. Flow (prot)	3045	1365	6071	0	0	6071
Flt Permitted	0.957					
Satd. Flow (perm)	3045	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	498	314	2273	0	0	2266
Future Volume (vph)	498	314	2273	0	0	2266
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	519	327	2368	0	0	2360
Shared Lane Traffic (%)		19%				
Lane Group Flow (vph)	581	265	2368	0	0	2360

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	498	314	2273	2266
Future Volume (vph)	498	314	2273	2266
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	16.5	16.5	36.6	36.6
Actuated g/C Ratio	0.27	0.27	0.59	0.59
v/c Ratio	0.72	0.73	0.66	0.66
Control Delay	26.0	33.1	10.2	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.0	33.1	10.2	10.2
LOS	C	C	B	B
Approach Delay	28.2		10.2	10.2
Approach LOS	C		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 62.1	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 12.9	Intersection LOS: B
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	581	265	2368	2360
v/c Ratio	0.72	0.73	0.66	0.66
Control Delay	26.0	33.1	10.2	10.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.0	33.1	10.2	10.2
Queue Length 50th (ft)	101	97	164	164
Queue Length 95th (ft)	149	#184	216	215
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	960	431	3575	3575
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.61	0.61	0.66	0.66

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

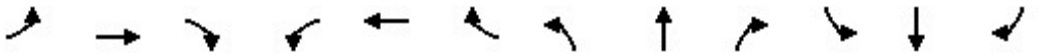
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	498	314	2273	0	0	2266
Future Volume (veh/h)	498	314	2273	0	0	2266
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	561	282	2368	0	0	2360
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	788	371	3613	0	0	3613
Arrive On Green	0.25	0.25	0.59	0.00	0.00	0.59
Sat Flow, veh/h	3188	1502	6592	0	0	6592
Grp Volume(v), veh/h	561	282	2368	0	0	2360
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	9.0	9.8	14.6	0.0	0.0	14.5
Cycle Q Clear(g_c), s	9.0	9.8	14.6	0.0	0.0	14.5
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	788	371	3613	0	0	3613
V/C Ratio(X)	0.71	0.76	0.66	0.00	0.00	0.65
Avail Cap(c_a), veh/h	1105	521	3956	0	0	3956
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	19.3	19.6	7.6	0.0	0.0	7.6
Incr Delay (d2), s/veh	1.3	4.1	0.4	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	3.5	3.5	0.0	0.0	3.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.6	23.8	8.0	0.0	0.0	8.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	843		2368			2360
Approach Delay, s/veh	21.7		8.0			8.0
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		37.8			37.8	18.4
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		16.6			16.5	11.8
Green Ext Time (p_c), s		16.8			16.8	2.1

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

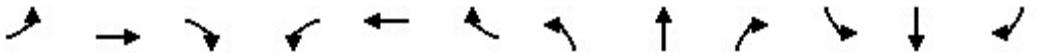
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			136			281			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



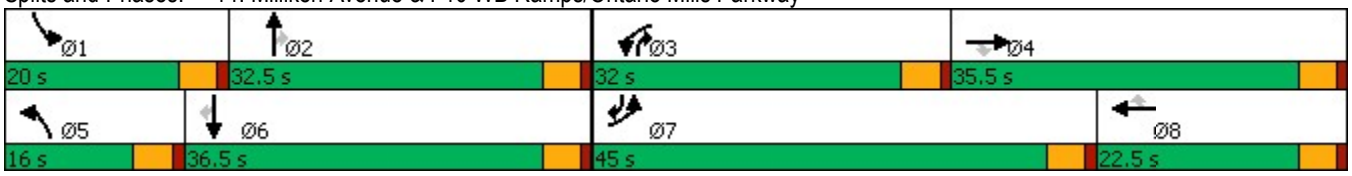
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	852	197	237	253	301	63	240	1033	453	332	1143	479
Future Volume (vph)	852	197	237	253	301	63	240	1033	453	332	1143	479
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	888	205	247	264	314	66	250	1076	472	346	1191	499
Shared Lane Traffic (%)												
Lane Group Flow (vph)	888	205	247	264	314	66	250	1076	472	346	1191	499

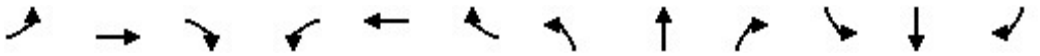
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	852	197	237	253	301	63	240	1033	453	332	1143	479
Future Volume (vph)	852	197	237	253	301	63	240	1033	453	332	1143	479
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	38.7	37.6	37.6	16.5	15.4	15.4	11.6	26.5	47.5	15.5	30.4	73.6
Actuated g/C Ratio	0.34	0.33	0.33	0.14	0.13	0.13	0.10	0.23	0.42	0.14	0.27	0.64
v/c Ratio	0.91	0.35	0.42	0.63	0.69	0.21	0.85	0.76	0.60	0.88	0.74	0.51
Control Delay	50.6	32.4	15.3	53.4	56.5	1.5	78.1	45.5	13.0	73.8	41.8	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	32.4	15.3	53.4	56.5	1.5	78.1	45.5	13.0	73.8	41.8	11.6
LOS	D	C	B	D	E	A	E	D	B	E	D	B
Approach Delay		41.3			49.6			41.5			39.9	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 41.8	Intersection LOS: D
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	888	205	247	264	314	66	250	1076	472	346	1191	499
v/c Ratio	0.91	0.35	0.42	0.63	0.69	0.21	0.85	0.76	0.60	0.88	0.74	0.51
Control Delay	50.6	32.4	15.3	53.4	56.5	1.5	78.1	45.5	13.0	73.8	41.8	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	32.4	15.3	53.4	56.5	1.5	78.1	45.5	13.0	73.8	41.8	11.6
Queue Length 50th (ft)	329	117	55	98	121	0	98	222	104	136	240	159
Queue Length 95th (ft)	#458	197	137	138	171	0	#178	269	199	#229	288	251
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1031	580	591	700	531	352	293	1497	907	394	1711	1013
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.35	0.42	0.38	0.59	0.19	0.85	0.72	0.52	0.88	0.70	0.49

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	852	197	237	253	301	63	240	1033	453	332	1143	479
Future Volume (veh/h)	852	197	237	253	301	63	240	1033	453	332	1143	479
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	888	205	247	264	314	66	250	1076	472	346	1191	499
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	961	594	503	331	400	178	298	1542	551	394	1743	925
Arrive On Green	0.33	0.34	0.34	0.11	0.12	0.12	0.10	0.25	0.25	0.14	0.29	0.29
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	888	205	247	264	314	66	250	1076	472	346	1191	499
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	32.6	9.6	14.5	9.8	10.0	4.5	9.3	17.7	28.0	12.9	19.2	21.1
Cycle Q Clear(g_c), s	32.6	9.6	14.5	9.8	10.0	4.5	9.3	17.7	28.0	12.9	19.2	21.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	961	594	503	331	400	178	298	1542	551	394	1743	925
V/C Ratio(X)	0.92	0.35	0.49	0.80	0.79	0.37	0.84	0.70	0.86	0.88	0.68	0.54
Avail Cap(c_a), veh/h	1065	594	503	723	548	244	302	1542	551	408	1762	930
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	27.7	29.3	47.8	47.4	45.0	48.8	37.5	32.4	46.9	35.1	12.2
Incr Delay (d2), s/veh	12.4	0.3	0.7	4.4	5.2	1.3	18.2	1.4	12.7	18.6	1.1	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.0	4.1	5.3	3.7	4.5	1.7	4.1	6.7	13.4	5.7	7.2	6.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.1	28.0	30.0	52.3	52.6	46.2	67.0	38.9	45.1	65.6	36.1	12.8
LnGrp LOS	D	C	C	D	D	D	E	D	D	E	D	B
Approach Vol, veh/h		1340			644			1798			2036	
Approach Delay, s/veh		41.7			51.8			44.4			35.4	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.5	32.5	17.1	41.6	15.8	36.2	41.0	17.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	14.9	30.0	11.8	16.5	11.3	23.1	34.6	12.0
Green Ext Time (p_c), s	0.1	0.0	0.8	1.8	0.0	6.1	2.0	1.1

Intersection Summary	
HCM 6th Ctrl Delay	41.5
HCM 6th LOS	D

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6	14				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

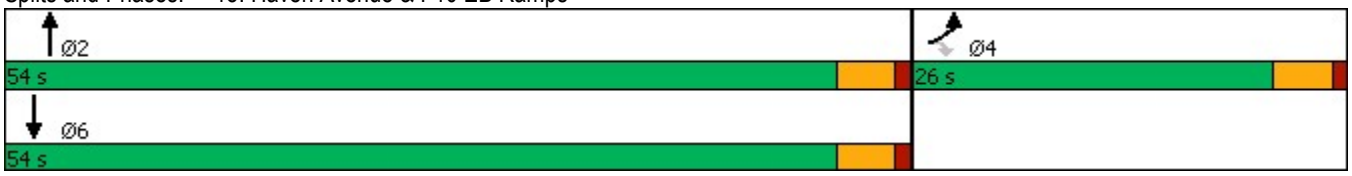
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	544	247	0	2465	1900	0
Future Volume (vph)	544	247	0	2465	1900	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	567	257	0	2568	1979	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	593	231	0	2568	1979	0

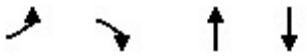
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	544	247	2465	1900
Future Volume (vph)	544	247	2465	1900
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	19.0	19.0	49.6	49.6
Actuated g/C Ratio	0.24	0.24	0.64	0.64
v/c Ratio	0.79	0.67	0.66	0.51
Control Delay	35.3	35.2	10.2	8.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.3	35.2	10.2	8.4
LOS	D	D	B	A
Approach Delay	35.3		10.2	8.4
Approach LOS	D		B	A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 77.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	593	231	2568	1979
v/c Ratio	0.79	0.67	0.66	0.51
Control Delay	35.3	35.2	10.2	8.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.3	35.2	10.2	8.4
Queue Length 50th (ft)	136	103	215	141
Queue Length 95th (ft)	193	186	259	173
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	854	389	3879	3879
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.69	0.59	0.66	0.51

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	544	247	0	2465	1900	0
Future Volume (veh/h)	544	247	0	2465	1900	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	567	257	0	2568	1979	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	721	340	0	3929	3929	0
Arrive On Green	0.23	0.23	0.00	0.64	0.64	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	567	257	0	2568	1979	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	11.7	11.1	0.0	18.0	11.9	0.0
Cycle Q Clear(g_c), s	11.7	11.1	0.0	18.0	11.9	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	721	340	0	3929	3929	0
V/C Ratio(X)	0.79	0.76	0.00	0.65	0.50	0.00
Avail Cap(c_a), veh/h	985	464	0	4335	4335	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.3	25.1	0.0	7.6	6.5	0.0
Incr Delay (d2), s/veh	3.0	4.8	0.0	0.3	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	4.2	0.0	4.5	3.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.3	29.9	0.0	7.9	6.6	0.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	824			2568	1979	
Approach Delay, s/veh	28.8			7.9	6.6	
Approach LOS	C			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		49.4		20.2		49.4
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		20.0		13.7		13.9
Green Ext Time (p_c), s		24.9		2.1		21.9

Intersection Summary		
HCM 6th Ctrl Delay	10.6	
HCM 6th LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		9				83
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	513	202	326	1219	1028	622
Future Volume (vph)	513	202	326	1219	1028	622
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	529	208	336	1257	1060	641
Shared Lane Traffic (%)						
Lane Group Flow (vph)	529	208	336	1257	1060	641

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	513	202	326	1219	1028	622
Future Volume (vph)	513	202	326	1219	1028	622
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.3	29.7	9.9	31.1	16.6	36.5
Actuated g/C Ratio	0.28	0.54	0.18	0.56	0.30	0.66
v/c Ratio	0.66	0.26	0.65	0.37	0.58	0.63
Control Delay	22.7	7.8	29.4	7.4	18.4	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	7.8	29.4	7.4	18.4	8.1
LOS	C	A	C	A	B	A
Approach Delay	18.5			12.1	14.5	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 55.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 59.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	529	208	336	1257	1060	641
v/c Ratio	0.66	0.26	0.65	0.37	0.58	0.63
Control Delay	22.7	7.8	29.4	7.4	18.4	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	7.8	29.4	7.4	18.4	8.1
Queue Length 50th (ft)	83	34	58	65	91	85
Queue Length 95th (ft)	128	66	#100	87	123	166
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	951	826	549	3662	2008	1090
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.25	0.61	0.34	0.53	0.59

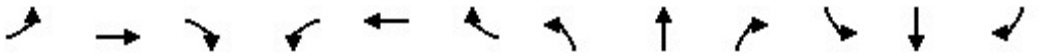
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	513	202	326	1219	1028	622
Future Volume (veh/h)	513	202	326	1219	1028	622
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	529	208	336	1257	1060	641
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	700	593	448	3577	2113	882
Arrive On Green	0.24	0.24	0.15	0.59	0.35	0.35
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	529	208	336	1257	1060	641
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	8.8	5.1	5.8	5.6	7.2	16.0
Cycle Q Clear(g_c), s	8.8	5.1	5.8	5.6	7.2	16.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	700	593	448	3577	2113	882
V/C Ratio(X)	0.76	0.35	0.75	0.35	0.50	0.73
Avail Cap(c_a), veh/h	1004	749	580	3855	2114	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	11.1	21.1	5.6	13.5	7.8
Incr Delay (d2), s/veh	2.0	0.4	4.0	0.1	0.2	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.9	2.0	1.2	2.1	8.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.4	11.5	25.1	5.7	13.7	10.8
LnGrp LOS	C	B	C	A	B	B
Approach Vol, veh/h	737			1593	1701	
Approach Delay, s/veh	17.9			9.8	12.6	
Approach LOS	B			A	B	

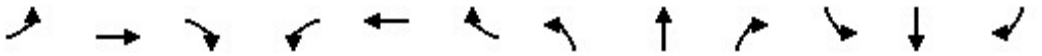
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		35.1		17.1	12.5	22.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		7.6		10.8	7.8	18.0
Green Ext Time (p_c), s		10.4		1.8	0.3	0.1

Intersection Summary	
HCM 6th Ctrl Delay	12.4
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.972				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4683	0	2891	3353	1500	2891	4818	1500	2891	6010	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48				212			271		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	52	566	128	251	538	199	185	1148	376	206	1115	79
Future Volume (vph)	52	566	128	251	538	199	185	1148	376	206	1115	79
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	55	602	136	267	572	212	197	1221	400	219	1186	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	738	0	267	572	212	197	1221	400	219	1270	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	52	566	251	538	199	185	1148	376	206	1115
Future Volume (vph)	52	566	251	538	199	185	1148	376	206	1115
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	20.3	12.0	29.4	29.4	11.9	36.0	96.5	10.2	34.3
Actuated g/C Ratio	0.05	0.21	0.12	0.30	0.30	0.12	0.37	1.00	0.11	0.36
v/c Ratio	0.37	0.72	0.75	0.56	0.35	0.55	0.68	0.27	0.72	0.59
Control Delay	52.8	37.5	55.2	31.2	5.5	46.1	28.3	0.4	56.9	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.8	37.5	55.2	31.2	5.5	46.1	28.3	0.4	56.9	27.4
LOS	D	D	E	C	A	D	C	A	E	C
Approach Delay		38.6		32.1			24.1			31.7
Approach LOS		D		C			C			C

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 96.5	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 30.2	Intersection LOS: C
Intersection Capacity Utilization 68.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	55	738	267	572	212	197	1221	400	219	1270
v/c Ratio	0.37	0.72	0.75	0.56	0.35	0.55	0.68	0.27	0.72	0.59
Control Delay	52.8	37.5	55.2	31.2	5.5	46.1	28.3	0.4	56.9	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.8	37.5	55.2	31.2	5.5	46.1	28.3	0.4	56.9	27.4
Queue Length 50th (ft)	17	146	84	160	0	60	234	0	69	185
Queue Length 95th (ft)	38	190	#140	215	51	94	294	0	#121	243
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	150	1160	375	1066	621	495	1797	1500	315	2144
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.64	0.71	0.54	0.34	0.40	0.68	0.27	0.70	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

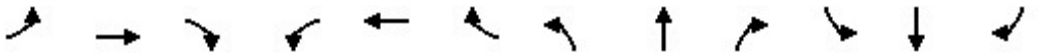
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	566	128	251	538	199	185	1148	376	206	1115	79
Future Volume (veh/h)	52	566	128	251	538	199	185	1148	376	206	1115	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	55	602	136	267	572	212	197	1221	0	219	1186	84
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	120	793	176	331	918	409	266	1900		281	2329	164
Arrive On Green	0.04	0.20	0.20	0.11	0.27	0.27	0.09	0.39	0.00	0.10	0.40	0.40
Sat Flow, veh/h	2910	3960	879	2910	3367	1502	2910	4837	1502	2910	5856	413
Grp Volume(v), veh/h	55	488	250	267	572	212	197	1221	0	219	925	345
Grp Sat Flow(s),veh/h/ln	1455	1612	1614	1455	1683	1502	1455	1612	1502	1455	1524	1698
Q Serve(g_s), s	1.7	13.0	13.4	8.2	13.6	10.9	6.0	18.7	0.0	6.7	14.0	14.0
Cycle Q Clear(g_c), s	1.7	13.0	13.4	8.2	13.6	10.9	6.0	18.7	0.0	6.7	14.0	14.0
Prop In Lane	1.00		0.54	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	120	645	323	331	918	409	266	1900		281	1818	675
V/C Ratio(X)	0.46	0.76	0.77	0.81	0.62	0.52	0.74	0.64		0.78	0.51	0.51
Avail Cap(c_a), veh/h	159	815	408	398	1127	503	525	1900		334	1818	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	34.5	34.6	39.5	29.1	28.2	40.5	22.5	0.0	40.3	20.8	20.8
Incr Delay (d2), s/veh	2.7	3.1	7.0	9.9	0.7	1.0	4.0	1.7	0.0	9.5	1.0	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	5.3	5.8	3.3	5.5	4.0	2.3	7.1	0.0	2.7	5.0	5.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.5	37.6	41.6	49.4	29.9	29.2	44.5	24.2	0.0	49.9	21.8	23.6
LnGrp LOS	D	D	D	D	C	C	D	C		D	C	C
Approach Vol, veh/h		793			1051			1418	A		1489	
Approach Delay, s/veh		39.4			34.7			27.0			26.3	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.3	40.4	14.9	22.8	12.9	40.8	8.3	29.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	8.7	20.7	10.2	15.4	8.0	16.0	3.7	15.6
Green Ext Time (p_c), s	0.1	7.7	0.2	2.9	0.4	7.2	0.0	4.1

Intersection Summary	
HCM 6th Ctrl Delay	30.6
HCM 6th LOS	C

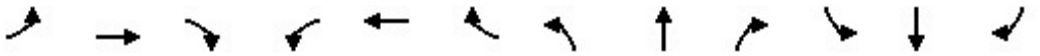
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.992				0.850			0.850		0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1667	6022	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1667	6022	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				153			386		271	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



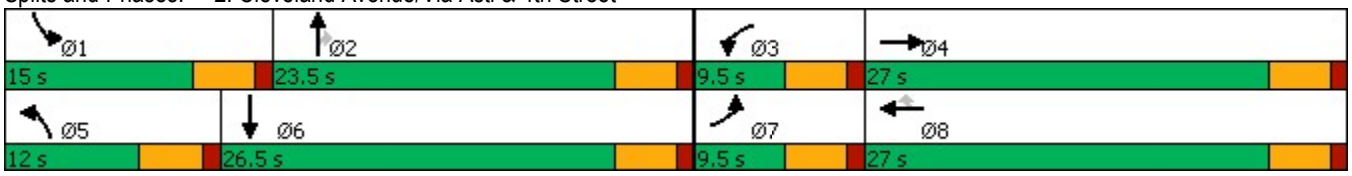
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1170	64	3	941	4	59	0	4	3	0	1
Future Volume (vph)	0	1170	64	3	941	4	59	0	4	3	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1206	66	3	970	4	61	0	4	3	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1272	0	3	970	4	61	0	4	3	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1170	3	941	4	59	4	3	0	
Future Volume (vph)	1170	3	941	4	59	4	3	0	
Turn Type	NA	Prot	NA	Perm	Prot	Perm	Prot	NA	
Protected Phases	4	3	8		5		1	6	7
Permitted Phases				8		2			
Detector Phase	4	3	8	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	12.0	23.5	15.0	26.5	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	16.0%	31.3%	20.0%	35.3%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	19.2	5.5	20.6	20.6	7.1	10.4	6.1	6.0	
Actuated g/C Ratio	0.45	0.13	0.49	0.49	0.17	0.25	0.14	0.14	
v/c Ratio	0.46	0.01	0.41	0.00	0.23	0.01	0.01	0.00	
Control Delay	9.7	22.7	8.0	0.0	22.4	0.0	22.0	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	9.7	22.7	8.0	0.0	22.4	0.0	22.0	0.0	
LOS	A	C	A	A	C	A	C	A	
Approach Delay	9.7		8.0					16.5	
Approach LOS	A		A					B	

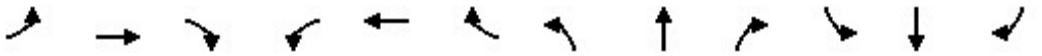
Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 42.4	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 38.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	1272	3	970	4	61	4	3	1
v/c Ratio	0.46	0.01	0.41	0.00	0.23	0.01	0.01	0.00
Control Delay	9.7	22.7	8.0	0.0	22.4	0.0	22.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	22.7	8.0	0.0	22.4	0.0	22.0	0.0
Queue Length 50th (ft)	64	1	62	0	15	0	1	0
Queue Length 95th (ft)	125	8	86	0	50	0	8	0
Internal Link Dist (ft)	2546		362					358
Turn Bay Length (ft)		130		145	165	165	50	
Base Capacity (vph)	3501	204	2953	978	306	931	428	1734
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.01	0.33	0.00	0.20	0.00	0.01	0.00

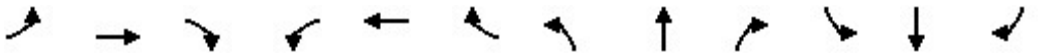
Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1170	64	3	941	4	59	0	4	3	0	1
Future Volume (veh/h)	0	1170	64	3	941	4	59	0	4	3	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	0	1206	66	3	970	4	61	0	4	3	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	4	2269	124	7	2386	741	97	314	266	7	203	181
Arrive On Green	0.00	0.38	0.38	0.00	0.49	0.49	0.06	0.00	0.18	0.00	0.00	0.12
Sat Flow, veh/h	1594	5960	325	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	0	924	348	3	970	4	61	0	4	3	0	1
Grp Sat Flow(s),veh/h/ln	1594	1524	1713	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.0	6.5	6.5	0.1	5.3	0.1	1.6	0.0	0.1	0.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.5	6.5	0.1	5.3	0.1	1.6	0.0	0.1	0.1	0.0	0.0
Prop In Lane	1.00		0.19	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	4	1741	652	7	2386	741	97	314	266	7	203	181
V/C Ratio(X)	0.00	0.53	0.53	0.46	0.41	0.01	0.63	0.00	0.02	0.46	0.00	0.01
Avail Cap(c_a), veh/h	192	2479	929	192	2623	814	288	811	688	403	893	796
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	10.0	10.0	20.6	6.7	5.3	19.0	0.0	14.1	20.6	0.0	16.1
Incr Delay (d2), s/veh	0.0	0.3	0.7	43.1	0.1	0.0	6.5	0.0	0.0	43.1	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.7	2.0	0.1	1.2	0.0	0.7	0.0	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.2	10.7	63.7	6.8	5.3	25.6	0.0	14.1	63.7	0.0	16.1
LnGrp LOS	A	B	B	E	A	A	C	A	B	E	A	B
Approach Vol, veh/h		1272			977			65			4	
Approach Delay, s/veh		10.3			6.9			24.9			51.8	
Approach LOS		B			A			C			D	

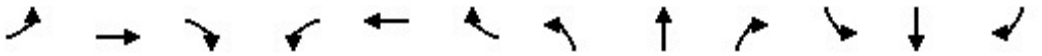
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.7	11.9	4.7	20.3	7.0	9.5	0.0	25.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	2.1	2.1	2.1	8.5	3.6	2.0	0.0	7.3
Green Ext Time (p_c), s	0.0	0.0	0.0	7.3	0.0	0.0	0.0	6.1

Intersection Summary	
HCM 6th Ctrl Delay	9.4
HCM 6th LOS	A



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4779	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.725				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4779	0	1208	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			15				225			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



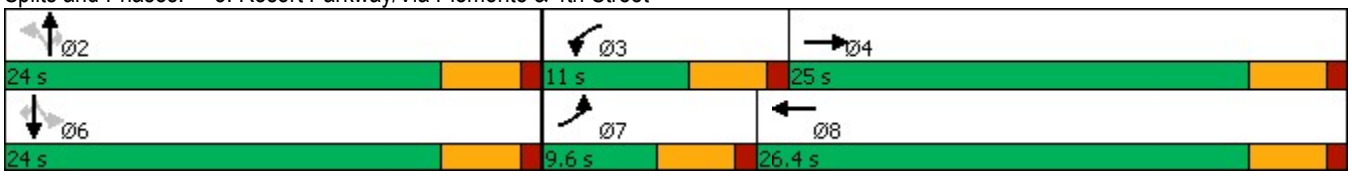
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	1151	8	65	884	47	32	0	37	47	1	16
Future Volume (vph)	11	1151	8	65	884	47	32	0	37	47	1	16
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	1187	8	67	911	48	33	0	38	48	1	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1195	0	67	959	0	33	0	38	0	49	16

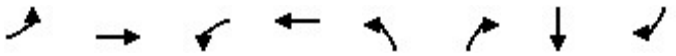
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	11	1151	65	884	32	37	47	1	16
Future Volume (vph)	11	1151	65	884	32	37	47	1	16
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.5	17.4	6.6	21.3	7.3	7.3		7.3	7.3
Actuated g/C Ratio	0.14	0.44	0.17	0.53	0.18	0.18		0.18	0.18
v/c Ratio	0.03	0.45	0.26	0.37	0.15	0.08		0.21	0.04
Control Delay	20.0	9.4	21.4	6.2	19.0	0.4		19.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	20.0	9.4	21.4	6.2	19.0	0.4		19.5	0.2
LOS	B	A	C	A	B	A		B	A
Approach Delay		9.5		7.2				14.8	
Approach LOS		A		A				B	

Intersection Summary		
Cycle Length: 60		
Actuated Cycle Length: 39.9		
Natural Cycle: 55		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.45		
Intersection Signal Delay: 8.6	Intersection LOS: A	
Intersection Capacity Utilization 44.0%	ICU Level of Service A	
Analysis Period (min) 15		

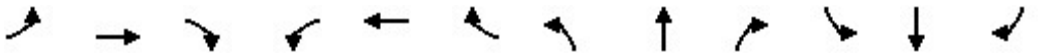
Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	11	1195	67	959	33	38	49	16
v/c Ratio	0.03	0.45	0.26	0.37	0.15	0.08	0.21	0.04
Control Delay	20.0	9.4	21.4	6.2	19.0	0.4	19.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	9.4	21.4	6.2	19.0	0.4	19.5	0.2
Queue Length 50th (ft)	1	63	17	30	8	0	12	0
Queue Length 95th (ft)	7	94	47	93	27	0	35	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	399	3370	278	3210	638	898	681	844
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.35	0.24	0.30	0.05	0.04	0.07	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1151	8	65	884	47	32	0	37	47	1	16
Future Volume (veh/h)	11	1151	8	65	884	47	32	0	37	47	1	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	11	1187	8	67	911	48	33	0	38	48	1	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	2479	17	110	2108	111	360	257	218	401	6	218
Arrive On Green	0.01	0.39	0.39	0.07	0.45	0.45	0.15	0.00	0.15	0.15	0.15	0.15
Sat Flow, veh/h	2910	6293	42	1594	4705	247	1318	1772	1502	1337	43	1502
Grp Volume(v), veh/h	11	862	333	67	624	335	33	0	38	49	0	16
Grp Sat Flow(s),veh/h/ln	1455	1524	1764	1594	1612	1727	1318	1772	1502	1379	0	1502
Q Serve(g_s), s	0.1	4.8	4.9	1.4	4.6	4.6	0.8	0.0	0.8	1.0	0.0	0.3
Cycle Q Clear(g_c), s	0.1	4.8	4.9	1.4	4.6	4.6	1.9	0.0	0.8	1.1	0.0	0.3
Prop In Lane	1.00		0.02	1.00		0.14	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	42	1801	695	110	1445	774	360	257	218	407	0	218
V/C Ratio(X)	0.26	0.48	0.48	0.61	0.43	0.43	0.09	0.00	0.17	0.12	0.00	0.07
Avail Cap(c_a), veh/h	431	2722	1051	301	2052	1099	915	1004	851	987	0	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	16.8	7.8	7.8	15.6	6.5	6.5	13.9	0.0	12.9	13.0	0.0	12.7
Incr Delay (d2), s/veh	3.2	0.2	0.5	5.4	0.2	0.4	0.1	0.0	0.4	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.1	1.3	0.6	1.0	1.1	0.2	0.0	0.2	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.0	8.0	8.3	21.0	6.7	6.9	14.0	0.0	13.3	13.2	0.0	12.9
LnGrp LOS	B	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1206			1026			71			65	
Approach Delay, s/veh		8.2			7.7			13.6			13.1	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	6.9	18.1		9.5	5.0	19.9				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		3.9	3.4	6.9		3.1	2.1	6.6				
Green Ext Time (p_c), s		0.1	0.0	6.7		0.2	0.0	5.7				

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	4774	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4774	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1160	75	0	1017	0	45
Future Volume (vph)	1160	75	0	1017	0	45
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1221	79	0	1071	0	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1300	0	0	1071	0	47

Intersection Summary

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1160	75	0	1017	0	45
Future Vol, veh/h	1160	75	0	1017	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1221	79	0	1071	0	47

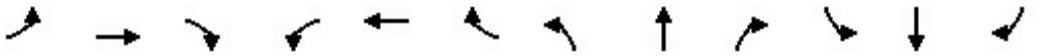
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	650
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	353
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	353
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	353	-	-	-
HCM Lane V/C Ratio	0.134	-	-	-
HCM Control Delay (s)	16.8	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.5	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5931	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			255			293			95		36	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



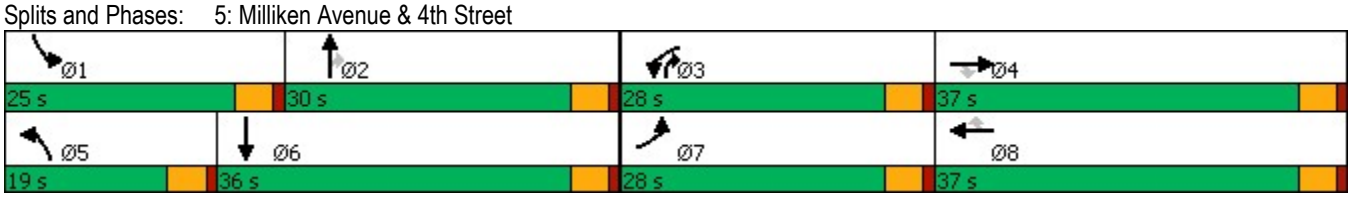
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	274	977	283	542	722	278	207	882	379	390	855	152
Future Volume (vph)	274	977	283	542	722	278	207	882	379	390	855	152
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	288	1028	298	571	760	293	218	928	399	411	900	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	288	1028	298	571	760	293	218	928	399	411	1060	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	274	977	283	542	722	278	207	882	379	390	855
Future Volume (vph)	274	977	283	542	722	278	207	882	379	390	855
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	16.9	31.1	31.1	23.6	37.8	37.8	13.0	23.9	52.0	19.4	30.3
Actuated g/C Ratio	0.15	0.27	0.27	0.20	0.33	0.33	0.11	0.21	0.45	0.17	0.26
v/c Ratio	0.69	0.80	0.51	0.97	0.48	0.43	0.67	0.74	0.55	0.85	0.67
Control Delay	56.1	45.2	10.3	77.7	33.6	5.8	61.1	47.6	21.2	64.8	39.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.1	45.2	10.3	77.7	33.6	5.8	61.1	47.6	21.2	64.8	39.8
LOS	E	D	B	E	C	A	E	D	C	E	D
Approach Delay		40.7			44.1			42.7			46.8
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 43.5	Intersection LOS: D
Intersection Capacity Utilization 80.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

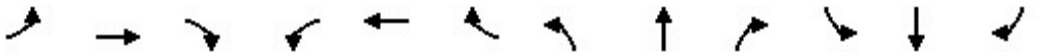


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	288	1028	298	571	760	293	218	928	399	411	1060
v/c Ratio	0.69	0.80	0.51	0.97	0.48	0.43	0.67	0.74	0.55	0.85	0.67
Control Delay	56.1	45.2	10.3	77.7	33.6	5.8	61.1	47.6	21.2	64.8	39.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.1	45.2	10.3	77.7	33.6	5.8	61.1	47.6	21.2	64.8	39.8
Queue Length 50th (ft)	110	271	25	~232	172	0	84	195	169	160	206
Queue Length 95th (ft)	151	326	105	#352	227	66	126	235	268	#239	247
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	588	1354	605	588	1570	686	362	1339	724	512	1646
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.76	0.49	0.97	0.48	0.43	0.60	0.69	0.55	0.80	0.64

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

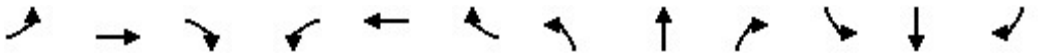
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	274	977	283	542	722	278	207	882	379	390	855	152
Future Volume (veh/h)	274	977	283	542	722	278	207	882	379	390	855	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	288	1028	298	571	760	293	218	928	399	411	900	160
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	350	1245	386	595	1652	513	271	1353	641	464	1516	265
Arrive On Green	0.12	0.26	0.26	0.20	0.34	0.34	0.09	0.22	0.22	0.16	0.29	0.29
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5259	919
Grp Volume(v), veh/h	288	1028	298	571	760	293	218	928	399	411	780	280
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1606
Q Serve(g_s), s	11.1	23.0	21.1	22.3	14.1	18.3	8.4	16.1	23.8	15.9	16.8	17.2
Cycle Q Clear(g_c), s	11.1	23.0	21.1	22.3	14.1	18.3	8.4	16.1	23.8	15.9	16.8	17.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.57
Lane Grp Cap(c), veh/h	350	1245	386	595	1652	513	271	1353	641	464	1318	463
V/C Ratio(X)	0.82	0.83	0.77	0.96	0.46	0.57	0.81	0.69	0.62	0.89	0.59	0.60
Avail Cap(c_a), veh/h	595	1369	425	595	1652	513	367	1353	641	519	1318	463
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.3	40.2	39.5	45.2	29.5	30.9	51.1	41.0	25.7	47.3	35.1	35.2
Incr Delay (d2), s/veh	4.8	4.0	7.8	26.9	0.2	1.5	9.0	1.5	1.9	15.6	0.7	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	9.5	8.6	10.2	5.5	6.8	3.4	6.1	8.7	6.7	6.3	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.2	44.2	47.3	72.2	29.7	32.5	60.1	42.5	27.6	62.8	35.8	37.4
LnGrp LOS	D	D	D	E	C	C	E	D	C	E	D	D
Approach Vol, veh/h		1614			1624			1545			1471	
Approach Delay, s/veh		46.5			45.1			41.1			43.7	
Approach LOS		D			D			D			D	

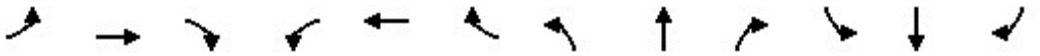
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.8	30.0	28.0	34.1	15.2	37.6	18.3	43.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	17.9	25.8	24.3	25.0	10.4	19.2	13.1	20.3
Green Ext Time (p_c), s	0.4	0.0	0.0	4.5	0.3	5.7	0.7	5.0

Intersection Summary	
HCM 6th Ctrl Delay	44.2
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.945	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3035	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3035	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			163			270			372		91	402
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



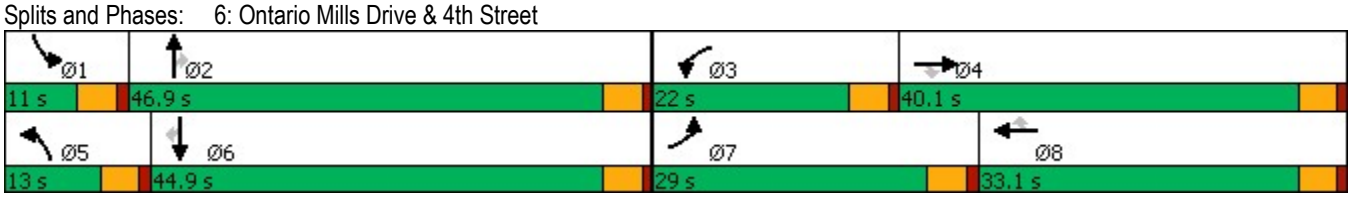
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	730	1128	156	410	905	420	182	318	488	68	632	812
Future Volume (vph)	730	1128	156	410	905	420	182	318	488	68	632	812
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	760	1175	163	427	943	438	190	331	508	71	658	846
Shared Lane Traffic (%)												45%
Lane Group Flow (vph)	760	1175	163	427	943	438	190	331	508	71	1039	465

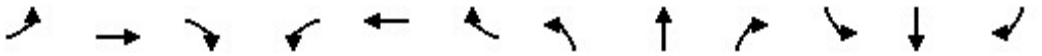
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	730	1128	156	410	905	420	182	318	488	68	632	812
Future Volume (vph)	730	1128	156	410	905	420	182	318	488	68	632	812
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	35.3	35.3	17.5	28.3	28.3	8.5	42.4	42.4	6.5	40.4	40.4
Actuated g/C Ratio	0.20	0.29	0.29	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
v/c Ratio	1.29	0.83	0.29	1.01	0.83	0.78	1.70	0.28	0.66	0.84	0.96	0.64
Control Delay	180.0	45.3	6.2	97.7	50.6	26.8	381.1	28.6	13.0	115.9	54.8	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	180.0	45.3	6.2	97.7	50.6	26.8	381.1	28.6	13.0	115.9	54.8	9.8
LOS	F	D	A	F	D	C	F	C	B	F	D	A
Approach Delay		91.0			56.0			86.0			44.3	
Approach LOS		F			E			F			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.7	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.70	
Intersection Signal Delay: 69.2	Intersection LOS: E
Intersection Capacity Utilization 97.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



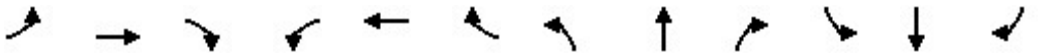


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	760	1175	163	427	943	438	190	331	508	71	1039	465
v/c Ratio	1.29	0.83	0.29	1.01	0.83	0.78	1.70	0.28	0.66	0.84	0.96	0.64
Control Delay	180.0	45.3	6.2	97.7	50.6	26.8	381.1	28.6	13.0	115.9	54.8	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	180.0	45.3	6.2	97.7	50.6	26.8	381.1	28.6	13.0	115.9	54.8	9.8
Queue Length 50th (ft)	~386	310	0	~175	254	125	~216	96	79	56	401	37
Queue Length 95th (ft)	#508	368	50	#283	309	#263	#366	134	206	#144	#553	157
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	591	1432	560	422	1151	564	112	1187	771	85	1084	727
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.29	0.82	0.29	1.01	0.82	0.78	1.70	0.28	0.66	0.84	0.96	0.64

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



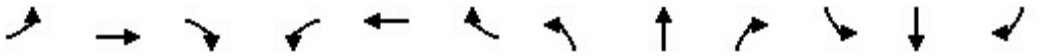
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	730	1128	156	410	905	420	182	318	488	68	632	812
Future Volume (veh/h)	730	1128	156	410	905	420	182	318	488	68	632	812
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	760	1175	162	427	943	438	190	331	508	71	658	846
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	760	1175	162	427	943	438	190	331	508	71	658	846
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	24.5	27.1	10.2	17.5	22.1	28.6	8.5	8.5	39.7	5.3	40.4	31.2
Cycle Q Clear(g_c), s	24.5	27.1	10.2	17.5	22.1	28.6	8.5	8.5	39.7	5.3	40.4	31.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
V/C Ratio(X)	1.28	0.82	0.36	1.01	0.82	1.22	1.68	0.28	0.96	0.82	1.10	0.84
Avail Cap(c_a), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	39.2	33.3	51.3	43.2	45.7	55.8	27.8	37.9	56.2	39.8	36.8
Incr Delay (d2), s/veh	138.2	3.9	0.5	45.2	4.7	123.2	342.6	0.1	28.6	44.7	68.3	6.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.2	11.1	3.8	9.0	9.3	22.8	14.2	3.4	18.5	3.2	28.6	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	186.0	43.1	33.8	96.5	48.0	168.9	398.3	28.0	66.5	100.9	108.1	43.0
LnGrp LOS	F	D	C	F	D	F	F	C	E	F	F	D
Approach Vol, veh/h		2097			1808			1029			1575	
Approach Delay, s/veh		94.2			88.7			115.4			72.8	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	46.9	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	7.3	41.7	19.5	29.1	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	0.3	0.0	4.3	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	90.8
HCM 6th LOS	F

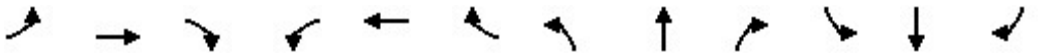
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.982			0.939				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (prot)	2891	4818	1500	1583	4731	0	1583	3148	0	1504	1670	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.996	
Satd. Flow (perm)	2891	4818	1500	1583	4731	0	1583	3148	0	1504	1670	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			99		18			50				426
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



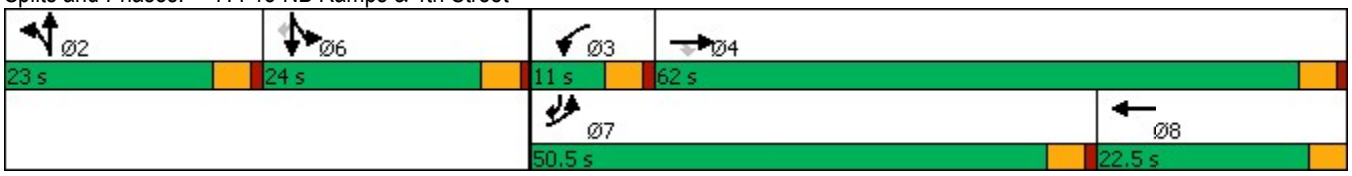
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1050	502	93	32	533	73	95	68	47	71	76	1134
Future Volume (vph)	1050	502	93	32	533	73	95	68	47	71	76	1134
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1117	534	99	34	567	78	101	72	50	76	81	1206
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	1117	534	99	34	645	0	101	122	0	68	89	1206

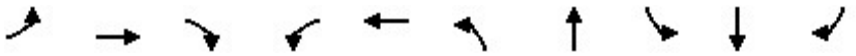
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1050	502	93	32	533	95	68	71	76	1134
Future Volume (vph)	1050	502	93	32	533	95	68	71	76	1134
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	46.3	61.4	61.4	6.3	17.9	12.0	12.0	10.9	10.9	61.7
Actuated g/C Ratio	0.44	0.59	0.59	0.06	0.17	0.12	0.12	0.10	0.10	0.59
v/c Ratio	0.87	0.19	0.11	0.35	0.78	0.55	0.30	0.43	0.51	0.69
Control Delay	36.5	11.9	3.3	60.7	48.3	56.4	28.0	53.7	55.7	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	11.9	3.3	60.7	48.3	56.4	28.0	53.7	55.7	11.8
LOS	D	B	A	E	D	E	C	D	E	B
Approach Delay		27.1			48.9		40.9		16.8	
Approach LOS		C			D		D		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104.2	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 28.1	Intersection LOS: C
Intersection Capacity Utilization 71.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1117	534	99	34	645	101	122	68	89	1206
v/c Ratio	0.87	0.19	0.11	0.35	0.78	0.55	0.30	0.43	0.51	0.69
Control Delay	36.5	11.9	3.3	60.7	48.3	56.4	28.0	53.7	55.7	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	11.9	3.3	60.7	48.3	56.4	28.0	53.7	55.7	11.8
Queue Length 50th (ft)	344	63	0	22	147	65	23	46	60	194
Queue Length 95th (ft)	#564	103	27	60	213	125	53	97	120	315
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1284	2840	924	99	882	283	603	283	314	1737
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.19	0.11	0.34	0.73	0.36	0.20	0.24	0.28	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1050	502	93	32	533	73	95	68	47	71	76	1134
Future Volume (veh/h)	1050	502	93	32	533	73	95	68	47	71	76	1134
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1117	534	99	34	567	78	101	72	50	76	81	1206
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1183	2593	805	47	686	93	137	170	108	288	321	1764
Arrive On Green	0.41	0.54	0.54	0.03	0.16	0.16	0.09	0.09	0.09	0.18	0.18	0.18
Sat Flow, veh/h	2910	4837	1502	1594	4307	584	1594	1973	1256	1594	1772	3003
Grp Volume(v), veh/h	1117	534	99	34	423	222	101	60	62	76	81	1206
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1667	1594	1683	1546	1594	1772	1502
Q Serve(g_s), s	39.8	6.2	3.5	2.3	13.7	14.0	6.7	3.7	4.1	4.4	4.2	19.5
Cycle Q Clear(g_c), s	39.8	6.2	3.5	2.3	13.7	14.0	6.7	3.7	4.1	4.4	4.2	19.5
Prop In Lane	1.00		1.00	1.00		0.35	1.00		0.81	1.00		1.00
Lane Grp Cap(c), veh/h	1183	2593	805	47	514	266	137	145	133	288	321	1764
V/C Ratio(X)	0.94	0.21	0.12	0.72	0.82	0.84	0.73	0.42	0.46	0.26	0.25	0.68
Avail Cap(c_a), veh/h	1243	2593	805	96	569	294	274	289	265	288	321	1764
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	13.0	12.4	51.8	43.8	43.9	48.0	46.7	46.8	37.9	37.9	15.3
Incr Delay (d2), s/veh	14.0	0.0	0.1	18.5	8.7	17.5	7.4	1.9	2.5	0.5	0.4	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.8	2.2	1.2	1.2	6.0	7.0	2.9	1.6	1.7	1.8	1.9	9.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.8	13.1	12.5	70.3	52.5	61.4	55.4	48.6	49.3	38.4	38.3	16.4
LnGrp LOS	D	B	B	E	D	E	E	D	D	D	D	B
Approach Vol, veh/h		1750			679			223			1363	
Approach Delay, s/veh		33.3			56.3			51.9			19.0	
Approach LOS		C			E			D			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.8	7.7	62.3		24.0	48.3	21.7				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.5	6.5	57.5		19.5	46.0	* 19				
Max Q Clear Time (g_c+I1), s		8.7	4.3	8.2		21.5	41.8	16.0				
Green Ext Time (p_c), s		0.6	0.0	4.6		0.0	1.9	1.2				

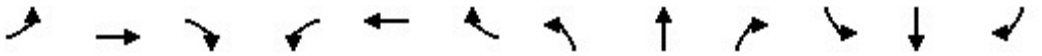
Intersection Summary		
HCM 6th Ctrl Delay		33.3
HCM 6th LOS		C

Notes

User approved volume balancing among the lanes for turning movement.

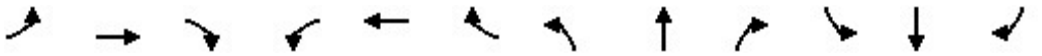
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50				236			245			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



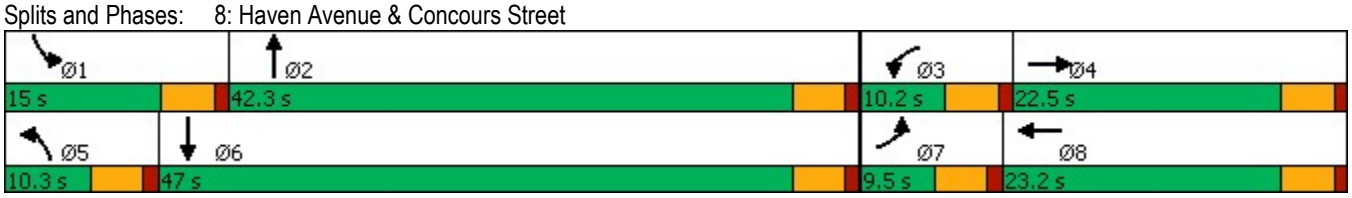
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	12	25	47	126	54	60	45	1600	230	43	1517	31
Future Volume (vph)	12	25	47	126	54	60	45	1600	230	43	1517	31
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	27	50	134	57	64	48	1702	245	46	1614	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	77	0	134	57	64	48	1702	245	46	1614	33

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	12	25	126	54	60	45	1600	230	43	1517	31
Future Volume (vph)	12	25	126	54	60	45	1600	230	43	1517	31
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.4	6.7	6.2	12.8	64.3	6.2	39.1	64.3	6.9	39.9	64.3
Actuated g/C Ratio	0.08	0.10	0.10	0.20	1.00	0.10	0.61	1.00	0.11	0.62	1.00
v/c Ratio	0.05	0.21	0.36	0.09	0.04	0.17	0.46	0.16	0.15	0.43	0.02
Control Delay	34.8	17.7	35.6	26.7	0.1	34.5	11.1	0.2	32.6	10.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	17.7	35.6	26.7	0.1	34.5	11.1	0.2	32.6	10.1	0.0
LOS	C	B	D	C	A	C	B	A	C	B	A
Approach Delay		20.2		24.7			10.3			10.5	
Approach LOS		C		C			B			B	

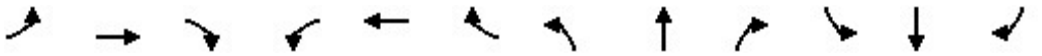
Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 64.3	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 11.5	Intersection LOS: B
Intersection Capacity Utilization 41.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	77	134	57	64	48	1702	245	46	1614	33
v/c Ratio	0.05	0.21	0.36	0.09	0.04	0.17	0.46	0.16	0.15	0.43	0.02
Control Delay	34.8	17.7	35.6	26.7	0.1	34.5	11.1	0.2	32.6	10.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	17.7	35.6	26.7	0.1	34.5	11.1	0.2	32.6	10.1	0.0
Queue Length 50th (ft)	3	6	21	11	0	10	145	0	10	131	0
Queue Length 95th (ft)	11	26	42	31	0	28	195	0	26	169	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	242	949	376	1052	1500	281	3888	1500	509	4218	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.08	0.36	0.05	0.04	0.17	0.44	0.16	0.09	0.38	0.02

Intersection Summary



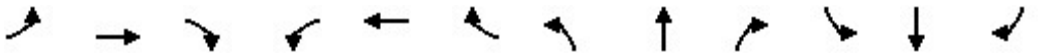
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	25	47	126	54	60	45	1600	230	43	1517	31
Future Volume (veh/h)	12	25	47	126	54	60	45	1600	230	43	1517	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	13	27	50	134	57	0	48	1702	0	46	1614	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	47	132	118	304	468		135	2969		132	2961	
Arrive On Green	0.02	0.08	0.08	0.08	0.14	0.00	0.05	0.49	0.00	0.05	0.49	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	13	27	50	134	57	0	48	1702	0	46	1614	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.3	0.9	1.8	1.9	0.9	0.0	0.9	11.4	0.0	0.9	10.7	0.0
Cycle Q Clear(g_c), s	0.3	0.9	1.8	1.9	0.9	0.0	0.9	11.4	0.0	0.9	10.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	47	132	118	304	468		135	2969		132	2961	
V/C Ratio(X)	0.27	0.20	0.42	0.44	0.12		0.35	0.57		0.35	0.55	
Avail Cap(c_a), veh/h	253	526	469	392	1093		293	4000		531	4498	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.0	24.9	25.3	25.4	21.7	0.0	26.6	10.5	0.0	26.7	10.4	0.0
Incr Delay (d2), s/veh	3.1	0.8	2.4	1.0	0.1	0.0	1.6	0.2	0.0	1.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.7	0.6	0.3	0.0	0.3	3.2	0.0	0.3	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.1	25.6	27.7	26.4	21.8	0.0	28.2	10.7	0.0	28.3	10.5	0.0
LnGrp LOS	C	C	C	C	C		C	B		C	B	
Approach Vol, veh/h		90			191	A		1750	A		1660	A
Approach Delay, s/veh		27.6			25.1			11.2			11.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	32.6	8.9	9.0	7.2	32.5	5.4	12.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	2.9	13.4	3.9	3.8	2.9	12.7	2.3	2.9
Green Ext Time (p_c), s	0.0	14.5	0.1	0.3	0.0	15.3	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B

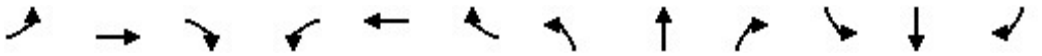
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.995									0.937	
Flt Protected	0.950	0.954					0.950					
Satd. Flow (prot)	1593	1591	0	0	1765	0	1676	4818	0	1765	4514	0
Flt Permitted	0.950	0.954					0.950					
Satd. Flow (perm)	1593	1591	0	0	1765	0	1676	4818	0	1765	4514	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143									184	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



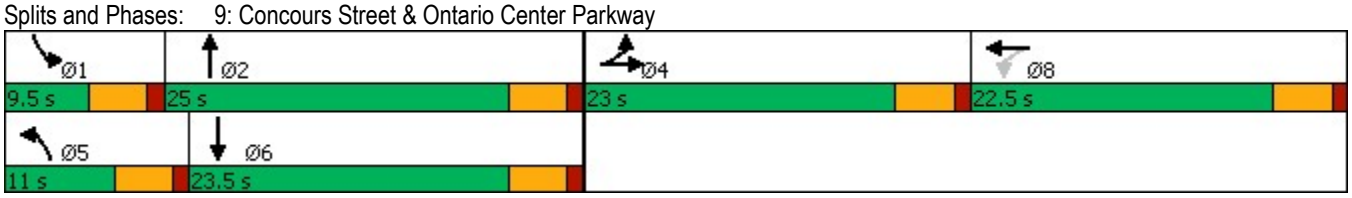
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	157	0	3	0	0	0	35	303	1	0	226	166
Future Volume (vph)	157	0	3	0	0	0	35	303	1	0	226	166
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	174	0	3	0	0	0	39	337	1	0	251	184
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	89	88	0	0	0	0	39	338	0	0	435	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	157	0	35	303	226		
Future Volume (vph)	157	0	35	303	226		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	7.6	7.6	6.3	16.2	14.6		
Actuated g/C Ratio	0.26	0.26	0.21	0.55	0.49		
v/c Ratio	0.22	0.17	0.11	0.13	0.19		
Control Delay	11.1	2.2	12.1	5.0	5.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	11.1	2.2	12.1	5.0	5.0		
LOS	B	A	B	A	A		
Approach Delay		6.7		5.8	5.0		
Approach LOS		A		A	A		

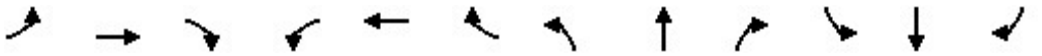
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 29.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.22	
Intersection Signal Delay: 5.6	Intersection LOS: A
Intersection Capacity Utilization 28.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	89	88	39	338	435
v/c Ratio	0.22	0.17	0.11	0.13	0.19
Control Delay	11.1	2.2	12.1	5.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	2.2	12.1	5.0	5.0
Queue Length 50th (ft)	8	0	4	9	6
Queue Length 95th (ft)	43	12	25	20	34
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	1025	1074	378	3639	3261
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.08	0.10	0.09	0.13

Intersection Summary



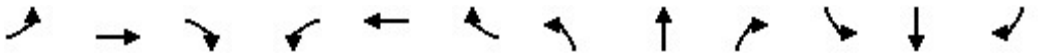
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	157	0	3	0	0	0	35	303	1	0	226	166
Future Volume (veh/h)	157	0	3	0	0	0	35	303	1	0	226	166
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	177	0	0	0	0	0	39	337	1	0	251	184
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	476	250	0	0	7	0	80	2500	7	7	890	415
Arrive On Green	0.14	0.00	0.00	0.00	0.00	0.00	0.05	0.50	0.50	0.00	0.28	0.28
Sat Flow, veh/h	3375	1772	0	0	1772	0	1688	4979	15	1688	3225	1502
Grp Volume(v), veh/h	177	0	0	0	0	0	39	218	120	0	251	184
Grp Sat Flow(s),veh/h/ln	1688	1772	0	0	1772	0	1688	1612	1769	1688	1612	1502
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.9	0.0	1.5	2.5
Cycle Q Clear(g_c), s	1.2	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.9	0.0	1.5	2.5
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	476	250	0	0	7	0	80	1619	888	7	890	415
V/C Ratio(X)	0.37	0.00	0.00	0.00	0.00	0.00	0.49	0.13	0.13	0.00	0.28	0.44
Avail Cap(c_a), veh/h	2477	1301	0	0	1265	0	435	2623	1439	335	2431	1132
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.8	0.0	0.0	0.0	0.0	0.0	11.7	3.4	3.4	0.0	7.2	7.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.1	0.0	0.2	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.3	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.3	0.0	0.0	0.0	0.0	0.0	16.2	3.4	3.4	0.0	7.3	8.3
LnGrp LOS	B	A	A	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		177			0			377			435	
Approach Delay, s/veh		10.3			0.0			4.7			7.7	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	17.2		8.1	5.7	11.5		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	2.9		3.2	2.6	4.5		0.0				
Green Ext Time (p_c), s	0.0	1.9		0.5	0.0	2.4		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.0
HCM 6th LOS	A

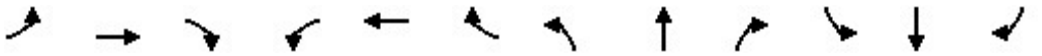
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			304			182			213			284
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



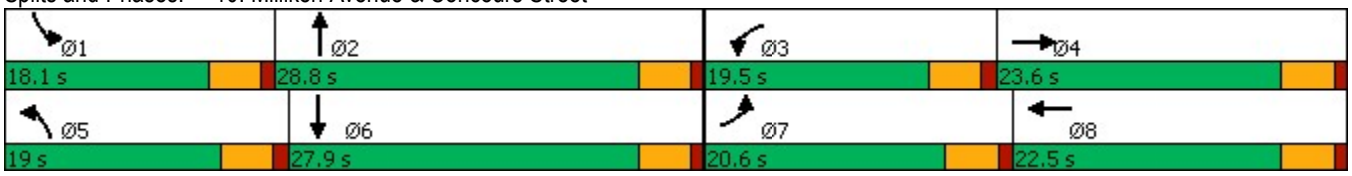
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	346	156	283	261	102	161	328	1000	243	281	1004	280
Future Volume (vph)	346	156	283	261	102	161	328	1000	243	281	1004	280
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	372	168	304	281	110	173	353	1075	261	302	1080	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	372	168	304	281	110	173	353	1075	261	302	1080	301

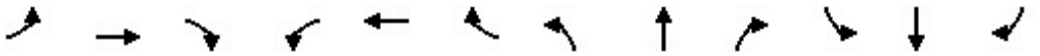
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	346	156	283	261	102	161	328	1000	243	281	1004	280
Future Volume (vph)	346	156	283	261	102	161	328	1000	243	281	1004	280
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	16.5	9.7	74.7	12.3	8.1	74.7	13.3	22.3	74.7	12.2	21.2	74.7
Actuated g/C Ratio	0.22	0.13	1.00	0.16	0.11	1.00	0.18	0.30	1.00	0.16	0.28	1.00
v/c Ratio	0.58	0.39	0.20	0.59	0.30	0.12	0.69	0.59	0.17	0.64	0.63	0.20
Control Delay	32.6	34.0	0.3	35.5	34.9	0.2	37.7	24.5	0.3	37.3	25.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	34.0	0.3	35.5	34.9	0.2	37.7	24.5	0.3	37.3	25.7	0.3
LOS	C	C	A	D	C	A	D	C	A	D	C	A
Approach Delay		21.3			24.6			23.5			23.2	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 57.4%	ICU Level of Service B
Analysis Period (min) 15	

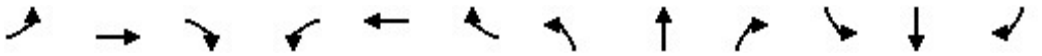
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	372	168	304	281	110	173	353	1075	261	302	1080	301
v/c Ratio	0.58	0.39	0.20	0.59	0.30	0.12	0.69	0.59	0.17	0.64	0.63	0.20
Control Delay	32.6	34.0	0.3	35.5	34.9	0.2	37.7	24.5	0.3	37.3	25.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	34.0	0.3	35.5	34.9	0.2	37.7	24.5	0.3	37.3	25.7	0.3
Queue Length 50th (ft)	88	40	0	67	26	0	84	129	0	72	132	0
Queue Length 95th (ft)	139	72	0	108	52	0	135	173	0	118	177	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	666	869	1500	589	820	1500	569	2004	1500	534	1929	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.19	0.20	0.48	0.13	0.12	0.62	0.54	0.17	0.57	0.56	0.20

Intersection Summary



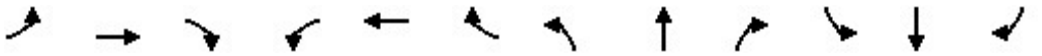
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	346	156	283	261	102	161	328	1000	243	281	1004	280
Future Volume (veh/h)	346	156	283	261	102	161	328	1000	243	281	1004	280
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	372	168	0	281	110	0	353	1075	0	302	1080	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	489	396		391	282		465	1862		410	1747	
Arrive On Green	0.17	0.12	0.00	0.13	0.08	0.00	0.16	0.31	0.00	0.14	0.29	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	372	168	0	281	110	0	353	1075	0	302	1080	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	7.3	2.8	0.0	5.5	1.8	0.0	6.9	8.9	0.0	5.9	9.2	0.0
Cycle Q Clear(g_c), s	7.3	2.8	0.0	5.5	1.8	0.0	6.9	8.9	0.0	5.9	9.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	489	396		391	282		465	1862		410	1747	
V/C Ratio(X)	0.76	0.42		0.72	0.39		0.76	0.58		0.74	0.62	
Avail Cap(c_a), veh/h	785	1078		732	1016		707	2482		663	2391	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.7	24.5	0.0	24.7	25.9	0.0	24.0	17.5	0.0	24.6	18.4	0.0
Incr Delay (d2), s/veh	2.5	0.7	0.0	2.5	0.9	0.0	2.6	0.3	0.0	2.6	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	1.1	0.0	1.9	0.7	0.0	2.4	2.9	0.0	2.1	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.1	25.2	0.0	27.2	26.8	0.0	26.6	17.8	0.0	27.2	18.8	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		540	A		391	A		1428	A		1382	A
Approach Delay, s/veh		25.8			27.1			19.9			20.6	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	22.7	12.5	11.5	14.0	21.6	14.5	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	7.9	10.9	7.5	4.8	8.9	11.2	9.3	3.8
Green Ext Time (p_c), s	0.5	6.3	0.6	0.8	0.6	5.9	0.8	0.4

Intersection Summary	
HCM 6th Ctrl Delay	21.8
HCM 6th LOS	C

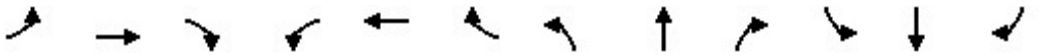
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			463			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



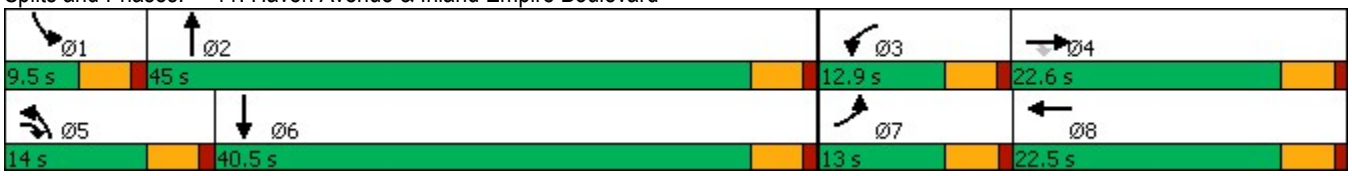
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	72	126	262	189	124	71	170	1728	570	55	1521	47
Future Volume (vph)	72	126	262	189	124	71	170	1728	570	55	1521	47
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	74	130	270	195	128	73	175	1781	588	57	1568	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	130	270	195	128	73	175	1781	588	57	1568	48

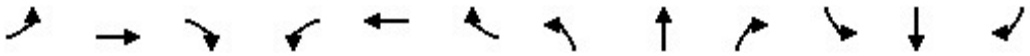
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	126	262	189	124	71	170	1728	570	55	1521	47
Future Volume (vph)	72	126	262	189	124	71	170	1728	570	55	1521	47
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	7.3	8.5	19.0	8.2	9.2	73.8	8.9	41.1	73.8	5.2	32.7	73.8
Actuated g/C Ratio	0.10	0.12	0.26	0.11	0.12	1.00	0.12	0.56	1.00	0.07	0.44	1.00
v/c Ratio	0.26	0.34	0.61	0.45	0.31	0.05	0.50	0.53	0.39	0.28	0.58	0.03
Control Delay	36.3	35.2	24.1	36.9	34.3	0.1	38.4	12.7	0.8	40.2	17.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	35.2	24.1	36.9	34.3	0.1	38.4	12.7	0.8	40.2	17.1	0.0
LOS	D	D	C	D	C	A	D	B	A	D	B	A
Approach Delay		29.0			29.3			11.7			17.4	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 56.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	74	130	270	195	128	73	175	1781	588	57	1568	48
v/c Ratio	0.26	0.34	0.61	0.45	0.31	0.05	0.50	0.53	0.39	0.28	0.58	0.03
Control Delay	36.3	35.2	24.1	36.9	34.3	0.1	38.4	12.7	0.8	40.2	17.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	35.2	24.1	36.9	34.3	0.1	38.4	12.7	0.8	40.2	17.1	0.0
Queue Length 50th (ft)	18	32	83	33	31	0	43	172	0	14	163	0
Queue Length 95th (ft)	38	59	159	57	58	0	76	220	0	33	209	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	343	848	456	462	843	1500	384	3497	1500	201	3055	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.15	0.59	0.42	0.15	0.05	0.46	0.51	0.39	0.28	0.51	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	72	126	262	189	124	71	170	1728	570	55	1521	47
Future Volume (veh/h)	72	126	262	189	124	71	170	1728	570	55	1521	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	74	130	270	195	128	0	175	1781	0	57	1568	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	153	654	419	300	732		247	2700		135	2464	
Arrive On Green	0.05	0.19	0.19	0.08	0.22	0.00	0.09	0.44	0.00	0.05	0.40	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	74	130	270	195	128	0	175	1781	0	57	1568	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.8	2.4	11.8	3.6	2.3	0.0	4.4	17.2	0.0	1.4	15.4	0.0
Cycle Q Clear(g_c), s	1.8	2.4	11.8	3.6	2.3	0.0	4.4	17.2	0.0	1.4	15.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	153	654	419	300	732		247	2700		135	2464	
V/C Ratio(X)	0.48	0.20	0.64	0.65	0.17		0.71	0.66		0.42	0.64	
Avail Cap(c_a), veh/h	331	815	491	446	811		370	3302		195	2935	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.4	25.2	23.7	33.6	23.8	0.0	33.3	16.4	0.0	34.7	17.9	0.0
Incr Delay (d2), s/veh	2.4	0.1	2.2	2.4	0.1	0.0	3.7	0.4	0.0	2.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.0	4.2	1.2	0.9	0.0	1.6	5.5	0.0	0.5	5.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.8	25.4	25.9	36.0	23.9	0.0	37.0	16.7	0.0	36.8	18.2	0.0
LnGrp LOS	D	C	C	D	C		D	B		D	B	
Approach Vol, veh/h		474			323	A		1956	A		1625	A
Approach Delay, s/veh		27.5			31.2			18.6			18.9	
Approach LOS		C			C			B			B	

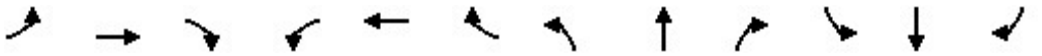
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.0	37.6	10.1	19.0	10.9	34.7	8.4	20.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	3.4	19.2	5.6	13.8	6.4	17.4	3.8	4.3
Green Ext Time (p_c), s	0.0	13.9	0.2	0.7	0.2	11.2	0.1	0.5

Intersection Summary	
HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

Notes

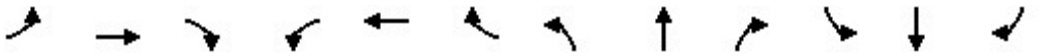
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			281			193			552			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



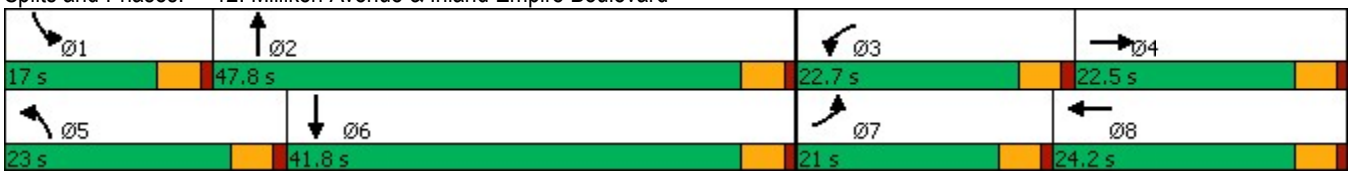
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	179	298	273	360	139	136	349	1198	794	143	1416	112
Future Volume (vph)	179	298	273	360	139	136	349	1198	794	143	1416	112
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	185	307	281	371	143	140	360	1235	819	147	1460	115
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	307	281	371	143	140	360	1235	819	147	1460	115

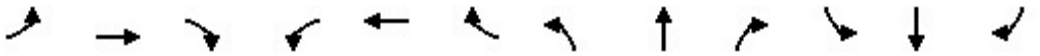
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	298	273	360	139	136	349	1198	794	143	1416	112
Future Volume (vph)	179	298	273	360	139	136	349	1198	794	143	1416	112
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	11.9	14.4	100.2	16.6	19.1	100.2	16.5	40.7	100.2	10.2	34.4	100.2
Actuated g/C Ratio	0.12	0.14	1.00	0.17	0.19	1.00	0.16	0.41	1.00	0.10	0.34	1.00
v/c Ratio	0.54	0.64	0.19	0.78	0.22	0.09	0.75	0.50	0.55	0.50	0.70	0.08
Control Delay	49.3	48.1	0.3	53.5	37.1	0.1	52.1	23.5	1.4	50.7	31.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	48.1	0.3	53.5	37.1	0.1	52.1	23.5	1.4	50.7	31.2	0.1
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		31.0			38.5			20.3			30.8	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 100.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 27.2	Intersection LOS: C
Intersection Capacity Utilization 69.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	185	307	281	371	143	140	360	1235	819	147	1460	115
v/c Ratio	0.54	0.64	0.19	0.78	0.22	0.09	0.75	0.50	0.55	0.50	0.70	0.08
Control Delay	49.3	48.1	0.3	53.5	37.1	0.1	52.1	23.5	1.4	50.7	31.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	48.1	0.3	53.5	37.1	0.1	52.1	23.5	1.4	50.7	31.2	0.1
Queue Length 50th (ft)	62	106	0	126	43	0	121	175	0	50	247	0
Queue Length 95th (ft)	98	153	0	#195	75	0	178	225	0	84	302	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	483	611	1500	533	691	1500	542	2689	1500	366	2295	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.50	0.19	0.70	0.21	0.09	0.66	0.46	0.55	0.40	0.64	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	179	298	273	360	139	136	349	1198	794	143	1416	112
Future Volume (veh/h)	179	298	273	360	139	136	349	1198	794	143	1416	112
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	185	307	0	371	143	0	360	1235	0	147	1460	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	259	424		453	648		443	2621		213	2140	
Arrive On Green	0.09	0.13	0.00	0.16	0.19	0.00	0.15	0.43	0.00	0.07	0.35	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	185	307	0	371	143	0	360	1235	0	147	1460	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	5.2	7.3	0.0	10.3	3.0	0.0	10.0	12.1	0.0	4.1	17.1	0.0
Cycle Q Clear(g_c), s	5.2	7.3	0.0	10.3	3.0	0.0	10.0	12.1	0.0	4.1	17.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	259	424		453	648		443	2621		213	2140	
V/C Ratio(X)	0.71	0.72		0.82	0.22		0.81	0.47		0.69	0.68	
Avail Cap(c_a), veh/h	574	724		633	793		643	3154		435	2717	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.1	35.2	0.0	34.2	28.5	0.0	34.3	17.1	0.0	37.8	23.2	0.0
Incr Delay (d2), s/veh	3.6	2.4	0.0	5.9	0.2	0.0	5.1	0.1	0.0	3.9	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	3.1	0.0	3.9	1.2	0.0	3.8	4.0	0.0	1.6	5.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	37.5	0.0	40.1	28.7	0.0	39.5	17.2	0.0	41.8	23.7	0.0
LnGrp LOS	D	D		D	C		D	B		D	C	
Approach Vol, veh/h		492	A		514	A		1595	A		1607	A
Approach Delay, s/veh		38.7			36.9			22.2			25.3	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.6	40.5	17.5	15.0	17.2	33.9	12.0	20.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	6.1	14.1	12.3	9.3	12.0	19.1	7.2	5.0
Green Ext Time (p_c), s	0.2	10.8	0.7	1.2	0.7	10.3	0.4	0.6

Intersection Summary	
HCM 6th Ctrl Delay	27.1
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.925	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	2919	1365	6071	0	0	6071
Flt Permitted	0.976					
Satd. Flow (perm)	2919	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	6	6				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

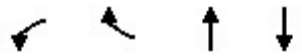
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	242	484	1945	0	0	1297
Future Volume (vph)	242	484	1945	0	0	1297
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	247	494	1985	0	0	1323
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	494	247	1985	0	0	1323

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	242	484	1945	1297
Future Volume (vph)	242	484	1945	1297
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	14.9	14.9	30.5	30.5
Actuated g/C Ratio	0.27	0.27	0.56	0.56
v/c Ratio	0.61	0.65	0.59	0.39
Control Delay	20.7	26.2	9.3	7.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.7	26.2	9.3	7.7
LOS	C	C	A	A
Approach Delay	22.5		9.3	7.7
Approach LOS	C		A	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 54.5	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	494	247	1985	1323
v/c Ratio	0.61	0.65	0.59	0.39
Control Delay	20.7	26.2	9.3	7.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.7	26.2	9.3	7.7
Queue Length 50th (ft)	72	76	111	63
Queue Length 95th (ft)	112	147	168	99
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1060	498	3551	3551
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.47	0.50	0.56	0.37

Intersection Summary

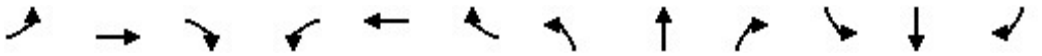
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	242	484	1945	0	0	1297
Future Volume (veh/h)	242	484	1945	0	0	1297
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	247	494	1985	0	0	1323
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	384	723	3448	0	0	3448
Arrive On Green	0.24	0.24	0.57	0.00	0.00	0.57
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	247	494	1985	0	0	1323
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	6.5	7.0	9.8	0.0	0.0	5.6
Cycle Q Clear(g_c), s	6.5	7.0	9.8	0.0	0.0	5.6
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	384	723	3448	0	0	3448
V/C Ratio(X)	0.64	0.68	0.58	0.00	0.00	0.38
Avail Cap(c_a), veh/h	668	1259	4129	0	0	4129
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	15.9	16.0	6.5	0.0	0.0	5.6
Incr Delay (d2), s/veh	1.8	1.2	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	2.2	2.0	0.0	0.0	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.7	17.2	6.7	0.0	0.0	5.7
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	741		1985			1323
Approach Delay, s/veh	17.4		6.7			5.7
Approach LOS	B		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	30.8			30.8	15.7
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s	11.8			7.6	9.0
Green Ext Time (p_c), s	14.6			10.8	2.2

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

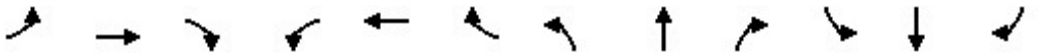
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			218			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



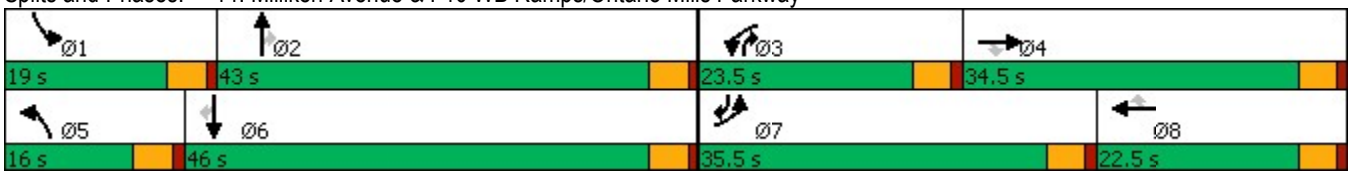
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	693	229	130	277	345	103	210	1366	420	305	1088	798
Future Volume (vph)	693	229	130	277	345	103	210	1366	420	305	1088	798
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	745	246	140	298	371	111	226	1469	452	328	1170	858
Shared Lane Traffic (%)												
Lane Group Flow (vph)	745	246	140	298	371	111	226	1469	452	328	1170	858

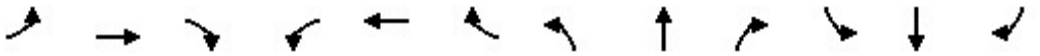
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	693	229	130	277	345	103	210	1366	420	305	1088	798
Future Volume (vph)	693	229	130	277	345	103	210	1366	420	305	1088	798
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	31.0	31.0	31.0	16.7	16.6	16.6	11.3	37.1	58.3	14.5	40.3	75.9
Actuated g/C Ratio	0.26	0.26	0.26	0.14	0.14	0.14	0.10	0.32	0.50	0.12	0.34	0.65
v/c Ratio	0.98	0.53	0.30	0.73	0.78	0.34	0.81	0.77	0.53	0.92	0.56	0.87
Control Delay	70.5	42.8	15.3	59.1	61.2	7.2	75.1	39.4	11.9	82.4	32.6	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	42.8	15.3	59.1	61.2	7.2	75.1	39.4	11.9	82.4	32.6	27.2
LOS	E	D	B	E	E	A	E	D	B	F	C	C
Approach Delay		57.6			52.7			37.4			37.6	
Approach LOS		E			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.3	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 42.9	Intersection LOS: D
Intersection Capacity Utilization 80.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

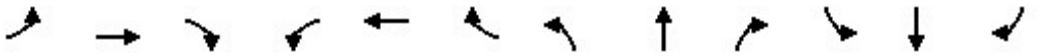




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	745	246	140	298	371	111	226	1469	452	328	1170	858
v/c Ratio	0.98	0.53	0.30	0.73	0.78	0.34	0.81	0.77	0.53	0.92	0.56	0.87
Control Delay	70.5	42.8	15.3	59.1	61.2	7.2	75.1	39.4	11.9	82.4	32.6	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.5	42.8	15.3	59.1	61.2	7.2	75.1	39.4	11.9	82.4	32.6	27.2
Queue Length 50th (ft)	297	166	27	113	146	0	90	295	109	131	212	477
Queue Length 95th (ft)	#430	253	82	161	201	34	#155	340	199	#222	249	#821
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	764	466	466	468	515	345	284	1995	880	357	2150	989
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.53	0.30	0.64	0.72	0.32	0.80	0.74	0.51	0.92	0.54	0.87

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	693	229	130	277	345	103	210	1366	420	305	1088	798
Future Volume (veh/h)	693	229	130	277	345	103	210	1366	420	305	1088	798
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	745	246	140	298	371	111	226	1469	452	328	1170	858
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	771	489	414	354	446	199	273	1979	670	361	2163	931
Arrive On Green	0.27	0.28	0.28	0.12	0.13	0.13	0.09	0.32	0.32	0.12	0.35	0.35
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	745	246	140	298	371	111	226	1469	452	328	1170	858
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	29.6	13.7	8.7	11.7	12.6	8.1	8.9	25.1	27.9	13.0	17.9	41.5
Cycle Q Clear(g_c), s	29.6	13.7	8.7	11.7	12.6	8.1	8.9	25.1	27.9	13.0	17.9	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	771	489	414	354	446	199	273	1979	670	361	2163	931
V/C Ratio(X)	0.97	0.50	0.34	0.84	0.83	0.56	0.83	0.74	0.67	0.91	0.54	0.92
Avail Cap(c_a), veh/h	771	489	414	473	518	231	286	2007	677	361	2163	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	35.6	33.8	50.3	49.5	47.5	52.1	35.1	25.7	50.6	30.1	19.7
Incr Delay (d2), s/veh	24.2	0.8	0.5	10.0	9.8	2.4	17.4	1.5	2.6	26.1	0.3	14.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.1	6.0	3.2	4.8	5.9	3.2	3.9	9.4	10.3	6.0	6.6	22.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.7	36.4	34.3	60.3	59.3	50.0	69.5	36.6	28.3	76.7	30.4	33.9
LnGrp LOS	E	D	C	E	E	D	E	D	C	E	C	C
Approach Vol, veh/h		1131			780			2147			2356	
Approach Delay, s/veh		56.1			58.4			38.3			38.1	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	42.5	18.7	36.8	15.5	46.0	35.5	20.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	15.0	29.9	13.7	15.7	10.9	43.5	31.6	14.6
Green Ext Time (p_c), s	0.0	6.6	0.5	1.6	0.0	0.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	43.8
HCM 6th LOS	D

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3066	1365	0	6071	6071	0
Flt Permitted	0.955					
Satd. Flow (perm)	3066	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	9	9				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

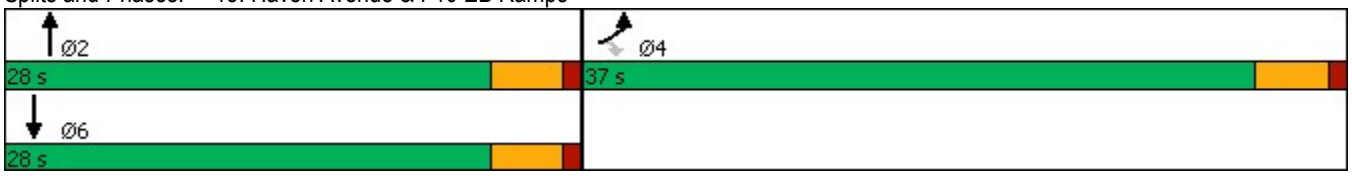
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1037	537	0	1485	1217	0
Future Volume (vph)	1037	537	0	1485	1217	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1069	554	0	1531	1255	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1124	499	0	1531	1255	0

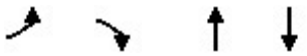
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1037	537	1485	1217
Future Volume (vph)	1037	537	1485	1217
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	27.8	27.8	22.7	22.7
Actuated g/C Ratio	0.47	0.47	0.38	0.38
v/c Ratio	0.78	0.78	0.66	0.54
Control Delay	17.8	23.2	17.6	16.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.8	23.2	17.6	16.1
LOS	B	C	B	B
Approach Delay	19.5		17.6	16.1
Approach LOS	B		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 59.6	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1124	499	1531	1255
v/c Ratio	0.78	0.78	0.66	0.54
Control Delay	17.8	23.2	17.6	16.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.8	23.2	17.6	16.1
Queue Length 50th (ft)	166	156	139	107
Queue Length 95th (ft)	237	#290	184	145
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1702	760	2431	2431
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.66	0.66	0.63	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1037	537	0	1485	1217	0
Future Volume (veh/h)	1037	537	0	1485	1217	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1081	541	0	1531	1255	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1452	684	0	2301	2301	0
Arrive On Green	0.46	0.46	0.00	0.38	0.38	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1081	541	0	1531	1255	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	15.1	16.5	0.0	11.2	8.7	0.0
Cycle Q Clear(g_c), s	15.1	16.5	0.0	11.2	8.7	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1452	684	0	2301	2301	0
V/C Ratio(X)	0.74	0.79	0.00	0.67	0.55	0.00
Avail Cap(c_a), veh/h	1923	906	0	2659	2659	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.1	12.5	0.0	13.9	13.1	0.0
Incr Delay (d2), s/veh	1.1	3.5	0.0	0.5	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	5.1	0.0	3.4	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.2	16.0	0.0	14.5	13.3	0.0
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	1622			1531	1255	
Approach Delay, s/veh	14.2			14.5	13.3	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		24.8		29.0		24.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		13.2		18.5		10.7
Green Ext Time (p_c), s		7.1		6.0		7.1

Intersection Summary		
HCM 6th Ctrl Delay	14.0	
HCM 6th LOS	B	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		11				127
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	887	222	158	1159	848	672
Future Volume (vph)	887	222	158	1159	848	672
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	914	229	163	1195	874	693
Shared Lane Traffic (%)						
Lane Group Flow (vph)	914	229	163	1195	874	693

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	887	222	158	1159	848	672
Future Volume (vph)	887	222	158	1159	848	672
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	27.6	39.6	7.4	28.3	16.3	48.6
Actuated g/C Ratio	0.42	0.61	0.11	0.43	0.25	0.75
v/c Ratio	0.75	0.25	0.50	0.45	0.57	0.60
Control Delay	20.3	6.7	35.8	14.3	23.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	6.7	35.8	14.3	23.7	5.3
LOS	C	A	D	B	C	A
Approach Delay	17.6			16.9	15.6	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 65.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 59.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	914	229	163	1195	874	693
v/c Ratio	0.75	0.25	0.50	0.45	0.57	0.60
Control Delay	20.3	6.7	35.8	14.3	23.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	6.7	35.8	14.3	23.7	5.3
Queue Length 50th (ft)	155	36	34	98	92	68
Queue Length 95th (ft)	230	71	67	141	132	126
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1571	923	341	3013	1865	1305
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.25	0.48	0.40	0.47	0.53

Intersection Summary

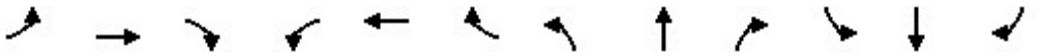
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	887	222	158	1159	848	672
Future Volume (veh/h)	887	222	158	1159	848	672
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	914	229	163	1195	874	693
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1116	701	242	2862	1907	1045
Arrive On Green	0.38	0.38	0.08	0.47	0.31	0.31
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	914	229	163	1195	874	693
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	17.3	5.9	3.3	7.9	7.0	15.9
Cycle Q Clear(g_c), s	17.3	5.9	3.3	7.9	7.0	15.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1116	701	242	2862	1907	1045
V/C Ratio(X)	0.82	0.33	0.67	0.42	0.46	0.66
Avail Cap(c_a), veh/h	1641	971	357	3138	1942	1054
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.0	10.3	27.2	10.7	16.9	5.2
Incr Delay (d2), s/veh	2.2	0.3	3.2	0.1	0.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	6.0	1.2	2.3	2.3	10.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.1	10.5	30.5	10.8	17.0	6.8
LnGrp LOS	B	B	C	B	B	A
Approach Vol, veh/h	1143			1358	1567	
Approach Delay, s/veh	17.4			13.2	12.5	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		33.2		28.0	9.6	23.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		9.9		19.3	5.3	17.9
Green Ext Time (p_c), s		9.1		4.2	0.1	1.2

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

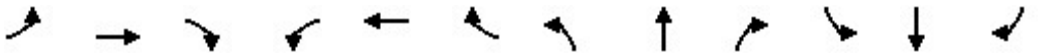
Appendix F

Intersection LOS Analysis Sheets
Opening Year With Related Projects Without Project Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.953				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4591	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4591	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90				149			238		8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



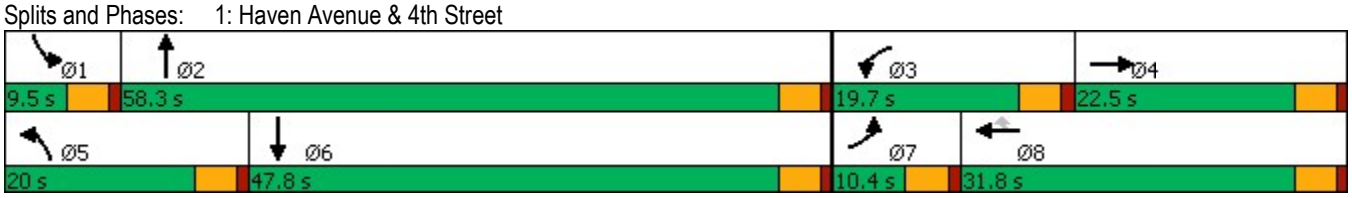
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	93	308	140	285	545	180	244	1666	508	104	1363	55
Future Volume (vph)	93	308	140	285	545	180	244	1666	508	104	1363	55
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	102	338	154	313	599	198	268	1831	558	114	1498	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	102	492	0	313	599	198	268	1831	558	114	1558	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	93	308	285	545	180	244	1666	508	104	1363
Future Volume (vph)	93	308	285	545	180	244	1666	508	104	1363
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	16.0	14.5	24.6	24.6	13.9	53.8	107.4	5.0	44.9
Actuated g/C Ratio	0.05	0.15	0.14	0.23	0.23	0.13	0.50	1.00	0.05	0.42
v/c Ratio	0.64	0.65	0.80	0.78	0.43	0.71	0.76	0.37	0.85	0.62
Control Delay	69.5	39.3	61.6	46.6	13.2	56.3	24.5	0.7	97.9	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	39.3	61.6	46.6	13.2	56.3	24.5	0.7	97.9	26.3
LOS	E	D	E	D	B	E	C	A	F	C
Approach Delay		44.5		44.9			22.7			31.2
Approach LOS		D		D			C			C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 107.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 73.2%	ICU Level of Service D
Analysis Period (min) 15	

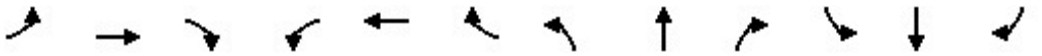
Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	102	492	313	599	198	268	1831	558	114	1558
v/c Ratio	0.64	0.65	0.80	0.78	0.43	0.71	0.76	0.37	0.85	0.62
Control Delay	69.5	39.3	61.6	46.6	13.2	56.3	24.5	0.7	97.9	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	39.3	61.6	46.6	13.2	56.3	24.5	0.7	97.9	26.3
Queue Length 50th (ft)	37	97	111	204	27	93	375	0	41	253
Queue Length 95th (ft)	#75	135	#175	268	90	138	440	0	#96	297
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	159	844	409	853	492	417	2415	1500	134	2527
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.58	0.77	0.70	0.40	0.64	0.76	0.37	0.85	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



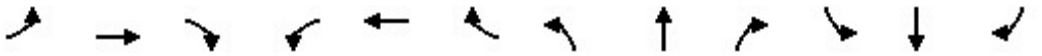
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	308	140	285	545	180	244	1666	508	104	1363	55
Future Volume (veh/h)	93	308	140	285	545	180	244	1666	508	104	1363	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	102	338	154	313	599	198	268	1831	0	114	1498	60
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	465	199	369	727	324	327	2485		139	2720	109
Arrive On Green	0.05	0.14	0.14	0.13	0.22	0.22	0.11	0.51	0.00	0.05	0.45	0.45
Sat Flow, veh/h	2910	3321	1420	2910	3367	1502	2910	4837	1502	2910	6057	242
Grp Volume(v), veh/h	102	328	164	313	599	198	268	1831	0	114	1130	428
Grp Sat Flow(s),veh/h/ln	1455	1612	1516	1455	1683	1502	1455	1612	1502	1455	1524	1728
Q Serve(g_s), s	3.6	10.2	11.0	11.0	17.8	12.5	9.4	31.0	0.0	4.1	19.0	19.0
Cycle Q Clear(g_c), s	3.6	10.2	11.0	11.0	17.8	12.5	9.4	31.0	0.0	4.1	19.0	19.0
Prop In Lane	1.00		0.94	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	148	452	212	369	727	324	327	2485		139	2052	776
V/C Ratio(X)	0.69	0.73	0.77	0.85	0.82	0.61	0.82	0.74		0.82	0.55	0.55
Avail Cap(c_a), veh/h	164	554	261	422	877	391	431	2485		139	2052	776
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	48.9	43.1	43.4	44.7	39.2	37.1	45.4	19.9	0.0	49.4	21.1	21.1
Incr Delay (d2), s/veh	10.2	3.7	11.1	13.6	5.5	1.9	9.1	2.0	0.0	30.8	1.1	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	4.3	4.7	4.6	7.8	4.7	3.8	11.5	0.0	2.1	6.8	8.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.1	46.8	54.5	58.3	44.6	39.0	54.6	21.9	0.0	80.3	22.2	23.9
LnGrp LOS	E	D	D	E	D	D	D	C		F	C	C
Approach Vol, veh/h		594			1110			2099	A		1672	
Approach Delay, s/veh		51.0			47.5			26.1			26.6	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	58.3	17.8	19.2	16.3	51.5	9.8	27.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	6.1	33.0	13.0	13.0	11.4	21.0	5.6	19.8
Green Ext Time (p_c), s	0.0	14.0	0.3	1.4	0.3	11.8	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

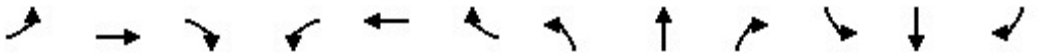
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.994				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6034	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6034	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				164			164		428	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	38	544	21	1	795	109	3	1	1	176	0	3
Future Volume (vph)	38	544	21	1	795	109	3	1	1	176	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	42	604	23	1	883	121	3	1	1	196	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	627	0	1	883	121	3	1	1	196	3	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	38	544	1	795	109	3	1	1	176	0
Future Volume (vph)	38	544	1	795	109	3	1	1	176	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	15.0	26.7
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	21.4%	38.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	5.1	17.5	5.1	15.9	15.9	5.8	5.7	5.7	10.3	18.8
Actuated g/C Ratio	0.10	0.36	0.10	0.33	0.33	0.12	0.12	0.12	0.21	0.38
v/c Ratio	0.25	0.29	0.01	0.56	0.20	0.02	0.00	0.00	0.59	0.00
Control Delay	27.5	11.7	24.0	15.9	2.5	23.0	23.0	0.0	29.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	11.7	24.0	15.9	2.5	23.0	23.0	0.0	29.5	0.0
LOS	C	B	C	B	A	C	C	A	C	A
Approach Delay		12.7		14.3			18.4			29.0
Approach LOS		B		B			B			C

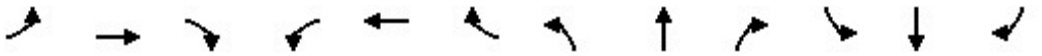
Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 48.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 49.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	42	627	1	883	121	3	1	1	196	3
v/c Ratio	0.25	0.29	0.01	0.56	0.20	0.02	0.00	0.00	0.59	0.00
Control Delay	27.5	11.7	24.0	15.9	2.5	23.0	23.0	0.0	29.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	11.7	24.0	15.9	2.5	23.0	23.0	0.0	29.5	0.0
Queue Length 50th (ft)	11	32	0	64	0	1	0	0	48	0
Queue Length 95th (ft)	40	66	4	127	18	7	4	0	#145	0
Internal Link Dist (ft)		2546		362			269			358
Turn Bay Length (ft)	130		130		145	165		165	50	
Base Capacity (vph)	165	2480	165	1815	667	225	683	681	347	1553
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.25	0.01	0.49	0.18	0.01	0.00	0.00	0.56	0.00

Intersection Summary

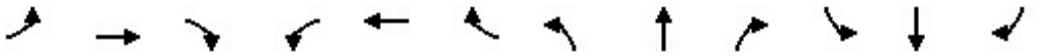
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	544	21	1	795	109	3	1	1	176	0	3
Future Volume (veh/h)	38	544	21	1	795	109	3	1	1	176	0	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	42	604	23	1	883	121	3	1	1	196	0	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	2057	78	4	1426	443	7	196	166	243	435	388
Arrive On Green	0.05	0.34	0.34	0.00	0.29	0.29	0.00	0.11	0.11	0.15	0.00	0.26
Sat Flow, veh/h	1594	6073	229	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	42	453	174	1	883	121	3	1	1	196	0	3
Grp Sat Flow(s),veh/h/ln	1594	1524	1731	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	1.2	3.3	3.3	0.0	7.1	2.8	0.1	0.0	0.0	5.4	0.0	0.1
Cycle Q Clear(g_c), s	1.2	3.3	3.3	0.0	7.1	2.8	0.1	0.0	0.0	5.4	0.0	0.1
Prop In Lane	1.00		0.13	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	72	1548	586	4	1426	443	7	196	166	243	435	388
V/C Ratio(X)	0.58	0.29	0.30	0.28	0.62	0.27	0.46	0.01	0.01	0.81	0.00	0.01
Avail Cap(c_a), veh/h	176	1816	688	176	1922	597	239	723	613	369	825	736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	11.0	11.0	22.6	13.8	12.3	22.5	17.9	17.9	18.6	0.0	12.5
Incr Delay (d2), s/veh	7.2	0.1	0.3	39.2	0.4	0.3	43.2	0.0	0.0	7.5	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.9	1.1	0.0	2.2	0.8	0.1	0.0	0.0	2.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.4	11.1	11.3	61.7	14.2	12.6	65.7	18.0	18.0	26.1	0.0	12.5
LnGrp LOS	C	B	B	E	B	B	E	B	B	C	A	B
Approach Vol, veh/h		669			1005			5			199	
Approach Delay, s/veh		12.2			14.1			46.6			25.9	
Approach LOS		B			B			D			C	

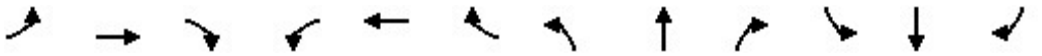
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	9.5	4.6	19.8	4.7	16.2	6.6	17.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	7.4	2.0	2.0	5.3	2.1	2.1	3.2	9.1
Green Ext Time (p_c), s	0.2	0.0	0.0	3.3	0.0	0.0	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.997				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	2891	6065	0	1583	4803	0	1583	1765	1500	0	1687	1500
Flt Permitted	0.950			0.950			0.731				0.740	
Satd. Flow (perm)	2891	6065	0	1583	4803	0	1218	1765	1500	0	1306	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			6				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



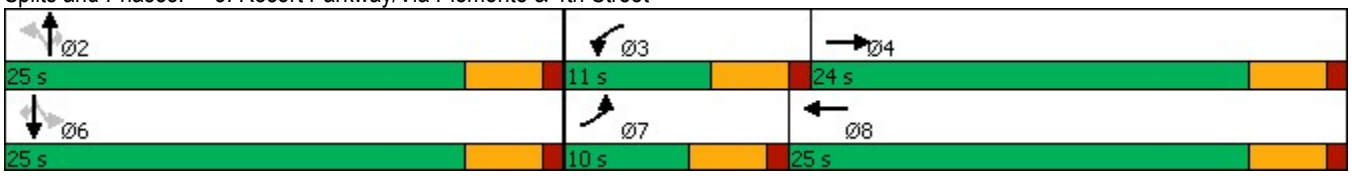
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	15	716	4	16	867	20	8	3	11	34	3	17
Future Volume (vph)	15	716	4	16	867	20	8	3	11	34	3	17
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	16	770	4	17	932	22	9	3	12	37	3	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	774	0	17	954	0	9	3	12	0	40	18

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	15	716	16	867	8	3	11	34	3	17
Future Volume (vph)	15	716	16	867	8	3	11	34	3	17
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.8	14.4	6.1	14.5	6.8	6.8	6.8		6.8	6.8
Actuated g/C Ratio	0.18	0.45	0.19	0.45	0.21	0.21	0.21		0.21	0.21
v/c Ratio	0.03	0.28	0.06	0.44	0.04	0.01	0.03		0.15	0.04
Control Delay	15.4	6.5	15.2	7.2	13.9	13.7	0.2		14.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	15.4	6.5	15.2	7.2	13.9	13.7	0.2		14.7	0.2
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		6.7		7.3		7.0			10.2	
Approach LOS		A		A		A			B	

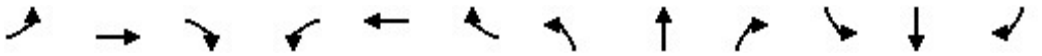
Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 32.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 7.1	Intersection LOS: A
Intersection Capacity Utilization 37.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	16	774	17	954	9	3	12	40	18
v/c Ratio	0.03	0.28	0.06	0.44	0.04	0.01	0.03	0.15	0.04
Control Delay	15.4	6.5	15.2	7.2	13.9	13.7	0.2	14.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.4	6.5	15.2	7.2	13.9	13.7	0.2	14.7	0.2
Queue Length 50th (ft)	1	16	2	28	1	0	0	5	0
Queue Length 95th (ft)	8	58	18	93	11	6	0	30	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	522	3890	338	3240	821	1190	1046	880	1046
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.20	0.05	0.29	0.01	0.00	0.01	0.05	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	716	4	16	867	20	8	3	11	34	3	17
Future Volume (veh/h)	15	716	4	16	867	20	8	3	11	34	3	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	16	770	4	17	932	22	9	3	12	37	3	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	2413	13	35	1866	44	413	285	242	428	26	242
Arrive On Green	0.02	0.38	0.38	0.02	0.38	0.38	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	2910	6305	33	1594	4862	115	1314	1772	1502	1272	161	1502
Grp Volume(v), veh/h	16	558	216	17	618	336	9	3	12	40	0	18
Grp Sat Flow(s),veh/h/ln	1455	1524	1766	1594	1612	1751	1314	1772	1502	1432	0	1502
Q Serve(g_s), s	0.2	2.7	2.7	0.3	4.5	4.5	0.2	0.0	0.2	0.6	0.0	0.3
Cycle Q Clear(g_c), s	0.2	2.7	2.7	0.3	4.5	4.5	0.9	0.0	0.2	0.7	0.0	0.3
Prop In Lane	1.00		0.02	1.00		0.07	1.00		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	60	1750	676	35	1238	672	413	285	242	453	0	242
V/C Ratio(X)	0.26	0.32	0.32	0.49	0.50	0.50	0.02	0.01	0.05	0.09	0.00	0.07
Avail Cap(c_a), veh/h	515	2869	1108	333	2127	1155	1068	1169	991	1162	0	991
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	6.7	6.7	15.0	7.3	7.3	11.6	11.0	11.0	11.2	0.0	11.1
Incr Delay (d2), s/veh	2.3	0.1	0.3	10.1	0.3	0.6	0.0	0.0	0.1	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.5	0.7	0.2	1.0	1.1	0.0	0.0	0.1	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	6.8	7.0	25.1	7.6	7.9	11.6	11.0	11.1	11.3	0.0	11.2
LnGrp LOS	B	A	A	C	A	A	B	B	B	B	A	B
Approach Vol, veh/h		790			971			24			58	
Approach Delay, s/veh		7.1			8.0			11.3			11.3	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.2	16.4		9.5	5.1	16.4				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		2.9	2.3	4.7		2.7	2.2	6.5				
Green Ext Time (p_c), s		0.0	0.0	4.5		0.2	0.0	5.4				

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	4798	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4798	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	754	21	0	860	0	3
Future Volume (vph)	754	21	0	860	0	3
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	820	23	0	935	0	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	843	0	0	935	0	3

Intersection Summary

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	754	21	0	860	0	3
Future Vol, veh/h	754	21	0	860	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	820	23	0	935	0	3

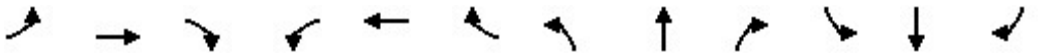
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	422
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	496
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	496
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	496	-	-	-
HCM Lane V/C Ratio	0.007	-	-	-
HCM Control Delay (s)	12.3	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5986	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			240			285			73		24	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



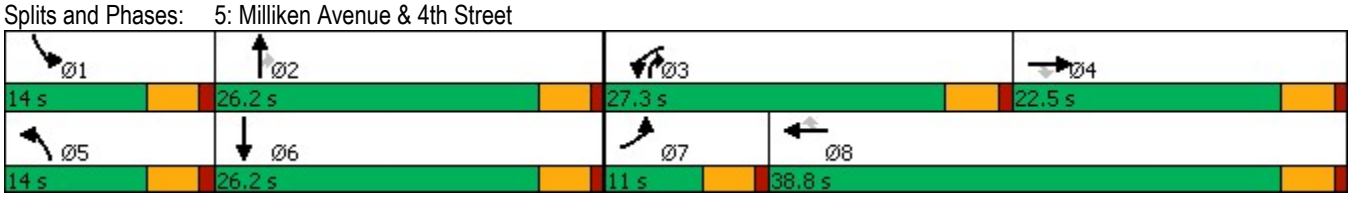
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	154	515	226	466	1298	407	236	993	154	248	951	97
Future Volume (vph)	154	515	226	466	1298	407	236	993	154	248	951	97
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	166	554	243	501	1396	438	254	1068	166	267	1023	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	554	243	501	1396	438	254	1068	166	267	1127	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	154	515	226	466	1298	407	236	993	154	248	951
Future Volume (vph)	154	515	226	466	1298	407	236	993	154	248	951
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	20.3	20.3	19.8	33.6	33.6	9.5	21.3	45.5	9.5	21.3
Actuated g/C Ratio	0.07	0.23	0.23	0.22	0.38	0.38	0.11	0.24	0.51	0.11	0.24
v/c Ratio	0.79	0.50	0.46	0.78	0.77	0.59	0.82	0.74	0.21	0.86	0.78
Control Delay	67.5	32.5	7.7	41.5	27.6	11.1	61.8	34.9	6.8	67.0	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.5	32.5	7.7	41.5	27.6	11.1	61.8	34.9	6.8	67.0	35.4
LOS	E	C	A	D	C	B	E	C	A	E	D
Approach Delay		32.3			27.5			36.3			41.4
Approach LOS		C			C			D			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 88.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 33.5	Intersection LOS: C
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	166	554	243	501	1396	438	254	1068	166	267	1127
v/c Ratio	0.79	0.50	0.46	0.78	0.77	0.59	0.82	0.74	0.21	0.86	0.78
Control Delay	67.5	32.5	7.7	41.5	27.6	11.1	61.8	34.9	6.8	67.0	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.5	32.5	7.7	41.5	27.6	11.1	61.8	34.9	6.8	67.0	35.4
Queue Length 50th (ft)	48	101	1	137	248	59	74	162	26	78	170
Queue Length 95th (ft)	#102	142	63	187	304	154	#138	201	55	#147	210
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	211	1102	528	742	1860	754	309	1482	852	309	1480
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.50	0.46	0.68	0.75	0.58	0.82	0.72	0.19	0.86	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	515	226	466	1298	407	236	993	154	248	951	97
Future Volume (veh/h)	154	515	226	466	1298	407	236	993	154	248	951	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	166	554	243	501	1396	438	254	1068	166	267	1023	104
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	1182	367	589	1791	556	317	1400	649	325	1319	133
Arrive On Green	0.08	0.24	0.24	0.20	0.37	0.37	0.11	0.23	0.23	0.11	0.23	0.23
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5669	572
Grp Volume(v), veh/h	166	554	243	501	1396	438	254	1068	166	267	823	304
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1669
Q Serve(g_s), s	4.7	8.3	12.4	14.1	21.7	22.0	7.2	13.9	6.0	7.6	14.3	14.5
Cycle Q Clear(g_c), s	4.7	8.3	12.4	14.1	21.7	22.0	7.2	13.9	6.0	7.6	14.3	14.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	223	1182	367	589	1791	556	317	1400	649	325	1064	388
V/C Ratio(X)	0.75	0.47	0.66	0.85	0.78	0.79	0.80	0.76	0.26	0.82	0.77	0.78
Avail Cap(c_a), veh/h	223	1182	367	781	1952	606	325	1556	687	325	1167	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.4	27.4	29.0	32.6	23.7	23.8	37.0	30.6	15.4	36.9	30.5	30.6
Incr Delay (d2), s/veh	12.8	0.3	4.4	6.9	1.9	6.4	13.2	2.1	0.2	15.3	3.0	8.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	3.2	4.8	5.4	8.2	8.4	3.1	5.2	2.0	3.3	5.4	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	27.7	33.4	39.6	25.6	30.2	50.2	32.6	15.6	52.2	33.5	39.0
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	C	D
Approach Vol, veh/h		963			2335			1488			1394	
Approach Delay, s/veh		33.2			29.5			33.7			38.3	
Approach LOS		C			C			C			D	

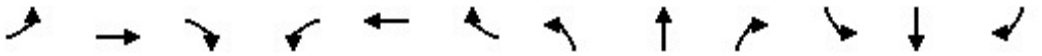
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	24.0	21.7	25.3	13.7	24.3	11.0	36.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	9.6	15.9	16.1	14.4	9.2	16.5	6.7	24.0
Green Ext Time (p_c), s	0.0	3.6	1.1	1.6	0.0	3.1	0.0	7.4

Intersection Summary	
HCM 6th Ctrl Delay	33.1
HCM 6th LOS	C

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.899	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2887	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2887	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		214	214
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary

Area Type: Other



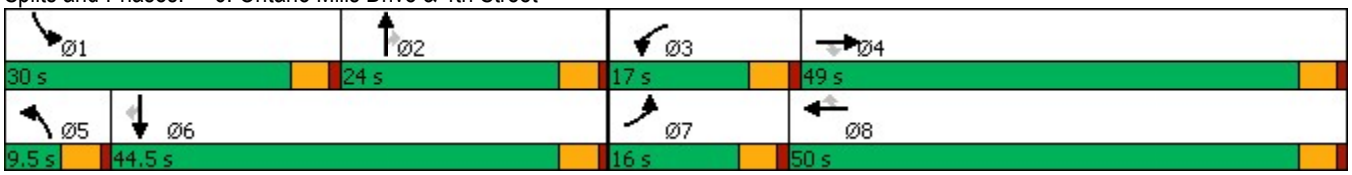
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	336	469	59	124	1371	172	72	71	86	194	223	927
Future Volume (vph)	336	469	59	124	1371	172	72	71	86	194	223	927
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	386	539	68	143	1576	198	83	82	99	223	256	1066
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	386	539	68	143	1576	198	83	82	99	223	789	533

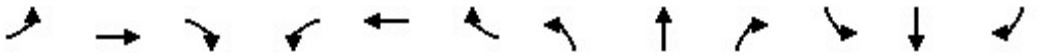
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	336	469	59	124	1371	172	72	71	86	194	223	927
Future Volume (vph)	336	469	59	124	1371	172	72	71	86	194	223	927
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.6	45.2	45.2	10.7	44.3	44.3	5.0	21.4	21.4	20.7	37.0	37.0
Actuated g/C Ratio	0.10	0.39	0.39	0.09	0.38	0.38	0.04	0.18	0.18	0.18	0.32	0.32
v/c Ratio	1.34	0.29	0.10	0.54	0.86	0.30	1.22	0.13	0.26	0.79	0.89dr	0.92
Control Delay	215.4	25.7	0.3	59.0	39.1	10.1	228.8	42.2	4.5	65.8	29.8	44.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	215.4	25.7	0.3	59.0	39.1	10.1	228.8	42.2	4.5	65.8	29.8	44.9
LOS	F	C	A	E	D	B	F	D	A	E	C	D
Approach Delay		97.7			37.6			86.7			40.2	
Approach LOS		F			D			F			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.34	
Intersection Signal Delay: 53.8	Intersection LOS: D
Intersection Capacity Utilization 84.1%	ICU Level of Service E
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 6: Ontario Mills Drive & 4th Street





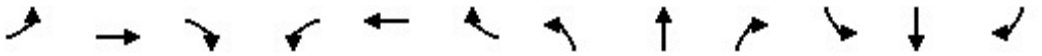
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	386	539	68	143	1576	198	83	82	99	223	789	533
v/c Ratio	1.34	0.29	0.10	0.54	0.86	0.30	1.22	0.13	0.26	0.79	0.89dr	0.92
Control Delay	215.4	25.7	0.3	59.0	39.1	10.1	228.8	42.2	4.5	65.8	29.8	44.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	215.4	25.7	0.3	59.0	39.1	10.1	228.8	42.2	4.5	65.8	29.8	44.9
Queue Length 50th (ft)	~205	105	0	55	408	31	~81	27	0	166	217	279
Queue Length 95th (ft)	#292	132	0	85	450	79	#179	51	19	238	278	#483
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	288	1889	670	313	1900	674	68	625	390	350	1141	612
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.34	0.29	0.10	0.46	0.83	0.29	1.22	0.13	0.25	0.64	0.69	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.



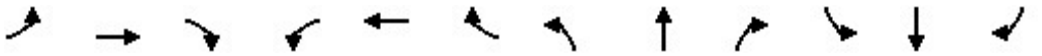
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	336	469	59	124	1371	172	72	71	86	194	223	927
Future Volume (veh/h)	336	469	59	124	1371	172	72	71	86	194	223	927
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	386	539	68	143	1576	198	83	82	99	223	256	1066
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	1942	603	192	1791	556	67	752	335	250	599	1015
Arrive On Green	0.10	0.40	0.40	0.07	0.37	0.37	0.04	0.22	0.22	0.16	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	386	539	68	143	1576	198	83	82	99	223	256	1066
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	11.5	8.9	3.4	5.7	36.0	11.3	5.0	2.3	6.5	16.2	13.2	40.0
Cycle Q Clear(g_c), s	11.5	8.9	3.4	5.7	36.0	11.3	5.0	2.3	6.5	16.2	13.2	40.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	283	1942	603	192	1791	556	67	752	335	250	599	1015
V/C Ratio(X)	1.36	0.28	0.11	0.75	0.88	0.36	1.23	0.11	0.30	0.89	0.43	1.05
Avail Cap(c_a), veh/h	283	1942	603	307	1860	577	67	752	335	344	599	1015
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.4	23.8	22.2	54.3	34.8	27.0	56.7	36.6	38.2	48.9	30.3	39.2
Incr Delay (d2), s/veh	185.2	0.1	0.1	5.6	5.1	0.4	184.7	0.1	0.5	19.1	0.5	42.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.5	3.4	1.2	2.2	14.7	4.1	5.5	1.0	2.4	7.8	5.7	20.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	238.6	23.9	22.3	59.9	39.9	27.4	241.4	36.6	38.7	68.0	30.8	81.4
LnGrp LOS	F	C	C	E	D	C	F	D	D	E	C	F
Approach Vol, veh/h		993			1917			264			1545	
Approach Delay, s/veh		107.3			40.1			101.8			71.1	
Approach LOS		F			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.1	30.9	12.3	52.0	9.5	44.5	16.0	48.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	18.2	8.5	7.7	10.9	7.0	42.0	13.5	38.0
Green Ext Time (p_c), s	0.4	0.5	0.2	4.3	0.0	0.0	0.0	5.8

Intersection Summary	
HCM 6th Ctrl Delay	67.8
HCM 6th LOS	E

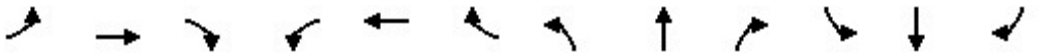
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.982			0.898				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.964	
Satd. Flow (prot)	2891	4818	1500	1583	4731	0	1583	3011	0	1504	1616	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.964	
Satd. Flow (perm)	2891	4818	1500	1583	4731	0	1583	3011	0	1504	1616	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		25			60				407
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



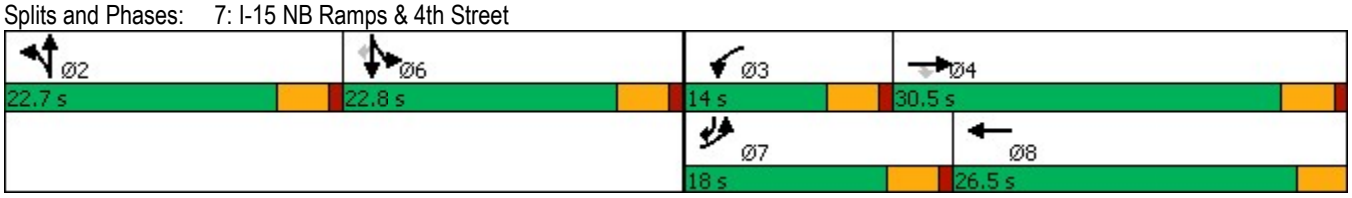
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	273	403	107	45	557	74	132	27	57	489	74	976
Future Volume (vph)	273	403	107	45	557	74	132	27	57	489	74	976
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	287	424	113	47	586	78	139	28	60	515	78	1027
Shared Lane Traffic (%)										43%		
Lane Group Flow (vph)	287	424	113	47	664	0	139	88	0	294	299	1027

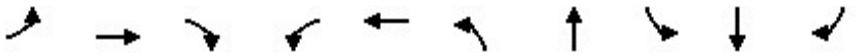
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	273	403	107	45	557	132	27	489	74	976
Future Volume (vph)	273	403	107	45	557	132	27	489	74	976
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	18.0	30.5	30.5	14.0	26.5	22.7	22.7	22.8	22.8	18.0
Total Split (%)	20.0%	33.9%	33.9%	15.6%	29.4%	25.2%	25.2%	25.3%	25.3%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	12.6	25.8	25.8	7.6	16.9	12.2	12.2	18.4	18.4	35.6
Actuated g/C Ratio	0.16	0.33	0.33	0.10	0.22	0.16	0.16	0.24	0.24	0.46
v/c Ratio	0.61	0.26	0.19	0.30	0.63	0.56	0.17	0.82	0.78	0.72
Control Delay	37.8	21.4	4.8	40.5	29.6	40.4	13.9	51.4	46.1	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.8	21.4	4.8	40.5	29.6	40.4	13.9	51.4	46.1	14.1
LOS	D	C	A	D	C	D	B	D	D	B
Approach Delay		24.9			30.3		30.1		26.8	
Approach LOS		C			C		C		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 77.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 68.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	287	424	113	47	664	139	88	294	299	1027
v/c Ratio	0.61	0.26	0.19	0.30	0.63	0.56	0.17	0.82	0.78	0.72
Control Delay	37.8	21.4	4.8	40.5	29.6	40.4	13.9	51.4	46.1	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.8	21.4	4.8	40.5	29.6	40.4	13.9	51.4	46.1	14.1
Queue Length 50th (ft)	67	59	0	22	103	64	6	145	145	129
Queue Length 95th (ft)	123	96	32	59	153	127	26	#342	#335	268
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	512	1712	615	197	1445	378	764	361	388	1465
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.25	0.18	0.24	0.46	0.37	0.12	0.81	0.77	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

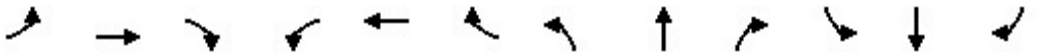
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	273	403	107	45	557	74	132	27	57	489	74	976
Future Volume (veh/h)	273	403	107	45	557	74	132	27	57	489	74	976
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	287	424	113	47	586	78	139	28	60	571	0	1027
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	381	1427	443	69	898	118	196	207	184	866	0	1209
Arrive On Green	0.13	0.29	0.29	0.04	0.21	0.21	0.12	0.12	0.12	0.27	0.00	0.27
Sat Flow, veh/h	2910	4837	1502	1594	4326	568	1594	1683	1502	3188	0	3003
Grp Volume(v), veh/h	287	424	113	47	435	229	139	28	60	571	0	1027
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1670	1594	1683	1502	1594	0	1502
Q Serve(g_s), s	6.4	4.6	3.9	2.0	8.3	8.5	5.6	1.0	2.5	10.7	0.0	18.3
Cycle Q Clear(g_c), s	6.4	4.6	3.9	2.0	8.3	8.5	5.6	1.0	2.5	10.7	0.0	18.3
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	381	1427	443	69	669	346	196	207	184	866	0	1209
V/C Ratio(X)	0.75	0.30	0.26	0.68	0.65	0.66	0.71	0.14	0.33	0.66	0.00	0.85
Avail Cap(c_a), veh/h	583	1867	580	225	1101	570	431	455	406	866	0	1209
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.2	18.3	18.1	31.8	24.5	24.5	28.4	26.4	27.0	21.8	0.0	18.3
Incr Delay (d2), s/veh	3.0	0.1	0.3	11.0	1.1	2.2	4.7	0.3	1.0	1.9	0.0	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	1.6	1.3	0.9	3.1	3.4	2.3	0.4	0.9	4.0	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	18.5	18.4	42.8	25.5	26.7	33.1	26.7	28.0	23.6	0.0	24.2
LnGrp LOS	C	B	B	D	C	C	C	C	C	C	A	C
Approach Vol, veh/h		824			711			227			1598	
Approach Delay, s/veh		22.9			27.0			31.0			24.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.8	7.4	24.4		22.8	13.3	18.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	13.5	* 23				
Max Q Clear Time (g_c+I1), s		7.6	4.0	6.6		20.3	8.4	10.5				
Green Ext Time (p_c), s		0.6	0.0	3.1		0.0	0.5	3.5				

Intersection Summary	
HCM 6th Ctrl Delay	24.8
HCM 6th LOS	C

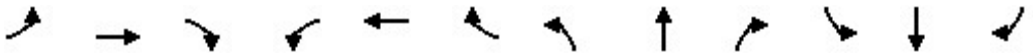
Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.904				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



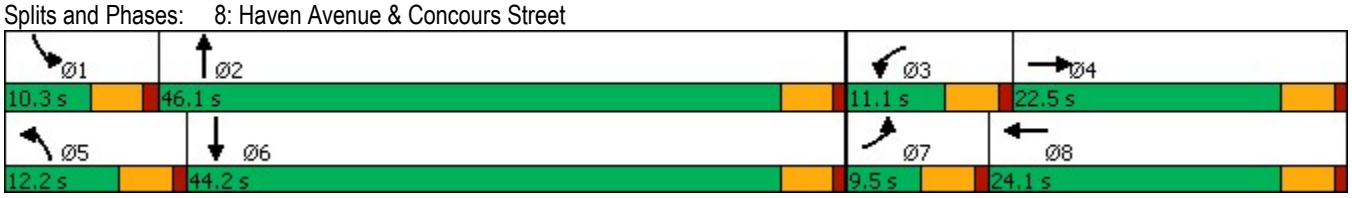
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	21	45	81	180	59	18	71	1967	154	139	1540	44
Future Volume (vph)	21	45	81	180	59	18	71	1967	154	139	1540	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	23	50	90	200	66	20	79	2186	171	154	1711	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	140	0	200	66	20	79	2186	171	154	1711	49

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	21	45	180	59	18	71	1967	154	139	1540	44
Future Volume (vph)	21	45	180	59	18	71	1967	154	139	1540	44
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.0	6.6	14.4	79.0	7.0	41.6	79.0	5.8	42.4	79.0
Actuated g/C Ratio	0.06	0.09	0.08	0.18	1.00	0.09	0.53	1.00	0.07	0.54	1.00
v/c Ratio	0.13	0.40	0.61	0.11	0.01	0.31	0.68	0.11	0.73	0.52	0.03
Control Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.3	0.0
LOS	D	B	D	C	A	D	B	A	E	B	A
Approach Delay		20.6		37.5			15.0			16.5	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 79	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 17.2	Intersection LOS: B
Intersection Capacity Utilization 58.3%	ICU Level of Service B
Analysis Period (min) 15	

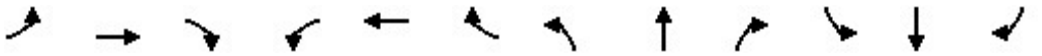
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	23	140	200	66	20	79	2186	171	154	1711	49
v/c Ratio	0.13	0.40	0.61	0.11	0.01	0.31	0.68	0.11	0.73	0.52	0.03
Control Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.3	0.0
Queue Length 50th (ft)	5	12	34	13	0	19	214	0	39	158	0
Queue Length 95th (ft)	17	38	#58	34	0	40	275	0	#87	206	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	183	760	329	832	1500	281	3197	1500	212	3261	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.18	0.61	0.08	0.01	0.28	0.68	0.11	0.73	0.52	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



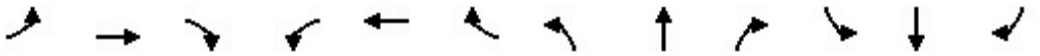
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	45	81	180	59	18	71	1967	154	139	1540	44
Future Volume (veh/h)	21	45	81	180	59	18	71	1967	154	139	1540	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	23	50	90	200	66	0	79	2186	0	154	1711	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	154	137	301	477		159	3123		220	3251	
Arrive On Green	0.03	0.09	0.09	0.08	0.14	0.00	0.05	0.51	0.00	0.08	0.53	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	23	50	90	200	66	0	79	2186	0	154	1711	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.6	2.0	4.3	3.6	1.3	0.0	1.9	20.0	0.0	3.8	13.4	0.0
Cycle Q Clear(g_c), s	0.6	2.0	4.3	3.6	1.3	0.0	1.9	20.0	0.0	3.8	13.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	74	154	137	301	477		159	3123		220	3251	
V/C Ratio(X)	0.31	0.33	0.66	0.66	0.14		0.50	0.70		0.70	0.53	
Avail Cap(c_a), veh/h	198	412	368	356	898		305	3451		230	3293	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	31.3	32.3	33.0	27.6	0.0	33.8	13.6	0.0	33.2	11.1	0.0
Incr Delay (d2), s/veh	2.3	1.2	5.2	3.6	0.1	0.0	2.4	0.6	0.0	8.7	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.9	1.7	1.2	0.5	0.0	0.7	6.2	0.0	1.6	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	32.5	37.5	36.6	27.7	0.0	36.2	14.2	0.0	41.9	11.3	0.0
LnGrp LOS	D	C	D	D	C		D	B		D	B	
Approach Vol, veh/h		163			266	A		2265	A		1865	A
Approach Delay, s/veh		36.0			34.4			15.0			13.8	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	42.1	10.1	11.2	8.5	43.7	6.4	14.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	5.8	22.0	5.6	6.3	3.9	15.4	2.6	3.3
Green Ext Time (p_c), s	0.0	15.6	0.1	0.5	0.1	14.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B

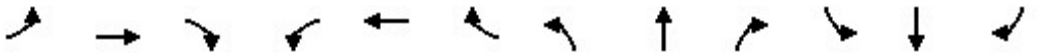
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.850			0.973			0.994			0.989	
Flt Protected	0.950				0.971		0.950			0.950		
Satd. Flow (prot)	1593	1425	0	0	1667	0	1676	4789	0	1676	4765	0
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	1593	1425	0	0	1717	0	1676	4789	0	1676	4765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		574			1			7			16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



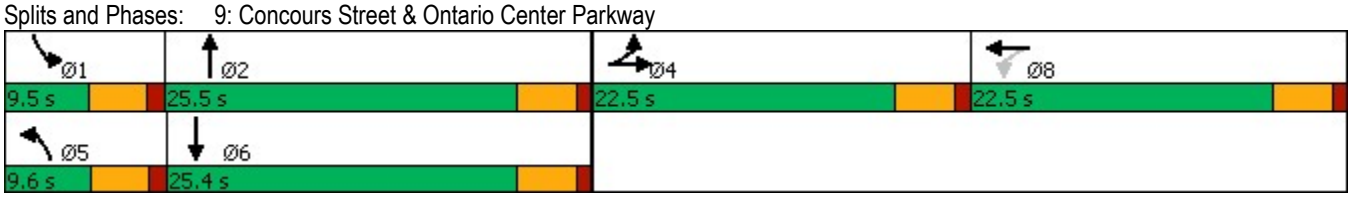
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	2	0	3	3	1	1	38	497	21	1	684	57
Future Volume (vph)	2	0	3	3	1	1	38	497	21	1	684	57
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	2	0	3	3	1	1	42	552	23	1	760	63
Shared Lane Traffic (%)	10%											
Lane Group Flow (vph)	2	3	0	0	5	0	42	575	0	1	823	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	2	0	3	1	38	497	1	684
Future Volume (vph)	2	0	3	1	38	497	1	684
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.0	6.0		6.1	5.5	32.0	5.4	29.5
Actuated g/C Ratio	0.16	0.16		0.17	0.15	0.87	0.15	0.81
v/c Ratio	0.01	0.00		0.02	0.17	0.14	0.00	0.21
Control Delay	19.5	0.0		18.0	20.4	3.9	20.0	4.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	0.0		18.0	20.4	3.9	20.0	4.7
LOS	B	A		B	C	A	B	A
Approach Delay		7.8		18.0		5.0		4.8
Approach LOS		A		B		A		A

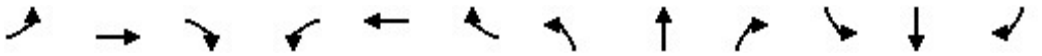
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 36.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.21	
Intersection Signal Delay: 4.9	Intersection LOS: A
Intersection Capacity Utilization 34.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	3	5	42	575	1	823
v/c Ratio	0.01	0.00	0.02	0.17	0.14	0.00	0.21
Control Delay	19.5	0.0	18.0	20.4	3.9	20.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	0.0	18.0	20.4	3.9	20.0	4.7
Queue Length 50th (ft)	0	0	1	6	0	0	0
Queue Length 95th (ft)	6	0	9	38	70	4	102
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	842	1024	908	251	4191	246	3837
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.00	0.01	0.17	0.14	0.00	0.21

Intersection Summary



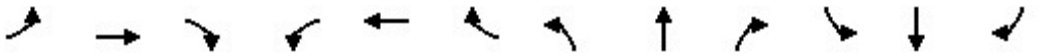
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	3	3	1	1	38	497	21	1	684	57
Future Volume (veh/h)	2	0	3	3	1	1	38	497	21	1	684	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	2	0	3	3	1	1	42	552	23	1	760	63
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	11	0	10	7	2	2	83	1901	79	5	1601	132
Arrive On Green	0.01	0.00	0.01	0.01	0.01	0.01	0.05	0.40	0.40	0.00	0.35	0.35
Sat Flow, veh/h	1688	0	1502	997	332	332	1688	4764	198	1688	4554	376
Grp Volume(v), veh/h	2	0	3	5	0	0	42	373	202	1	537	286
Grp Sat Flow(s),veh/h/ln	1688	0	1502	1662	0	0	1688	1612	1736	1688	1612	1704
Q Serve(g_s), s	0.0	0.0	0.1	0.1	0.0	0.0	0.7	2.4	2.4	0.0	4.0	4.0
Cycle Q Clear(g_c), s	0.0	0.0	0.1	0.1	0.0	0.0	0.7	2.4	2.4	0.0	4.0	4.0
Prop In Lane	1.00		1.00	0.60		0.20	1.00		0.11	1.00		0.22
Lane Grp Cap(c), veh/h	11	0	10	11	0	0	83	1287	693	5	1134	599
V/C Ratio(X)	0.17	0.00	0.29	0.44	0.00	0.00	0.51	0.29	0.29	0.18	0.47	0.48
Avail Cap(c_a), veh/h	989	0	880	974	0	0	280	2204	1187	275	2194	1159
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	15.2	15.2	0.0	0.0	14.2	6.3	6.3	15.3	7.8	7.8
Incr Delay (d2), s/veh	7.0	0.0	15.1	24.9	0.0	0.0	4.7	0.1	0.2	15.1	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.5	0.6	0.0	0.9	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	0.0	30.3	40.0	0.0	0.0	19.0	6.4	6.5	30.4	8.1	8.4
LnGrp LOS	C	A	C	D	A	A	B	A	A	C	A	A
Approach Vol, veh/h		5			5			617			824	
Approach Delay, s/veh		27.1			40.0			7.3			8.2	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	16.8		4.7	6.0	15.3		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	4.4		2.1	2.7	6.0		2.1				
Green Ext Time (p_c), s	0.0	3.4		0.0	0.0	4.8		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		8.0
HCM 6th LOS		A

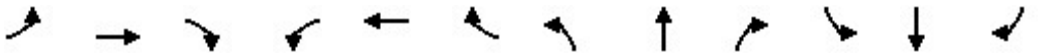
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			273
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



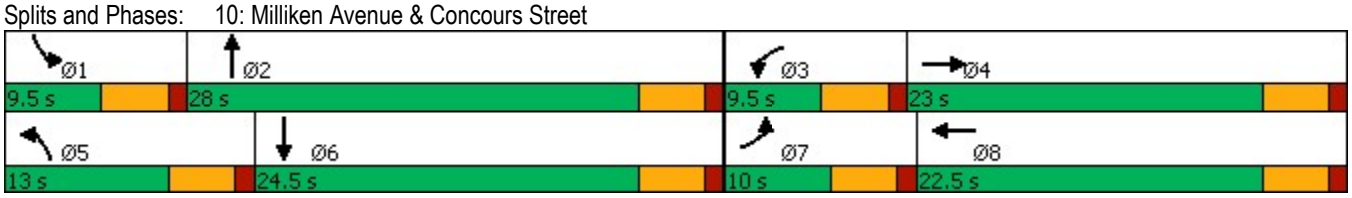
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	70	24	55	60	78	55	158	1024	67	103	1109	235
Future Volume (vph)	70	24	55	60	78	55	158	1024	67	103	1109	235
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	81	28	64	70	91	64	184	1191	78	120	1290	273
Shared Lane Traffic (%)												
Lane Group Flow (vph)	81	28	64	70	91	64	184	1191	78	120	1290	273

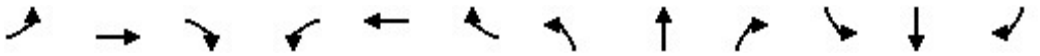
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	24	55	60	78	55	158	1024	67	103	1109	235
Future Volume (vph)	70	24	55	60	78	55	158	1024	67	103	1109	235
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.6	8.9	56.1	7.4	7.0	56.1	8.0	28.9	56.1	5.1	22.4	56.1
Actuated g/C Ratio	0.10	0.16	1.00	0.13	0.12	1.00	0.14	0.52	1.00	0.09	0.40	1.00
v/c Ratio	0.28	0.05	0.04	0.18	0.22	0.04	0.45	0.38	0.05	0.46	0.53	0.18
Control Delay	28.1	22.7	0.1	25.2	24.7	0.1	27.2	12.4	0.1	32.3	16.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	22.7	0.1	25.2	24.7	0.1	27.2	12.4	0.1	32.3	16.0	0.3
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		16.9			17.9			13.6			14.6	
Approach LOS		B			B			B			B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 56.1	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 14.5	Intersection LOS: B
Intersection Capacity Utilization 42.6%	ICU Level of Service A
Analysis Period (min) 15	

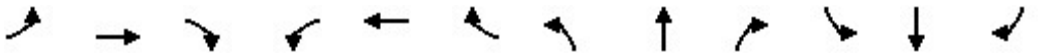
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	81	28	64	70	91	64	184	1191	78	120	1290	273
v/c Ratio	0.28	0.05	0.04	0.18	0.22	0.04	0.45	0.38	0.05	0.46	0.53	0.18
Control Delay	28.1	22.7	0.1	25.2	24.7	0.1	27.2	12.4	0.1	32.3	16.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	22.7	0.1	25.2	24.7	0.1	27.2	12.4	0.1	32.3	16.0	0.3
Queue Length 50th (ft)	14	4	0	9	15	0	31	88	0	21	109	0
Queue Length 95th (ft)	31	14	0	28	32	0	56	114	0	42	139	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	288	1124	1500	379	1093	1500	445	3141	1500	261	2422	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.02	0.04	0.18	0.08	0.04	0.41	0.38	0.05	0.46	0.53	0.18

Intersection Summary



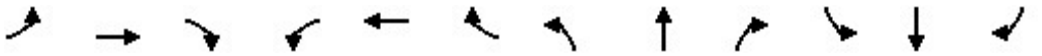
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	70	24	55	60	78	55	158	1024	67	103	1109	235
Future Volume (veh/h)	70	24	55	60	78	55	158	1024	67	103	1109	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	81	28	0	70	91	0	184	1191	0	120	1290	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	203	350		186	330		285	2197		246	2116	
Arrive On Green	0.07	0.10	0.00	0.06	0.10	0.00	0.10	0.36	0.00	0.08	0.35	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	81	28	0	70	91	0	184	1191	0	120	1290	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.2	0.3	0.0	1.1	1.2	0.0	2.8	7.2	0.0	1.8	8.2	0.0
Cycle Q Clear(g_c), s	1.2	0.3	0.0	1.1	1.2	0.0	2.8	7.2	0.0	1.8	8.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	203	350		186	330		285	2197		246	2116	
V/C Ratio(X)	0.40	0.08		0.38	0.28		0.65	0.54		0.49	0.61	
Avail Cap(c_a), veh/h	344	1339		313	1303		532	3080		313	2621	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.7	18.8	0.0	20.9	19.4	0.0	20.2	11.8	0.0	20.3	12.6	0.0
Incr Delay (d2), s/veh	1.3	0.1	0.0	1.3	0.4	0.0	2.4	0.2	0.0	1.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.1	0.0	0.4	0.4	0.0	1.0	2.0	0.0	0.6	2.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	18.9	0.0	22.1	19.9	0.0	22.6	12.0	0.0	21.8	12.9	0.0
LnGrp LOS	C	B		C	B		C	B		C	B	
Approach Vol, veh/h		109	A		161	A		1375	A		1410	A
Approach Delay, s/veh		21.2			20.9			13.5			13.6	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	21.3	7.5	9.3	9.1	20.6	7.7	9.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	3.8	9.2	3.1	2.3	4.8	10.2	3.2	3.2
Green Ext Time (p_c), s	0.0	7.2	0.0	0.1	0.2	6.0	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

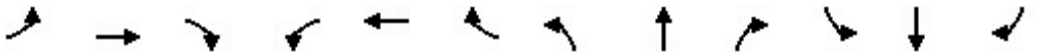
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			410			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



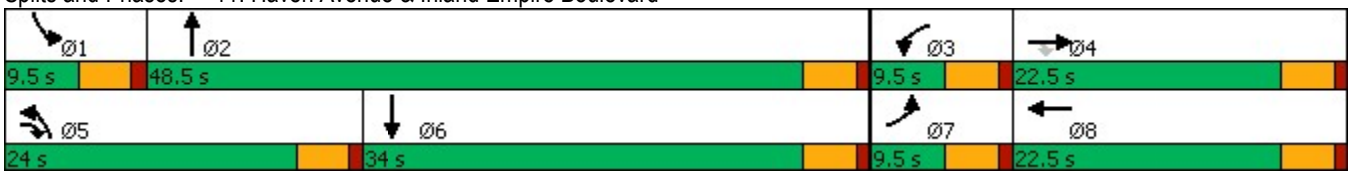
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	90	113	260	118	124	21	498	2218	647	52	1481	128
Future Volume (vph)	90	113	260	118	124	21	498	2218	647	52	1481	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	97	122	280	127	133	23	535	2385	696	56	1592	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	122	280	127	133	23	535	2385	696	56	1592	138

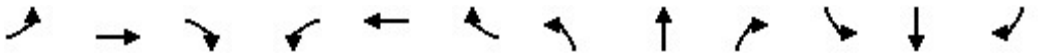
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	113	260	118	124	21	498	2218	647	52	1481	128
Future Volume (vph)	90	113	260	118	124	21	498	2218	647	52	1481	128
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.3	8.6	28.3	5.3	8.6	73.9	18.4	48.5	73.9	5.3	29.2	73.9
Actuated g/C Ratio	0.07	0.12	0.38	0.07	0.12	1.00	0.25	0.66	1.00	0.07	0.40	1.00
v/c Ratio	0.47	0.31	0.45	0.45	0.34	0.02	0.75	0.60	0.46	0.27	0.66	0.09
Control Delay	45.5	35.4	15.0	42.6	35.7	0.0	35.3	12.0	1.0	40.3	21.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	35.4	15.0	42.6	35.7	0.0	35.3	12.0	1.0	40.3	21.9	0.1
LOS	D	D	B	D	D	A	D	B	A	D	C	A
Approach Delay		25.9			35.9			13.3			20.8	
Approach LOS		C			D			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 62.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard

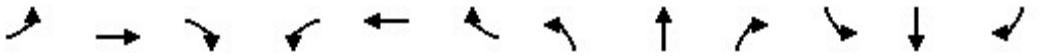




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	97	122	280	127	133	23	535	2385	696	56	1592	138
v/c Ratio	0.47	0.31	0.45	0.45	0.34	0.02	0.75	0.60	0.46	0.27	0.66	0.09
Control Delay	45.5	35.4	15.0	42.6	35.7	0.0	35.3	12.0	1.0	40.3	21.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	35.4	15.0	42.6	35.7	0.0	35.3	12.0	1.0	40.3	21.9	0.1
Queue Length 50th (ft)	25	30	71	22	33	0	129	241	0	14	196	0
Queue Length 95th (ft)	#54	56	134	42	60	0	#207	306	0	32	249	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	205	858	661	280	858	1500	802	3929	1500	205	2548	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.14	0.42	0.45	0.16	0.02	0.67	0.61	0.46	0.27	0.62	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	113	260	118	124	21	498	2218	647	52	1481	128
Future Volume (veh/h)	90	113	260	118	124	21	498	2218	647	52	1481	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	97	122	280	127	133	0	535	2385	0	56	1592	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	586	576	227	597		610	3092		127	2080	
Arrive On Green	0.05	0.17	0.17	0.06	0.18	0.00	0.21	0.51	0.00	0.04	0.34	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	97	122	280	127	133	0	535	2385	0	56	1592	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	2.7	2.6	11.7	2.6	2.8	0.0	14.7	26.2	0.0	1.6	19.3	0.0
Cycle Q Clear(g_c), s	2.7	2.6	11.7	2.6	2.8	0.0	14.7	26.2	0.0	1.6	19.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	157	586	576	227	597		610	3092		127	2080	
V/C Ratio(X)	0.62	0.21	0.49	0.56	0.22		0.88	0.77		0.44	0.77	
Avail Cap(c_a), veh/h	176	733	642	240	733		686	3244		176	2175	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.3	29.3	19.3	38.0	29.1	0.0	31.6	16.5	0.0	38.5	24.3	0.0
Incr Delay (d2), s/veh	5.3	0.2	0.6	2.6	0.2	0.0	11.4	1.1	0.0	2.4	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.0	4.0	0.9	1.1	0.0	6.0	8.5	0.0	0.6	6.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	29.4	19.9	40.6	29.3	0.0	43.0	17.6	0.0	40.9	25.9	0.0
LnGrp LOS	D	C	B	D	C		D	B		D	C	
Approach Vol, veh/h		499			260	A		2920	A		1648	A
Approach Delay, s/veh		26.8			34.8			22.3			26.4	
Approach LOS		C			C			C			C	

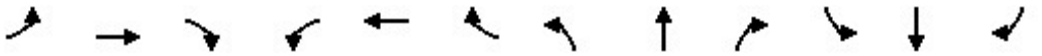
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	46.4	9.2	18.9	21.8	32.7	9.0	19.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.6	28.2	4.6	13.7	16.7	21.3	4.7	4.8
Green Ext Time (p_c), s	0.0	13.7	0.0	0.7	0.6	6.1	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	24.6
HCM 6th LOS	C

Notes

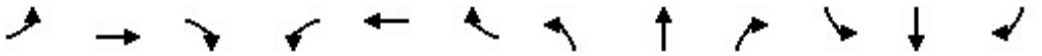
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



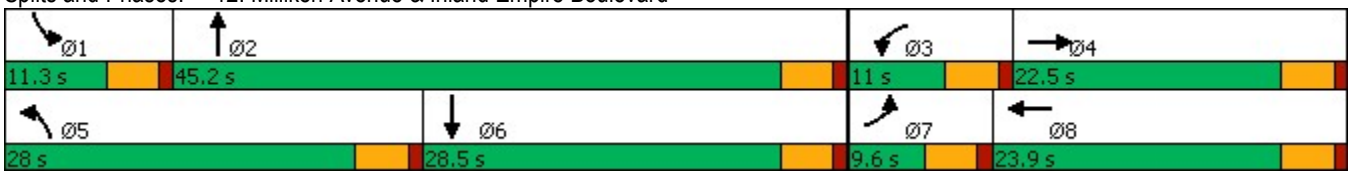
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	71	41	52	99	89	35	406	1121	110	82	983	141
Future Volume (vph)	71	41	52	99	89	35	406	1121	110	82	983	141
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	83	48	60	115	103	41	472	1303	128	95	1143	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	48	60	115	103	41	472	1303	128	95	1143	164

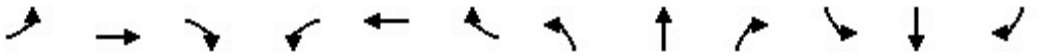
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	41	52	99	89	35	406	1121	110	82	983	141
Future Volume (vph)	71	41	52	99	89	35	406	1121	110	82	983	141
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	7.2	64.1	9.0	8.2	64.1	16.5	37.1	64.1	7.2	21.6	64.1
Actuated g/C Ratio	0.09	0.11	1.00	0.14	0.13	1.00	0.26	0.58	1.00	0.11	0.34	1.00
v/c Ratio	0.32	0.13	0.04	0.28	0.24	0.03	0.63	0.37	0.09	0.29	0.56	0.11
Control Delay	37.1	32.0	0.1	33.4	31.8	0.0	27.6	11.6	0.1	34.6	20.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	32.0	0.1	33.4	31.8	0.0	27.6	11.6	0.1	34.6	20.6	0.1
LOS	D	C	A	C	C	A	C	B	A	C	C	A
Approach Delay		24.2			27.5			14.8			19.2	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 64.1	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 50.1%	ICU Level of Service A
Analysis Period (min) 15	

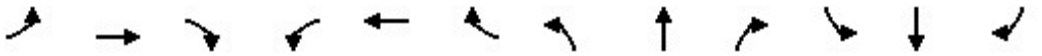
Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	83	48	60	115	103	41	472	1303	128	95	1143	164
v/c Ratio	0.32	0.13	0.04	0.28	0.24	0.03	0.63	0.37	0.09	0.29	0.56	0.11
Control Delay	37.1	32.0	0.1	33.4	31.8	0.0	27.6	11.6	0.1	34.6	20.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	32.0	0.1	33.4	31.8	0.0	27.6	11.6	0.1	34.6	20.6	0.1
Queue Length 50th (ft)	18	10	0	25	22	0	97	106	0	20	118	0
Queue Length 95th (ft)	40	26	0	51	45	0	141	130	0	44	165	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	259	1063	1500	419	1146	1500	1197	3954	1500	346	2568	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.05	0.04	0.27	0.09	0.03	0.39	0.33	0.09	0.27	0.45	0.11

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	41	52	99	89	35	406	1121	110	82	983	141
Future Volume (veh/h)	71	41	52	99	89	35	406	1121	110	82	983	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	83	48	0	115	103	0	472	1303	0	95	1143	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	187	290		215	321		620	2769		199	1887	
Arrive On Green	0.06	0.09	0.00	0.07	0.10	0.00	0.21	0.45	0.00	0.07	0.31	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	83	48	0	115	103	0	472	1303	0	95	1143	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.6	0.7	0.0	2.2	1.6	0.0	8.6	8.4	0.0	1.8	9.0	0.0
Cycle Q Clear(g_c), s	1.6	0.7	0.0	2.2	1.6	0.0	8.6	8.4	0.0	1.8	9.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	187	290		215	321		620	2769		199	1887	
V/C Ratio(X)	0.44	0.17		0.54	0.32		0.76	0.47		0.48	0.61	
Avail Cap(c_a), veh/h	262	1069		334	1152		1207	4377		349	2581	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.5	24.0	0.0	25.3	23.9	0.0	20.9	10.7	0.0	25.4	16.6	0.0
Incr Delay (d2), s/veh	1.6	0.3	0.0	2.1	0.6	0.0	2.0	0.1	0.0	1.8	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.3	0.0	0.8	0.6	0.0	2.8	2.4	0.0	0.6	2.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.2	24.3	0.0	27.4	24.5	0.0	22.9	10.9	0.0	27.2	16.9	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		131	A		218	A		1775	A		1238	A
Approach Delay, s/veh		26.1			26.0			14.1			17.7	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	30.2	8.7	9.4	16.6	22.0	8.1	9.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	3.8	10.4	4.2	2.7	10.6	11.0	3.6	3.6
Green Ext Time (p_c), s	0.1	11.7	0.1	0.1	1.5	6.5	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.940	0.850				
Flt Protected	0.971					
Satd. Flow (prot)	2951	1365	6071	0	0	6071
Flt Permitted	0.971					
Satd. Flow (perm)	2951	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

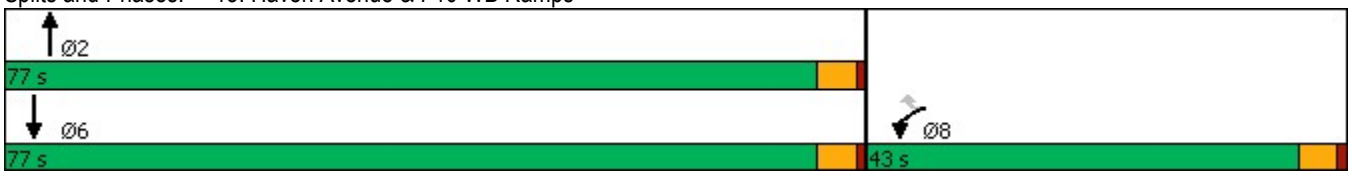
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	505	726	2730	0	0	1589
Future Volume (vph)	505	726	2730	0	0	1589
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	555	798	3000	0	0	1746
Shared Lane Traffic (%)		46%				
Lane Group Flow (vph)	922	431	3000	0	0	1746

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	505	726	2730	1589
Future Volume (vph)	505	726	2730	1589
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	38.5	38.5	72.5	72.5
Actuated g/C Ratio	0.32	0.32	0.60	0.60
v/c Ratio	0.97	0.98	0.82	0.48
Control Delay	64.1	80.3	21.0	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	64.1	80.3	21.0	13.7
LOS	E	F	C	B
Approach Delay	69.2		21.0	13.7
Approach LOS	E		C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 29.6	Intersection LOS: C
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	922	431	3000	1746
v/c Ratio	0.97	0.98	0.82	0.48
Control Delay	64.1	80.3	21.0	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	64.1	80.3	21.0	13.7
Queue Length 50th (ft)	361	362	497	205
Queue Length 95th (ft)	#502	#598	546	233
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	947	438	3667	3667
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.97	0.98	0.82	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

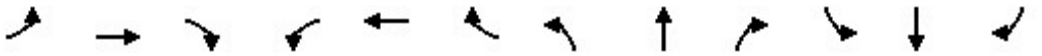
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	505	726	2730	0	0	1589
Future Volume (veh/h)	505	726	2730	0	0	1589
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	451	909	3000	0	0	1746
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	512	965	3671	0	0	3671
Arrive On Green	0.32	0.32	0.60	0.00	0.00	0.60
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	451	909	3000	0	0	1746
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	31.5	34.7	45.4	0.0	0.0	18.8
Cycle Q Clear(g_c), s	31.5	34.7	45.4	0.0	0.0	18.8
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	512	965	3671	0	0	3671
V/C Ratio(X)	0.88	0.94	0.82	0.00	0.00	0.48
Avail Cap(c_a), veh/h	521	983	3755	0	0	3755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	37.8	38.9	18.3	0.0	0.0	13.0
Incr Delay (d2), s/veh	15.8	16.5	1.5	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.4	14.8	15.3	0.0	0.0	6.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.6	55.3	19.8	0.0	0.0	13.1
LnGrp LOS	D	E	B	A	A	B
Approach Vol, veh/h	1360		3000			1746
Approach Delay, s/veh	54.8		19.8			13.1
Approach LOS	D		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		75.4			75.4	42.3
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s		47.4			20.8	36.7
Green Ext Time (p_c), s		23.5			21.9	1.1

Intersection Summary	
HCM 6th Ctrl Delay	25.7
HCM 6th LOS	C

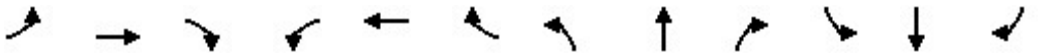
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			182			338			235
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



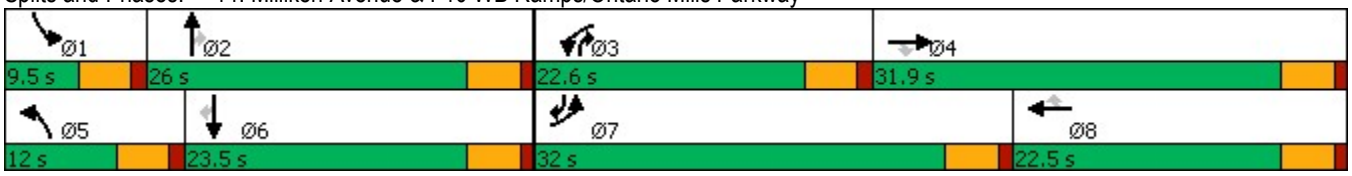
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	653	89	237	162	185	34	154	899	301	83	705	253
Future Volume (vph)	653	89	237	162	185	34	154	899	301	83	705	253
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	734	100	266	182	208	38	173	1010	338	93	792	284
Shared Lane Traffic (%)												
Lane Group Flow (vph)	734	100	266	182	208	38	173	1010	338	93	792	284

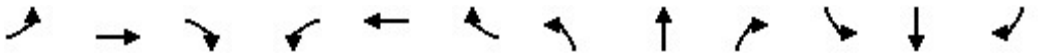
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	653	89	237	162	185	34	154	899	301	83	705	253
Future Volume (vph)	653	89	237	162	185	34	154	899	301	83	705	253
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	24.3	24.1	24.1	10.5	10.2	10.2	7.5	22.1	37.2	5.1	17.2	46.1
Actuated g/C Ratio	0.31	0.31	0.31	0.14	0.13	0.13	0.10	0.28	0.48	0.07	0.22	0.59
v/c Ratio	0.81	0.18	0.41	0.47	0.47	0.11	0.62	0.58	0.38	0.49	0.59	0.29
Control Delay	33.2	21.6	5.2	36.2	36.1	0.6	46.7	27.0	3.0	47.5	29.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	21.6	5.2	36.2	36.1	0.6	46.7	27.0	3.0	47.5	29.6	2.6
LOS	C	C	A	D	D	A	D	C	A	D	C	A
Approach Delay		25.4			33.0			23.9			24.5	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 77.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 25.4	Intersection LOS: C
Intersection Capacity Utilization 60.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

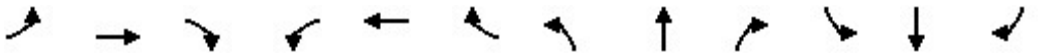




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	734	100	266	182	208	38	173	1010	338	93	792	284
v/c Ratio	0.81	0.18	0.41	0.47	0.47	0.11	0.62	0.58	0.38	0.49	0.59	0.29
Control Delay	33.2	21.6	5.2	36.2	36.1	0.6	46.7	27.0	3.0	47.5	29.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	21.6	5.2	36.2	36.1	0.6	46.7	27.0	3.0	47.5	29.6	2.6
Queue Length 50th (ft)	172	36	0	45	53	0	45	134	0	24	105	9
Queue Length 95th (ft)	246	76	51	74	85	0	#88	175	41	#52	141	40
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1038	632	707	683	788	491	283	1753	1012	188	1507	1045
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.16	0.38	0.27	0.26	0.08	0.61	0.58	0.33	0.49	0.53	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	653	89	237	162	185	34	154	899	301	83	705	253
Future Volume (veh/h)	653	89	237	162	185	34	154	899	301	83	705	253
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	734	100	266	182	208	38	173	1010	338	93	792	284
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	864	545	462	271	348	155	247	1680	554	176	1532	823
Arrive On Green	0.30	0.31	0.31	0.09	0.10	0.10	0.08	0.28	0.28	0.06	0.25	0.25
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	734	100	266	182	208	38	173	1010	338	93	792	284
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	16.2	2.8	10.2	4.1	4.0	1.6	4.0	9.8	12.5	2.1	7.6	7.2
Cycle Q Clear(g_c), s	16.2	2.8	10.2	4.1	4.0	1.6	4.0	9.8	12.5	2.1	7.6	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	864	545	462	271	348	155	247	1680	554	176	1532	823
V/C Ratio(X)	0.85	0.18	0.58	0.67	0.60	0.24	0.70	0.60	0.61	0.53	0.52	0.34
Avail Cap(c_a), veh/h	1170	710	602	770	886	395	319	1917	612	213	1694	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.6	17.4	19.9	30.0	29.3	28.2	30.4	21.5	17.6	31.2	22.0	8.6
Incr Delay (d2), s/veh	4.6	0.2	1.1	2.9	1.6	0.8	4.6	0.4	1.5	2.4	0.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	1.1	3.5	1.5	1.6	0.6	1.5	3.3	4.2	0.8	2.6	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.2	17.5	21.1	32.9	30.9	29.0	35.1	21.9	19.1	33.6	22.3	8.8
LnGrp LOS	C	B	C	C	C	C	D	C	B	C	C	A
Approach Vol, veh/h		1100			428			1521			1169	
Approach Delay, s/veh		24.8			31.6			22.8			19.9	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	23.4	10.9	25.5	10.3	21.7	24.8	11.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	4.1	14.5	6.1	12.2	6.0	9.6	18.2	6.0
Green Ext Time (p_c), s	0.0	4.3	0.4	1.3	0.1	4.4	2.1	1.0

Intersection Summary	
HCM 6th Ctrl Delay	23.4
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

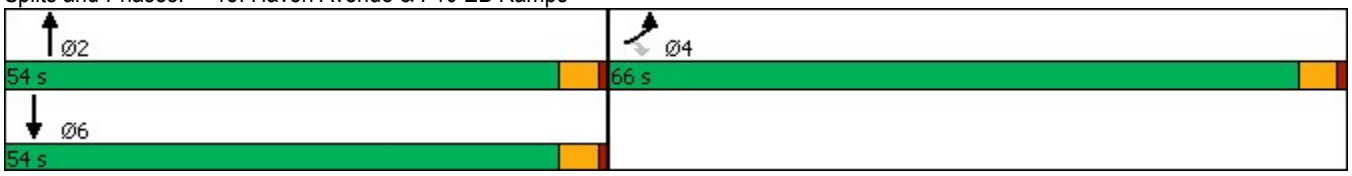
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1298	592	0	1764	1575	0
Future Volume (vph)	1298	592	0	1764	1575	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1458	665	0	1982	1770	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1525	598	0	1982	1770	0

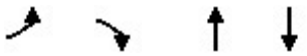
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1298	592	1764	1575
Future Volume (vph)	1298	592	1764	1575
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	61.3	61.3	49.3	49.3
Actuated g/C Ratio	0.51	0.51	0.41	0.41
v/c Ratio	0.97	0.85	0.79	0.71
Control Delay	45.6	39.0	33.6	31.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.6	39.0	33.6	31.1
LOS	D	D	C	C
Approach Delay	43.8		33.6	31.1
Approach LOS	D		C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 36.5	Intersection LOS: D
Intersection Capacity Utilization 82.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1525	598	1982	1770
v/c Ratio	0.97	0.85	0.79	0.71
Control Delay	45.6	39.0	33.6	31.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.6	39.0	33.6	31.1
Queue Length 50th (ft)	569	424	383	325
Queue Length 95th (ft)	#736	#668	424	363
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1576	703	2512	2512
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.97	0.85	0.79	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1298	592	0	1764	1575	0
Future Volume (veh/h)	1298	592	0	1764	1575	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1458	665	0	1982	1770	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1613	760	0	2516	2516	0
Arrive On Green	0.51	0.51	0.00	0.41	0.41	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1458	665	0	1982	1770	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	46.1	43.5	0.0	31.4	26.6	0.0
Cycle Q Clear(g_c), s	46.1	43.5	0.0	31.4	26.6	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1613	760	0	2516	2516	0
V/C Ratio(X)	0.90	0.88	0.00	0.79	0.70	0.00
Avail Cap(c_a), veh/h	1769	833	0	2723	2723	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	24.9	24.3	0.0	28.3	26.9	0.0
Incr Delay (d2), s/veh	6.6	9.7	0.0	1.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.0	16.7	0.0	11.4	9.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.5	34.0	0.0	29.8	27.7	0.0
LnGrp LOS	C	C	A	C	C	A
Approach Vol, veh/h	2123			1982	1770	
Approach Delay, s/veh	32.3			29.8	27.7	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		50.2		60.6		50.2
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		33.4		48.1		28.6
Green Ext Time (p_c), s		12.4		7.9		13.6

Intersection Summary	
HCM 6th Ctrl Delay	30.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		7				424
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	654	587	159	703	733	383
Future Volume (vph)	654	587	159	703	733	383
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	752	675	183	808	843	440
Shared Lane Traffic (%)						
Lane Group Flow (vph)	752	675	183	808	843	440

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	654	587	159	703	733	383
Future Volume (vph)	654	587	159	703	733	383
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	27.0	27.0	52.0	25.0	38.0
Total Split (%)	42.2%	30.0%	30.0%	57.8%	27.8%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	24.1	41.1	12.3	33.8	16.9	45.7
Actuated g/C Ratio	0.36	0.61	0.18	0.50	0.25	0.68
v/c Ratio	0.73	0.74	0.35	0.27	0.56	0.38
Control Delay	24.4	15.0	27.8	10.2	25.0	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	15.0	27.8	10.2	25.0	1.7
LOS	C	B	C	B	C	A
Approach Delay	20.0			13.5	17.0	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.2	Intersection LOS: B
Intersection Capacity Utilization 57.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

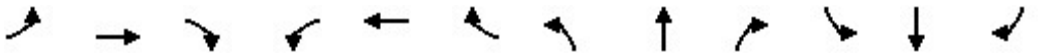
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	752	675	183	808	843	440
v/c Ratio	0.73	0.74	0.35	0.27	0.56	0.38
Control Delay	24.4	15.0	27.8	10.2	25.0	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	15.0	27.8	10.2	25.0	1.7
Queue Length 50th (ft)	129	171	34	50	83	2
Queue Length 95th (ft)	237	294	69	84	152	29
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1508	1169	1013	4482	1938	1320
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.58	0.18	0.18	0.43	0.33

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	654	587	159	703	733	383
Future Volume (veh/h)	654	587	159	703	733	383
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	752	675	183	808	843	440
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1325	828	279	2471	1463	1044
Arrive On Green	0.46	0.46	0.10	0.41	0.24	0.24
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	752	675	183	808	843	440
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	12.3	23.7	3.9	5.9	7.9	8.2
Cycle Q Clear(g_c), s	12.3	23.7	3.9	5.9	7.9	8.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1325	828	279	2471	1463	1044
V/C Ratio(X)	0.57	0.82	0.66	0.33	0.58	0.42
Avail Cap(c_a), veh/h	1507	922	1012	4476	1932	1160
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.9	11.8	28.2	13.2	21.7	4.2
Incr Delay (d2), s/veh	0.4	5.2	2.6	0.1	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	18.8	1.4	1.8	2.7	6.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.3	17.1	30.8	13.3	22.0	4.5
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	1427			991	1283	
Approach Delay, s/veh	15.1			16.5	16.0	
Approach LOS	B			B	B	

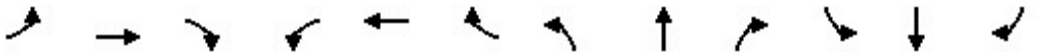
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		30.7		34.0	10.7	20.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	22.5	20.5
Max Q Clear Time (g_c+I1), s		7.9		25.7	5.9	10.2
Green Ext Time (p_c), s		6.8		3.8	0.5	5.4

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.955				0.850			0.850		0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4601	0	2891	3353	1500	2891	4818	1500	2891	5907	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4601	0	2891	3353	1500	2891	4818	1500	2891	5907	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87				136			177		57	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	364	710	300	200	597	125	334	1733	263	198	1696	370
Future Volume (vph)	364	710	300	200	597	125	334	1733	263	198	1696	370
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	396	772	326	217	649	136	363	1884	286	215	1843	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	396	1098	0	217	649	136	363	1884	286	215	2245	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	364	710	200	597	125	334	1733	263	198	1696
Future Volume (vph)	364	710	200	597	125	334	1733	263	198	1696
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.5	32.5	9.5	24.5	24.5	9.5	52.5	120.0	7.5	50.5
Actuated g/C Ratio	0.15	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	0.94	0.84	0.95	0.95	0.33	1.59	0.89	0.19	1.19	0.89
Control Delay	82.3	44.7	103.6	71.4	8.9	322.0	37.9	0.3	176.8	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	44.7	103.6	71.4	8.9	322.0	37.9	0.3	176.8	36.9
LOS	F	D	F	E	A	F	D	A	F	D
Approach Delay		54.7		69.9			74.4			49.2
Approach LOS		D		E			E			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.59	
Intersection Signal Delay: 61.6	Intersection LOS: E
Intersection Capacity Utilization 88.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	396	1098	217	649	136	363	1884	286	215	2245
v/c Ratio	0.94	0.84	0.95	0.95	0.33	1.59	0.89	0.19	1.19	0.89
Control Delay	82.3	44.7	103.6	71.4	8.9	322.0	37.9	0.3	176.8	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	44.7	103.6	71.4	8.9	322.0	37.9	0.3	176.8	36.9
Queue Length 50th (ft)	158	273	87	263	0	~206	484	0	~103	451
Queue Length 95th (ft)	#255	332	#166	#380	53	#305	557	0	#184	506
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	421	1309	228	684	414	228	2107	1500	180	2518
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.84	0.95	0.95	0.33	1.59	0.89	0.19	1.19	0.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

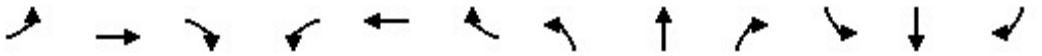
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	364	710	300	200	597	125	334	1733	263	198	1696	370
Future Volume (veh/h)	364	710	300	200	597	125	334	1733	263	198	1696	370
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	396	772	326	217	649	136	363	1884	0	215	1843	402
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	424	906	379	230	687	307	230	2116		182	2124	462
Arrive On Green	0.15	0.27	0.27	0.08	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	2910	3344	1400	2910	3367	1502	2910	4837	1502	2910	5047	1098
Grp Volume(v), veh/h	396	744	354	217	649	136	363	1884	0	215	1669	576
Grp Sat Flow(s),veh/h/ln	1455	1612	1520	1455	1683	1502	1455	1612	1502	1455	1524	1574
Q Serve(g_s), s	16.1	26.2	26.6	8.9	22.8	9.5	9.5	43.1	0.0	7.5	40.0	40.1
Cycle Q Clear(g_c), s	16.1	26.2	26.6	8.9	22.8	9.5	9.5	43.1	0.0	7.5	40.0	40.1
Prop In Lane	1.00		0.92	1.00		1.00	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	424	873	412	230	687	307	230	2116		182	1924	662
V/C Ratio(X)	0.93	0.85	0.86	0.94	0.94	0.44	1.58	0.89		1.18	0.87	0.87
Avail Cap(c_a), veh/h	424	873	412	230	687	307	230	2116		182	1924	662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	41.5	41.6	55.0	47.1	41.8	55.3	31.1	0.0	56.3	31.7	31.7
Incr Delay (d2), s/veh	27.6	8.1	16.5	43.3	21.7	1.0	278.9	6.1	0.0	124.3	5.6	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	11.3	11.8	4.6	11.6	3.6	12.4	17.5	0.0	5.9	15.4	17.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.3	49.6	58.1	98.3	68.8	42.8	334.2	37.2	0.0	180.5	37.3	46.3
LnGrp LOS	E	D	E	F	E	D	F	D		F	D	D
Approach Vol, veh/h		1494			1002			2247	A		2460	
Approach Delay, s/veh		59.2			71.6			85.2			51.9	
Approach LOS		E			E			F			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	14.0	37.0	14.0	55.0	22.0	29.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	9.5	45.1	10.9	28.6	11.5	42.1	18.1	24.8
Green Ext Time (p_c), s	0.0	6.2	0.0	2.5	0.0	7.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	66.6
HCM 6th LOS	E

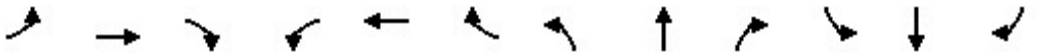
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6071	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6071	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				203			133		246	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	1961	5	1	1195	193	15	0	9	151	0	12
Future Volume (vph)	4	1961	5	1	1195	193	15	0	9	151	0	12
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	2064	5	1	1258	203	16	0	9	159	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	2069	0	1	1258	203	16	0	9	159	13	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	1961	1	1195	193	15	9	151	0
Future Volume (vph)	4	1961	1	1195	193	15	9	151	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.0	37.4	5.0	37.4	37.4	6.2	5.5	9.9	17.9
Actuated g/C Ratio	0.07	0.55	0.07	0.55	0.55	0.09	0.08	0.15	0.26
v/c Ratio	0.03	0.62	0.01	0.48	0.22	0.11	0.04	0.69	0.01
Control Delay	32.2	11.9	32.0	10.5	2.2	31.6	0.3	46.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	11.9	32.0	10.5	2.2	31.6	0.3	46.8	0.0
LOS	C	B	C	B	A	C	A	D	A
Approach Delay		12.0		9.4					43.3
Approach LOS		B		A					D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 54.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	4	2069	1	1258	203	16	9	159	13
v/c Ratio	0.03	0.62	0.01	0.48	0.22	0.11	0.04	0.69	0.01
Control Delay	32.2	11.9	32.0	10.5	2.2	31.6	0.3	46.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	11.9	32.0	10.5	2.2	31.6	0.3	46.8	0.0
Queue Length 50th (ft)	2	145	0	99	0	6	0	62	0
Queue Length 95th (ft)	11	246	5	178	31	25	0	#169	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	116	3393	116	2693	927	170	519	231	1083
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.61	0.01	0.47	0.22	0.09	0.02	0.69	0.01

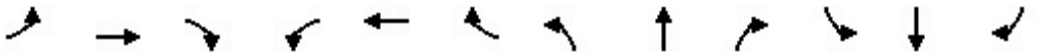
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1961	5	1	1195	193	15	0	9	151	0	12
Future Volume (veh/h)	4	1961	5	1	1195	193	15	0	9	151	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	4	2064	5	1	1258	203	16	0	9	159	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	3221	8	3	2444	759	31	141	120	195	307	274
Arrive On Green	0.01	0.51	0.51	0.00	0.51	0.51	0.02	0.00	0.08	0.12	0.00	0.18
Sat Flow, veh/h	1594	6325	15	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	4	1492	577	1	1258	203	16	0	9	159	0	13
Grp Sat Flow(s),veh/h/ln	1594	1524	1769	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.2	14.9	14.9	0.0	10.9	4.8	0.6	0.0	0.3	6.1	0.0	0.4
Cycle Q Clear(g_c), s	0.2	14.9	14.9	0.0	10.9	4.8	0.6	0.0	0.3	6.1	0.0	0.4
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	9	2328	901	3	2444	759	31	141	120	195	307	274
V/C Ratio(X)	0.47	0.64	0.64	0.39	0.51	0.27	0.52	0.00	0.08	0.82	0.00	0.05
Avail Cap(c_a), veh/h	127	2767	1071	127	2927	909	186	543	460	252	586	523
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.1	11.2	11.2	31.2	10.4	8.9	30.4	0.0	26.7	26.8	0.0	21.1
Incr Delay (d2), s/veh	34.9	0.4	1.0	77.1	0.2	0.2	12.7	0.0	0.3	14.7	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	4.3	5.1	0.1	3.3	1.4	0.3	0.0	0.1	3.0	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.9	11.6	12.2	108.4	10.5	9.1	43.2	0.0	26.9	41.5	0.0	21.2
LnGrp LOS	E	B	B	F	B	A	D	A	C	D	A	C
Approach Vol, veh/h		2073			1462			25			172	
Approach Delay, s/veh		11.8			10.4			37.3			40.0	
Approach LOS		B			B			D			D	

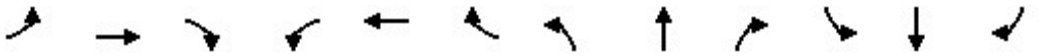
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	9.5	4.6	36.4	5.7	15.9	4.8	36.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	8.1	2.3	2.0	16.9	2.6	2.4	2.2	12.9
Green Ext Time (p_c), s	0.1	0.0	0.0	15.0	0.0	0.0	0.0	11.3

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4798	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.727				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4798	0	1212	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			7				153			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



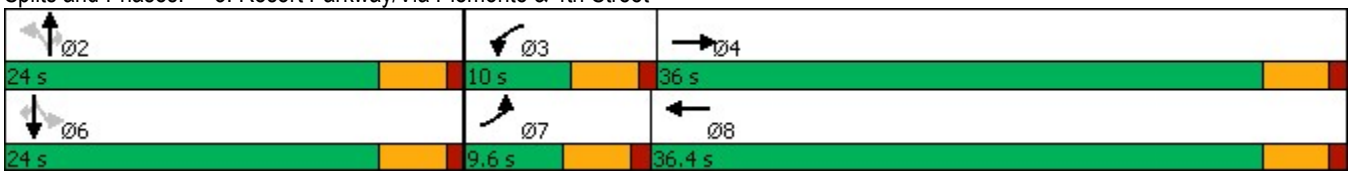
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	29	2082	8	5	1373	38	11	0	20	43	1	20
Future Volume (vph)	29	2082	8	5	1373	38	11	0	20	43	1	20
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	31	2192	8	5	1445	40	12	0	21	45	1	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	2200	0	5	1485	0	12	0	21	0	46	21

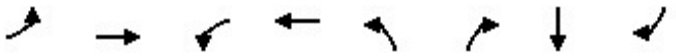
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	29	2082	5	1373	11	20	43	1	20
Future Volume (vph)	29	2082	5	1373	11	20	43	1	20
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	33.7	5.6	32.1	7.3	7.3		7.3	7.3
Actuated g/C Ratio	0.10	0.65	0.11	0.62	0.14	0.14		0.14	0.14
v/c Ratio	0.11	0.56	0.03	0.50	0.07	0.06		0.26	0.07
Control Delay	25.0	6.5	24.6	7.2	22.2	0.3		25.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	25.0	6.5	24.6	7.2	22.2	0.3		25.2	0.5
LOS	C	A	C	A	C	A		C	A
Approach Delay		6.7		7.3				17.4	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 51.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 7.2	Intersection LOS: A
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	31	2200	5	1485	12	21	46	21
v/c Ratio	0.11	0.56	0.03	0.50	0.07	0.06	0.26	0.07
Control Delay	25.0	6.5	24.6	7.2	22.2	0.3	25.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	6.5	24.6	7.2	22.2	0.3	25.2	0.5
Queue Length 50th (ft)	4	69	1	53	3	0	11	0
Queue Length 95th (ft)	17	198	10	160	16	0	41	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	288	3947	170	2999	462	667	492	630
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.56	0.03	0.50	0.03	0.03	0.09	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	2082	8	5	1373	38	11	0	20	43	1	20
Future Volume (veh/h)	29	2082	8	5	1373	38	11	0	20	43	1	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	31	2192	8	5	1445	40	12	0	21	45	1	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	104	3717	14	11	2708	75	262	194	164	304	5	164
Arrive On Green	0.04	0.59	0.59	0.01	0.56	0.56	0.11	0.00	0.11	0.11	0.11	0.11
Sat Flow, veh/h	2910	6316	23	1594	4839	134	1312	1772	1502	1355	46	1502
Grp Volume(v), veh/h	31	1586	614	5	963	522	12	0	21	46	0	21
Grp Sat Flow(s),veh/h/ln	1455	1524	1768	1594	1612	1748	1312	1772	1502	1401	0	1502
Q Serve(g_s), s	0.5	10.0	10.0	0.1	8.6	8.6	0.4	0.0	0.6	1.3	0.0	0.6
Cycle Q Clear(g_c), s	0.5	10.0	10.0	0.1	8.6	8.6	1.8	0.0	0.6	1.4	0.0	0.6
Prop In Lane	1.00		0.01	1.00		0.08	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	104	2690	1040	11	1805	978	262	194	164	309	0	164
V/C Ratio(X)	0.30	0.59	0.59	0.47	0.53	0.53	0.05	0.00	0.13	0.15	0.00	0.13
Avail Cap(c_a), veh/h	325	3151	1218	192	2251	1220	678	756	641	752	0	641
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	5.9	5.9	22.6	6.3	6.3	19.5	0.0	18.4	18.7	0.0	18.4
Incr Delay (d2), s/veh	1.6	0.2	0.5	28.3	0.2	0.5	0.1	0.0	0.3	0.2	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.0	2.4	0.1	1.9	2.1	0.1	0.0	0.2	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	6.1	6.5	51.0	6.6	6.8	19.6	0.0	18.7	19.0	0.0	18.7
LnGrp LOS	C	A	A	D	A	A	B	A	B	B	A	B
Approach Vol, veh/h		2231			1490			33			67	
Approach Delay, s/veh		6.5			6.8			19.1			18.9	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	4.8	31.4		9.5	6.1	30.1				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		3.8	2.1	12.0		3.4	2.5	10.6				
Green Ext Time (p_c), s		0.0	0.0	14.9		0.2	0.0	11.0				

Intersection Summary	
HCM 6th Ctrl Delay	6.9
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	4798	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4798	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	2089	63	0	1390	0	27
Future Volume (vph)	2089	63	0	1390	0	27
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	2176	66	0	1448	0	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2242	0	0	1448	0	28

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2089	63	0	1390	0	27
Future Vol, veh/h	2089	63	0	1390	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2176	66	0	1448	0	28

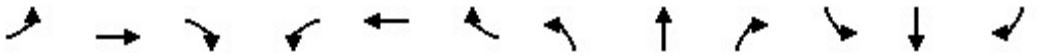
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1121
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	172
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	172
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	30
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	172	-	-	-
HCM Lane V/C Ratio	0.164	-	-	-
HCM Control Delay (s)	30	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.6	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5955	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5955	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			215			285			55		30	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



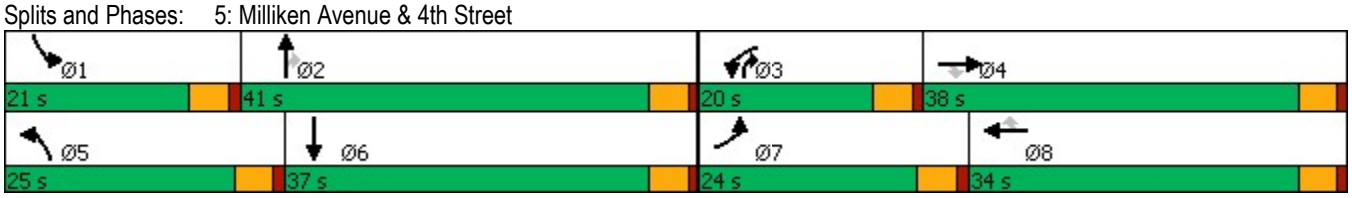
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	440	1267	279	376	1036	326	426	1626	373	462	1020	150
Future Volume (vph)	440	1267	279	376	1036	326	426	1626	373	462	1020	150
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	458	1320	291	392	1079	340	444	1694	389	481	1063	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	458	1320	291	392	1079	340	444	1694	389	481	1219	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	440	1267	279	376	1036	326	426	1626	373	462	1020
Future Volume (vph)	440	1267	279	376	1036	326	426	1626	373	462	1020
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.5	33.5	33.5	15.5	29.5	29.5	20.2	36.5	56.5	16.5	32.8
Actuated g/C Ratio	0.16	0.28	0.28	0.13	0.25	0.25	0.17	0.30	0.47	0.14	0.27
v/c Ratio	0.98	0.98	0.51	1.05	0.91	0.58	0.91	0.92	0.53	1.21	0.74
Control Delay	86.4	63.6	13.4	110.8	56.3	12.2	73.5	49.3	22.1	160.4	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	63.6	13.4	110.8	56.3	12.2	73.5	49.3	22.1	160.4	42.0
LOS	F	E	B	F	E	B	E	D	C	F	D
Approach Delay		61.6			59.8			49.4			75.5
Approach LOS		E			E			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 60.3	Intersection LOS: E
Intersection Capacity Utilization 94.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	458	1320	291	392	1079	340	444	1694	389	481	1219
v/c Ratio	0.98	0.98	0.51	1.05	0.91	0.58	0.91	0.92	0.53	1.21	0.74
Control Delay	86.4	63.6	13.4	110.8	56.3	12.2	73.5	49.3	22.1	160.4	42.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	63.6	13.4	110.8	56.3	12.2	73.5	49.3	22.1	160.4	42.0
Queue Length 50th (ft)	184	372	45	~170	298	34	175	367	177	~234	245
Queue Length 95th (ft)	#291	#478	130	#271	#381	126	#269	#423	272	#342	288
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	469	1345	573	373	1184	583	493	1846	735	397	1649
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.98	0.51	1.05	0.91	0.58	0.90	0.92	0.53	1.21	0.74

Intersection Summary

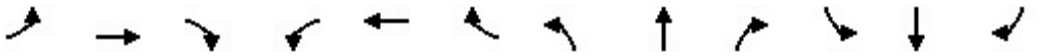
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	1267	279	376	1036	326	426	1626	373	462	1020	150
Future Volume (veh/h)	440	1267	279	376	1036	326	426	1626	373	462	1020	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	458	1320	291	392	1079	340	444	1694	389	481	1062	156
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	1353	420	377	1192	370	488	1845	649	401	1478	215
Arrive On Green	0.16	0.28	0.28	0.13	0.25	0.25	0.17	0.30	0.30	0.14	0.27	0.27
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5414	788
Grp Volume(v), veh/h	458	1320	291	392	1079	340	444	1694	389	481	895	323
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1630
Q Serve(g_s), s	18.7	32.4	20.7	15.5	25.9	26.4	17.9	32.1	23.8	16.5	21.2	21.5
Cycle Q Clear(g_c), s	18.7	32.4	20.7	15.5	25.9	26.4	17.9	32.1	23.8	16.5	21.2	21.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.48
Lane Grp Cap(c), veh/h	474	1353	420	377	1192	370	488	1845	649	401	1248	445
V/C Ratio(X)	0.97	0.98	0.69	1.04	0.91	0.92	0.91	0.92	0.60	1.20	0.72	0.73
Avail Cap(c_a), veh/h	474	1353	420	377	1192	370	498	1858	652	401	1248	445
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	42.7	38.5	52.1	43.8	44.0	49.0	40.3	26.1	51.6	39.4	39.5
Incr Delay (d2), s/veh	32.7	18.8	4.8	57.3	10.0	27.5	20.6	7.8	1.5	111.5	2.0	5.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.9	15.1	8.2	8.6	11.4	12.6	7.9	12.9	8.7	12.2	8.1	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.5	61.5	43.4	109.5	53.8	71.5	69.6	48.1	27.6	163.2	41.4	45.3
LnGrp LOS	F	E	D	F	D	E	E	D	C	F	D	D
Approach Vol, veh/h		2069			1811			2527			1699	
Approach Delay, s/veh		63.6			69.1			48.7			76.6	
Approach LOS		E			E			D			E	

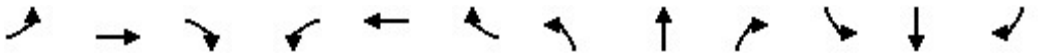
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	40.8	20.0	38.0	24.6	37.2	24.0	34.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	34.1	17.5	34.4	19.9	23.5	20.7	28.4
Green Ext Time (p_c), s	0.0	2.1	0.0	0.0	0.1	5.2	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	62.9
HCM 6th LOS	E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.922	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2961	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2961	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			125			196			263		217	369
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



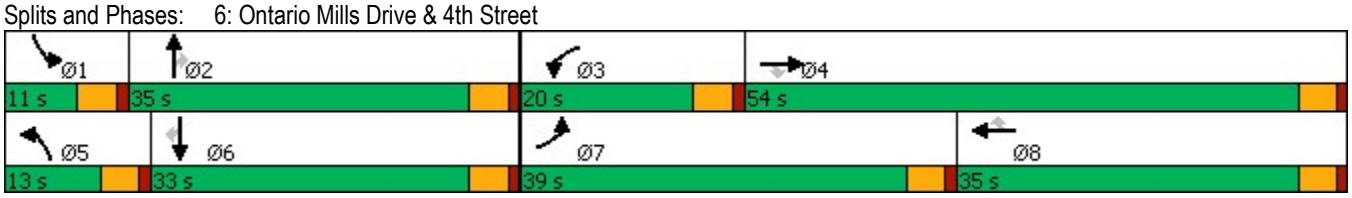
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	986	1413	120	244	1116	456	141	310	360	104	312	680
Future Volume (vph)	986	1413	120	244	1116	456	141	310	360	104	312	680
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1072	1536	130	265	1213	496	153	337	391	113	339	739
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	1072	1536	130	265	1213	496	153	337	391	113	709	369

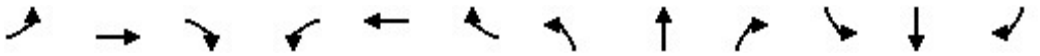
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	986	1413	120	244	1116	456	141	310	360	104	312	680
Future Volume (vph)	986	1413	120	244	1116	456	141	310	360	104	312	680
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.5	50.7	50.7	14.3	30.5	30.5	8.5	28.2	28.2	6.5	26.2	26.2
Actuated g/C Ratio	0.29	0.43	0.43	0.12	0.26	0.26	0.07	0.24	0.24	0.06	0.22	0.22
v/c Ratio	1.27	0.74	0.18	0.75	0.97	0.93	1.34	0.42	0.70	1.30	0.86	0.63
Control Delay	164.9	31.4	4.9	64.5	63.4	51.6	243.4	39.5	20.4	241.4	41.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	164.9	31.4	4.9	64.5	63.4	51.6	243.4	39.5	20.4	241.4	41.4	9.0
LOS	F	C	A	E	E	D	F	D	C	F	D	A
Approach Delay		82.4			60.6			66.4			50.3	
Approach LOS		F			E			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.8	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.34	
Intersection Signal Delay: 68.3	Intersection LOS: E
Intersection Capacity Utilization 96.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



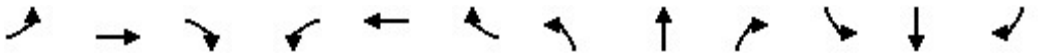


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1072	1536	130	265	1213	496	153	337	391	113	709	369
v/c Ratio	1.27	0.74	0.18	0.75	0.97	0.93	1.34	0.42	0.70	1.30	0.86	0.63
Control Delay	164.9	31.4	4.9	64.5	63.4	51.6	243.4	39.5	20.4	241.4	41.4	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	164.9	31.4	4.9	64.5	63.4	51.6	243.4	39.5	20.4	241.4	41.4	9.0
Queue Length 50th (ft)	~545	369	2	103	344	248	~156	114	86	~113	204	0
Queue Length 95th (ft)	#676	431	40	150	#449	#466	#293	159	203	#234	285	94
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	847	2074	717	380	1248	533	114	868	583	87	881	610
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.27	0.74	0.18	0.70	0.97	0.93	1.34	0.39	0.67	1.30	0.80	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



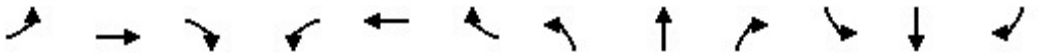
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	986	1413	120	244	1116	456	141	310	360	104	312	680
Future Volume (veh/h)	986	1413	120	244	1116	456	141	310	360	104	312	680
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1072	1536	130	265	1213	496	153	337	391	113	339	739
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	837	2097	651	315	1229	382	113	856	382	86	421	713
Arrive On Green	0.29	0.43	0.43	0.11	0.25	0.25	0.07	0.25	0.25	0.05	0.24	0.24
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	1072	1536	130	265	1213	496	153	337	391	113	339	739
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	34.5	31.6	6.4	10.7	30.0	30.5	8.5	10.0	30.5	6.5	21.6	28.5
Cycle Q Clear(g_c), s	34.5	31.6	6.4	10.7	30.0	30.5	8.5	10.0	30.5	6.5	21.6	28.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	837	2097	651	315	1229	382	113	856	382	86	421	713
V/C Ratio(X)	1.28	0.73	0.20	0.84	0.99	1.30	1.36	0.39	1.02	1.31	0.81	1.04
Avail Cap(c_a), veh/h	837	2097	651	376	1229	382	113	856	382	86	421	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	28.2	21.1	52.5	44.5	44.8	55.8	37.1	44.8	56.8	43.1	45.7
Incr Delay (d2), s/veh	135.7	1.3	0.1	13.8	22.4	152.9	206.9	0.3	52.5	200.3	10.9	43.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.0	12.3	2.3	4.5	14.4	27.4	9.9	4.1	16.8	7.4	10.7	14.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	178.5	29.6	21.2	66.3	66.9	197.6	262.6	37.4	97.2	257.1	54.1	89.1
LnGrp LOS	F	C	C	E	E	F	F	D	F	F	D	F
Approach Vol, veh/h		2738			1974			881			1191	
Approach Delay, s/veh		87.5			99.7			103.0			95.1	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	17.5	56.5	13.0	33.0	39.0	35.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.5	32.5	12.7	33.6	10.5	30.5	36.5	32.5
Green Ext Time (p_c), s	0.0	0.0	0.3	10.2	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	94.4
HCM 6th LOS	F

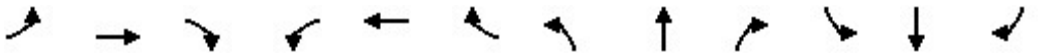
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.973			0.940				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.978	
Satd. Flow (prot)	2891	4818	1500	1583	4688	0	1583	3152	0	1504	1640	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.978	
Satd. Flow (perm)	2891	4818	1500	1583	4688	0	1583	3152	0	1504	1640	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			126		39			60				217
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



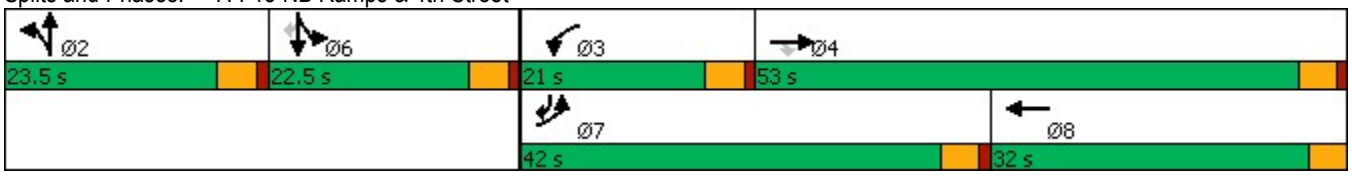
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	913	827	131	79	972	216	152	85	58	197	76	676
Future Volume (vph)	913	827	131	79	972	216	152	85	58	197	76	676
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	951	861	136	82	1013	225	158	89	60	205	79	704
Shared Lane Traffic (%)										32%		
Lane Group Flow (vph)	951	861	136	82	1238	0	158	149	0	139	145	704

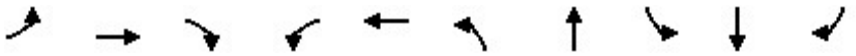
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	913	827	131	79	972	152	85	197	76	676
Future Volume (vph)	913	827	131	79	972	152	85	197	76	676
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	37.6	56.5	56.5	11.2	28.6	15.5	15.5	14.6	14.6	56.8
Actuated g/C Ratio	0.33	0.50	0.50	0.10	0.25	0.14	0.14	0.13	0.13	0.50
v/c Ratio	0.99	0.36	0.17	0.53	1.02	0.73	0.31	0.72	0.69	0.49
Control Delay	66.1	20.3	5.1	61.4	72.9	67.6	28.1	68.8	64.7	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.1	20.3	5.1	61.4	72.9	67.6	28.1	68.8	64.7	13.9
LOS	E	C	A	E	E	E	C	E	E	B
Approach Delay		41.6			72.2		48.4		29.1	
Approach LOS		D			E		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.4	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 48.2	Intersection LOS: D
Intersection Capacity Utilization 87.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	951	861	136	82	1238	158	149	139	145	704
v/c Ratio	0.99	0.36	0.17	0.53	1.02	0.73	0.31	0.72	0.69	0.49
Control Delay	66.1	20.3	5.1	61.4	72.9	67.6	28.1	68.8	64.7	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.1	20.3	5.1	61.4	72.9	67.6	28.1	68.8	64.7	13.9
Queue Length 50th (ft)	~373	149	4	59	~358	113	31	105	109	128
Queue Length 95th (ft)	#543	212	44	111	#482	190	63	182	185	190
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	959	2399	810	231	1211	266	579	239	261	1430
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.36	0.17	0.35	1.02	0.59	0.26	0.58	0.56	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	913	827	131	79	972	216	152	85	58	197	76	676
Future Volume (veh/h)	913	827	131	79	972	216	152	85	58	197	76	676
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	951	861	136	82	1012	225	158	89	60	142	167	704
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	942	2446	759	102	974	216	191	238	148	248	275	1439
Arrive On Green	0.32	0.51	0.51	0.06	0.25	0.25	0.12	0.12	0.12	0.16	0.16	0.16
Sat Flow, veh/h	2910	4837	1502	1594	3960	879	1594	1992	1240	1594	1772	3003
Grp Volume(v), veh/h	951	861	136	82	824	413	158	74	75	142	167	704
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1614	1594	1683	1549	1594	1772	1502
Q Serve(g_s), s	37.5	12.4	5.7	5.9	28.5	28.5	11.2	4.7	5.2	9.6	10.2	18.0
Cycle Q Clear(g_c), s	37.5	12.4	5.7	5.9	28.5	28.5	11.2	4.7	5.2	9.6	10.2	18.0
Prop In Lane	1.00		1.00	1.00		0.54	1.00		0.80	1.00		1.00
Lane Grp Cap(c), veh/h	942	2446	759	102	793	397	191	201	185	248	275	1439
V/C Ratio(X)	1.01	0.35	0.18	0.80	1.04	1.04	0.83	0.37	0.40	0.57	0.61	0.49
Avail Cap(c_a), veh/h	942	2446	759	227	793	397	261	276	254	248	275	1439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	17.2	15.6	53.5	43.7	43.7	49.8	47.0	47.2	45.4	45.6	20.5
Incr Delay (d2), s/veh	31.7	0.1	0.1	13.6	42.4	56.2	14.6	1.1	1.4	3.2	3.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.3	4.6	2.0	2.7	15.9	17.4	5.2	2.0	2.1	4.0	4.8	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.9	17.3	15.7	67.1	86.1	99.8	64.4	48.1	48.6	48.6	49.4	20.8
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	C
Approach Vol, veh/h		1948			1319			307			1013	
Approach Delay, s/veh		43.4			89.2			56.6			29.4	
Approach LOS		D			F			E			C	

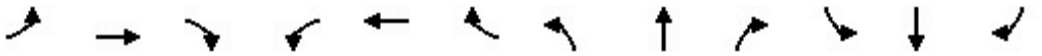
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.4	11.9	63.1		22.5	42.0	33.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		13.2	7.9	14.4		20.0	39.5	30.5				
Green Ext Time (p_c), s		0.6	0.1	7.7		0.0	0.0	0.0				

Intersection Summary	
HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

Notes

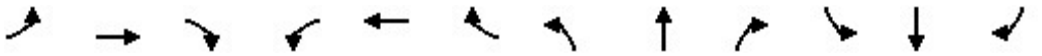
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



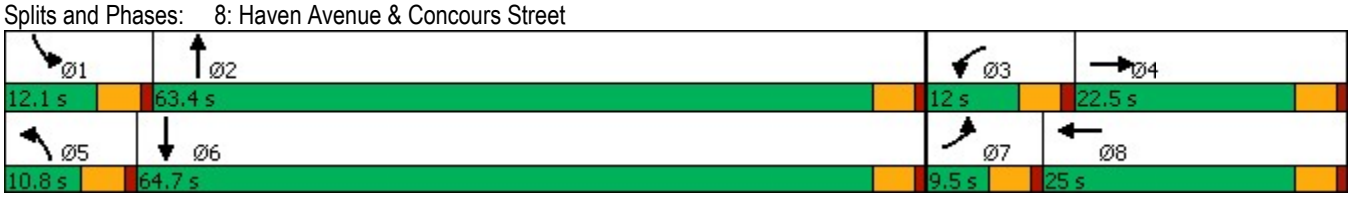
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	26	40	65	226	95	97	48	2579	228	178	2162	28
Future Volume (vph)	26	40	65	226	95	97	48	2579	228	178	2162	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	27	41	66	231	97	99	49	2632	233	182	2206	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	107	0	231	97	99	49	2632	233	182	2206	29

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	40	226	95	97	48	2579	228	178	2162	28
Future Volume (vph)	26	40	226	95	97	48	2579	228	178	2162	28
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.0	7.5	13.4	99.0	6.1	58.9	99.0	7.6	62.4	99.0
Actuated g/C Ratio	0.05	0.07	0.08	0.14	1.00	0.06	0.59	1.00	0.08	0.63	1.00
v/c Ratio	0.19	0.39	0.78	0.21	0.07	0.27	0.73	0.16	0.82	0.58	0.02
Control Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.0	0.2	74.3	12.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.0	0.2	74.3	12.0	0.0
LOS	D	C	E	D	A	D	B	A	E	B	A
Approach Delay		28.9		43.8			15.3			16.6	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 68.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	107	231	97	99	49	2632	233	182	2206	29
v/c Ratio	0.19	0.39	0.78	0.21	0.07	0.27	0.73	0.16	0.82	0.58	0.02
Control Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.0	0.2	74.3	12.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.0	0.2	74.3	12.0	0.0
Queue Length 50th (ft)	8	13	51	30	0	15	318	0	59	228	0
Queue Length 95th (ft)	23	39	#93	56	0	35	388	0	#121	281	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	145	606	298	693	1500	183	3611	1500	221	3825	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.18	0.78	0.14	0.07	0.27	0.73	0.16	0.82	0.58	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

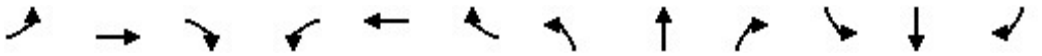
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	40	65	226	95	97	48	2579	228	178	2162	28
Future Volume (veh/h)	26	40	65	226	95	97	48	2579	228	178	2162	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	27	41	66	231	97	0	49	2632	0	182	2206	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	114	102	310	400		111	3560		233	3816	
Arrive On Green	0.03	0.07	0.07	0.08	0.12	0.00	0.04	0.58	0.00	0.08	0.63	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	27	41	66	231	97	0	49	2632	0	182	2206	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.9	2.2	4.1	5.4	2.5	0.0	1.6	29.9	0.0	5.8	20.1	0.0
Cycle Q Clear(g_c), s	0.9	2.2	4.1	5.4	2.5	0.0	1.6	29.9	0.0	5.8	20.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	78	114	102	310	400		111	3560		233	3816	
V/C Ratio(X)	0.35	0.36	0.65	0.75	0.24		0.44	0.74		0.78	0.58	
Avail Cap(c_a), veh/h	154	320	285	314	729		194	3790		233	3873	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.3	42.2	43.1	42.8	37.9	0.0	44.6	14.4	0.0	42.7	10.4	0.0
Incr Delay (d2), s/veh	2.6	1.9	6.8	9.3	0.3	0.0	2.7	0.7	0.0	15.4	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.0	1.7	2.0	1.0	0.0	0.6	9.5	0.0	2.6	6.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.9	44.1	49.9	52.0	38.2	0.0	47.3	15.2	0.0	58.2	10.6	0.0
LnGrp LOS	D	D	D	D	D		D	B		E	B	
Approach Vol, veh/h		134			328	A		2681	A		2388	A
Approach Delay, s/veh		47.7			47.9			15.8			14.2	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	59.8	11.9	10.9	8.1	63.8	7.0	15.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	7.8	31.9	7.4	6.1	3.6	22.1	2.9	4.5
Green Ext Time (p_c), s	0.0	23.4	0.0	0.4	0.0	26.2	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

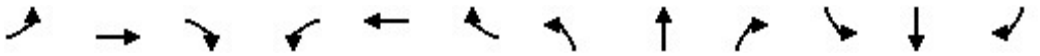
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.939			0.951						0.998	
Flt Protected	0.950	0.971			0.969		0.950			0.950		
Satd. Flow (prot)	1593	1529	0	0	1626	0	1676	4818	0	1676	4808	0
Flt Permitted	0.950	0.971					0.950			0.950		
Satd. Flow (perm)	1593	1529	0	0	1678	0	1676	4818	0	1676	4808	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						3	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



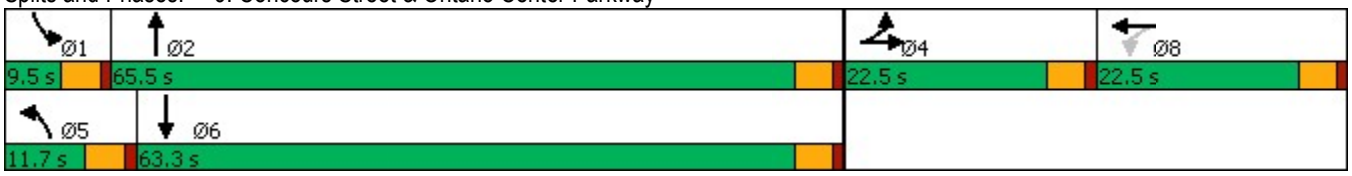
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	49	0	12	15	0	9	4	1803	5	1	1088	17
Future Volume (vph)	49	0	12	15	0	9	4	1803	5	1	1088	17
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	52	0	13	16	0	9	4	1898	5	1	1145	18
Shared Lane Traffic (%)	36%											
Lane Group Flow (vph)	33	32	0	0	25	0	4	1903	0	1	1163	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	49	0	15	0	4	1803	1	1088
Future Volume (vph)	49	0	15	0	4	1803	1	1088
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.6	7.6		6.0	6.2	57.1	5.4	56.9
Actuated g/C Ratio	0.10	0.10		0.08	0.08	0.77	0.07	0.77
v/c Ratio	0.20	0.13		0.11	0.03	0.51	0.01	0.32
Control Delay	40.3	1.1		1.0	40.8	6.6	42.0	5.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	1.1		1.0	40.8	6.6	42.0	5.3
LOS	D	A		A	D	A	D	A
Approach Delay		21.0		1.0		6.7		5.3
Approach LOS		C		A		A		A

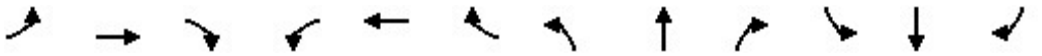
Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 74.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	33	32	25	4	1903	1	1163
v/c Ratio	0.20	0.13	0.11	0.03	0.51	0.01	0.32
Control Delay	40.3	1.1	1.0	40.8	6.6	42.0	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	1.1	1.0	40.8	6.6	42.0	5.3
Queue Length 50th (ft)	16	0	0	2	83	1	40
Queue Length 95th (ft)	52	0	0	13	307	6	161
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	419	472	511	176	3924	122	3844
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.05	0.02	0.48	0.01	0.30

Intersection Summary



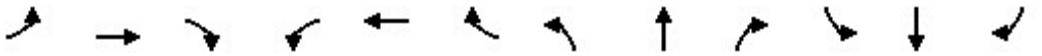
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	49	0	12	15	0	9	4	1803	5	1	1088	17
Future Volume (veh/h)	49	0	12	15	0	9	4	1803	5	1	1088	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	32	27	13	16	0	9	4	1898	5	1	1145	18
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	65	31	29	0	16	9	3101	8	3	3035	48
Arrive On Green	0.06	0.06	0.06	0.03	0.00	0.03	0.01	0.62	0.62	0.00	0.62	0.62
Sat Flow, veh/h	1688	1130	544	1034	0	582	1688	4981	13	1688	4906	77
Grp Volume(v), veh/h	32	0	40	25	0	0	4	1229	674	1	753	410
Grp Sat Flow(s),veh/h/ln	1688	0	1674	1616	0	0	1688	1612	1770	1688	1612	1758
Q Serve(g_s), s	1.1	0.0	1.4	0.9	0.0	0.0	0.1	14.4	14.4	0.0	7.2	7.2
Cycle Q Clear(g_c), s	1.1	0.0	1.4	0.9	0.0	0.0	0.1	14.4	14.4	0.0	7.2	7.2
Prop In Lane	1.00		0.32	0.64		0.36	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	97	0	96	46	0	0	9	2008	1102	3	1995	1087
V/C Ratio(X)	0.33	0.00	0.42	0.55	0.00	0.00	0.44	0.61	0.61	0.37	0.38	0.38
Avail Cap(c_a), veh/h	490	0	486	469	0	0	196	3175	1742	136	3061	1668
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	28.2	29.7	0.0	0.0	30.7	7.1	7.1	30.9	5.9	5.9
Incr Delay (d2), s/veh	2.0	0.0	2.9	9.9	0.0	0.0	30.3	0.3	0.6	67.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.6	0.5	0.0	0.0	0.1	3.7	4.1	0.1	1.8	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.0	0.0	31.1	39.6	0.0	0.0	61.0	7.4	7.7	98.0	6.0	6.1
LnGrp LOS	C	A	C	D	A	A	E	A	A	F	A	A
Approach Vol, veh/h		72			25			1907			1164	
Approach Delay, s/veh		30.6			39.6			7.6			6.1	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	43.1		8.1	4.8	42.8		6.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.0	16.4		3.4	2.1	9.2		2.9				
Green Ext Time (p_c), s	0.0	22.2		0.2	0.0	10.5		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

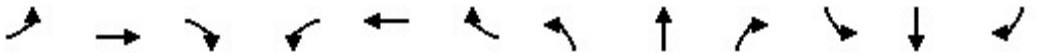
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			193			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



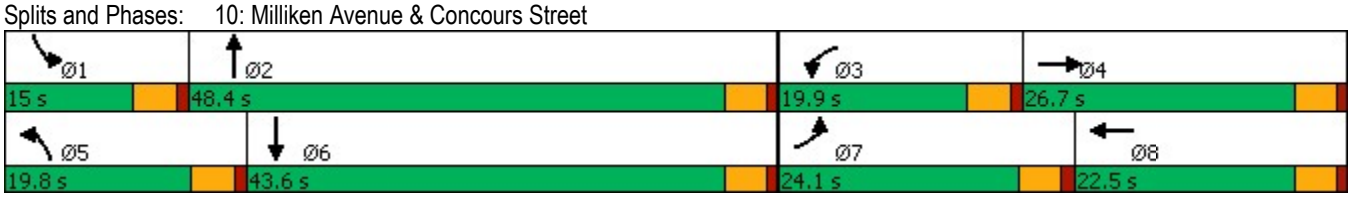
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	339	133	148	185	69	168	190	1880	141	214	1386	129
Future Volume (vph)	339	133	148	185	69	168	190	1880	141	214	1386	129
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	353	139	154	193	72	175	198	1958	147	223	1444	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	353	139	154	193	72	175	198	1958	147	223	1444	134

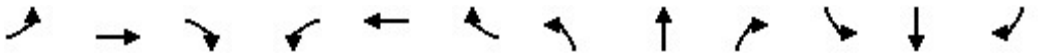
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	339	133	148	185	69	168	190	1880	141	214	1386	129
Future Volume (vph)	339	133	148	185	69	168	190	1880	141	214	1386	129
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.1	11.6	94.4	11.6	7.5	94.4	11.8	42.7	94.4	10.3	41.3	94.4
Actuated g/C Ratio	0.19	0.12	1.00	0.12	0.08	1.00	0.12	0.45	1.00	0.11	0.44	1.00
v/c Ratio	0.64	0.34	0.10	0.54	0.27	0.12	0.55	0.71	0.10	0.71	0.54	0.09
Control Delay	42.3	41.1	0.1	45.6	45.3	0.2	45.7	23.2	0.1	55.3	21.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	41.1	0.1	45.6	45.3	0.2	45.7	23.2	0.1	55.3	21.5	0.1
LOS	D	D	A	D	D	A	D	C	A	E	C	A
Approach Delay		32.0			27.5			23.7			24.1	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 94.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 25.2	Intersection LOS: C
Intersection Capacity Utilization 66.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street

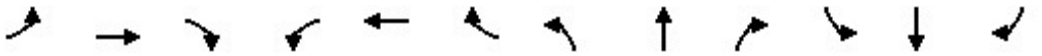




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	353	139	154	193	72	175	198	1958	147	223	1444	134
v/c Ratio	0.64	0.34	0.10	0.54	0.27	0.12	0.55	0.71	0.10	0.71	0.54	0.09
Control Delay	42.3	41.1	0.1	45.6	45.3	0.2	45.7	23.2	0.1	55.3	21.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	41.1	0.1	45.6	45.3	0.2	45.7	23.2	0.1	55.3	21.5	0.1
Queue Length 50th (ft)	106	41	0	58	22	0	60	273	0	69	184	0
Queue Length 95th (ft)	157	73	0	94	45	0	96	346	0	#127	254	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	605	794	1500	475	644	1500	472	2845	1500	324	2662	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.18	0.10	0.41	0.11	0.12	0.42	0.69	0.10	0.69	0.54	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



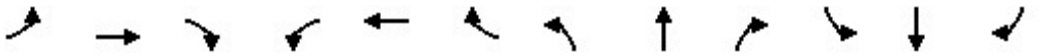
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	339	133	148	185	69	168	190	1880	141	214	1386	129
Future Volume (veh/h)	339	133	148	185	69	168	190	1880	141	214	1386	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	353	139	0	193	72	0	198	1958	0	223	1444	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	441	406		269	207		274	2834		293	2874	
Arrive On Green	0.15	0.12	0.00	0.09	0.06	0.00	0.09	0.46	0.00	0.10	0.47	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	353	139	0	193	72	0	198	1958	0	223	1444	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	9.5	3.1	0.0	5.2	1.7	0.0	5.4	20.6	0.0	6.1	13.4	0.0
Cycle Q Clear(g_c), s	9.5	3.1	0.0	5.2	1.7	0.0	5.4	20.6	0.0	6.1	13.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	441	406		269	207		274	2834		293	2874	
V/C Ratio(X)	0.80	0.34		0.72	0.35		0.72	0.69		0.76	0.50	
Avail Cap(c_a), veh/h	701	919		551	745		547	3289		376	2929	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.3	32.8	0.0	35.9	36.6	0.0	35.8	17.2	0.0	35.6	14.9	0.0
Incr Delay (d2), s/veh	3.5	0.5	0.0	3.6	1.0	0.0	3.6	0.5	0.0	6.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.3	0.0	2.0	0.7	0.0	2.0	6.8	0.0	2.4	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.8	33.3	0.0	39.5	37.6	0.0	39.4	17.7	0.0	42.3	15.0	0.0
LnGrp LOS	D	C		D	D		D	B		D	B	
Approach Vol, veh/h		492	A		265	A		2156	A		1667	A
Approach Delay, s/veh		35.8			39.0			19.7			18.7	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	42.3	12.0	14.3	12.2	42.9	16.8	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	8.1	22.6	7.2	5.1	7.4	15.4	11.5	3.7
Green Ext Time (p_c), s	0.2	15.2	0.4	0.7	0.4	11.9	0.8	0.2

Intersection Summary	
HCM 6th Ctrl Delay	22.2
HCM 6th LOS	C

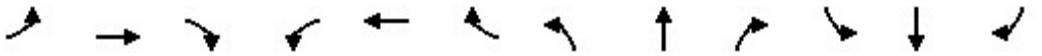
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			223			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



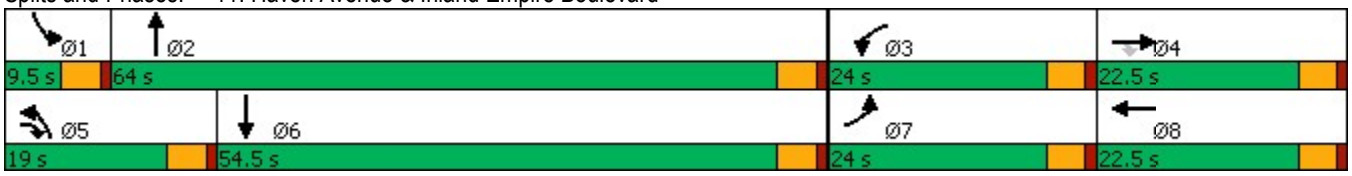
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	278	241	538	638	181	41	414	2056	435	42	2409	151
Future Volume (vph)	278	241	538	638	181	41	414	2056	435	42	2409	151
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	299	259	578	686	195	44	445	2211	468	45	2590	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	299	259	578	686	195	44	445	2211	468	45	2590	162

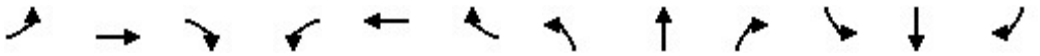
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	241	538	638	181	41	414	2056	435	42	2409	151
Future Volume (vph)	278	241	538	638	181	41	414	2056	435	42	2409	151
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	16.6	14.1	33.1	19.5	17.1	116.2	14.5	61.5	116.2	5.0	50.0	116.2
Actuated g/C Ratio	0.14	0.12	0.28	0.17	0.15	1.00	0.12	0.53	1.00	0.04	0.43	1.00
v/c Ratio	0.73	0.64	1.24	1.04	0.40	0.03	1.23	0.69	0.31	0.36	0.99	0.11
Control Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.4	0.5	63.5	48.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.4	0.5	63.5	48.8	0.1
LOS	E	E	F	F	D	A	F	C	A	E	D	A
Approach Delay		108.6			78.6			40.1			46.2	
Approach LOS		F			E			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 56.5	Intersection LOS: E
Intersection Capacity Utilization 98.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard



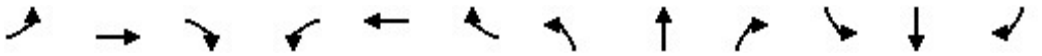


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	299	259	578	686	195	44	445	2211	468	45	2590	162
v/c Ratio	0.73	0.64	1.24	1.04	0.40	0.03	1.23	0.69	0.31	0.36	0.99	0.11
Control Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.4	0.5	63.5	48.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.4	0.5	63.5	48.8	0.1
Queue Length 50th (ft)	111	98	~508	~196	71	0	~212	356	0	17	549	0
Queue Length 95th (ft)	161	143	#725	#291	111	0	#329	428	0	38	#693	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	485	519	466	661	519	1500	361	3214	1500	124	2614	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.50	1.24	1.04	0.38	0.03	1.23	0.69	0.31	0.36	0.99	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



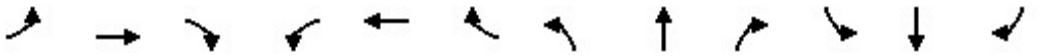
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	241	538	638	181	41	414	2056	435	42	2409	151
Future Volume (veh/h)	278	241	538	638	181	41	414	2056	435	42	2409	151
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	299	259	578	686	195	0	445	2211	0	45	2590	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	353	505	407	644	643		352	3079		94	2540	
Arrive On Green	0.12	0.15	0.15	0.16	0.19	0.00	0.12	0.51	0.00	0.03	0.42	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	299	259	578	686	195	0	445	2211	0	45	2590	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	12.1	8.5	18.0	19.5	6.0	0.0	14.5	33.8	0.0	1.8	50.0	0.0
Cycle Q Clear(g_c), s	12.1	8.5	18.0	19.5	6.0	0.0	14.5	33.8	0.0	1.8	50.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	353	505	407	644	643		352	3079		94	2540	
V/C Ratio(X)	0.85	0.51	1.42	1.06	0.30		1.27	0.72		0.48	1.02	
Avail Cap(c_a), veh/h	473	505	407	644	643		352	3079		121	2540	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.6	47.0	43.8	50.2	41.7	0.0	52.8	23.1	0.0	57.1	35.0	0.0
Incr Delay (d2), s/veh	10.3	0.9	203.5	53.9	0.3	0.0	140.3	0.8	0.0	3.7	23.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	3.6	34.9	9.6	2.5	0.0	12.1	12.0	0.0	0.7	22.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	47.8	247.2	104.1	41.9	0.0	193.0	23.9	0.0	60.8	58.0	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	F	
Approach Vol, veh/h		1136			881	A		2656	A		2635	A
Approach Delay, s/veh		153.0			90.4			52.2			58.1	
Approach LOS		F			F			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	65.1	24.0	22.5	19.0	54.5	19.1	27.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	3.8	35.8	21.5	20.0	16.5	52.0	14.1	8.0
Green Ext Time (p_c), s	0.0	18.4	0.0	0.0	0.0	0.0	0.5	0.8

Intersection Summary	
HCM 6th Ctrl Delay	74.6
HCM 6th LOS	E

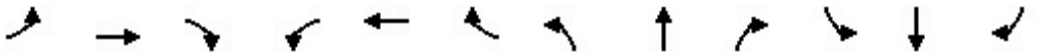
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			340			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



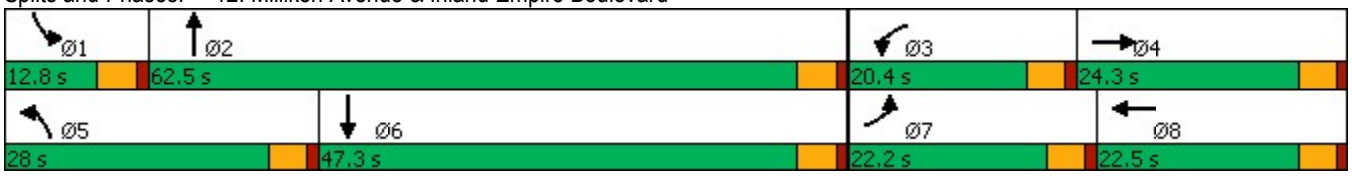
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	305	298	323	212	90	137	391	1755	365	127	1523	131
Future Volume (vph)	305	298	323	212	90	137	391	1755	365	127	1523	131
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	321	314	340	223	95	144	412	1847	384	134	1603	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	321	314	340	223	95	144	412	1847	384	134	1603	138

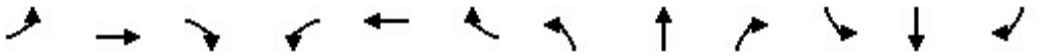
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	305	298	323	212	90	137	391	1755	365	127	1523	131
Future Volume (vph)	305	298	323	212	90	137	391	1755	365	127	1523	131
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	19.2	15.3	106.3	13.2	12.1	106.3	19.7	51.2	106.3	8.2	39.7	106.3
Actuated g/C Ratio	0.18	0.14	1.00	0.12	0.11	1.00	0.19	0.48	1.00	0.08	0.37	1.00
v/c Ratio	0.62	0.65	0.23	0.62	0.25	0.10	0.77	0.63	0.26	0.60	0.71	0.09
Control Delay	49.7	51.2	0.3	54.2	46.3	0.1	52.8	21.9	0.4	62.9	31.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	51.2	0.3	54.2	46.3	0.1	52.8	21.9	0.4	62.9	31.3	0.1
LOS	D	D	A	D	D	A	D	C	A	E	C	A
Approach Delay		33.0			35.7			23.6			31.2	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 106.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 67.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard

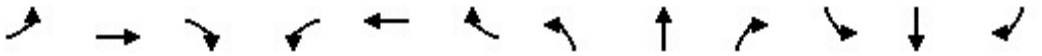




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	321	314	340	223	95	144	412	1847	384	134	1603	138
v/c Ratio	0.62	0.65	0.23	0.62	0.25	0.10	0.77	0.63	0.26	0.60	0.71	0.09
Control Delay	49.7	51.2	0.3	54.2	46.3	0.1	52.8	21.9	0.4	62.9	31.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	51.2	0.3	54.2	46.3	0.1	52.8	21.9	0.4	62.9	31.3	0.1
Queue Length 50th (ft)	113	113	0	79	33	0	145	267	0	48	275	0
Queue Length 95th (ft)	#183	168	0	127	61	0	213	340	0	#94	359	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	535	637	1500	441	579	1500	652	3381	1500	230	2495	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.49	0.23	0.51	0.16	0.10	0.63	0.55	0.26	0.58	0.64	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	298	323	212	90	137	391	1755	365	127	1523	131
Future Volume (veh/h)	305	298	323	212	90	137	391	1755	365	127	1523	131
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	321	314	0	223	95	0	412	1847	0	134	1603	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	399	433		297	315		501	3014		193	2369	
Arrive On Green	0.14	0.13	0.00	0.10	0.09	0.00	0.17	0.49	0.00	0.07	0.39	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	321	314	0	223	95	0	412	1847	0	134	1603	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	9.2	7.7	0.0	6.4	2.3	0.0	11.8	19.0	0.0	3.9	18.8	0.0
Cycle Q Clear(g_c), s	9.2	7.7	0.0	6.4	2.3	0.0	11.8	19.0	0.0	3.9	18.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	399	433		297	315		501	3014		193	2369	
V/C Ratio(X)	0.80	0.73		0.75	0.30		0.82	0.61		0.69	0.68	
Avail Cap(c_a), veh/h	596	772		536	701		792	4092		280	3020	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.1	36.2	0.0	37.7	36.5	0.0	34.5	15.8	0.0	39.5	21.9	0.0
Incr Delay (d2), s/veh	4.8	2.3	0.0	3.8	0.5	0.0	3.9	0.2	0.0	4.4	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	3.3	0.0	2.4	0.9	0.0	4.3	6.2	0.0	1.5	6.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.0	38.5	0.0	41.5	37.1	0.0	38.4	16.0	0.0	43.9	22.3	0.0
LnGrp LOS	D	D		D	D		D	B		D	C	
Approach Vol, veh/h		635	A		318	A		2259	A		1737	A
Approach Delay, s/veh		39.7			40.2			20.1			24.0	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	47.2	13.3	15.6	19.4	38.1	16.4	12.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	5.9	21.0	8.4	9.7	13.8	20.8	11.2	4.3
Green Ext Time (p_c), s	0.1	20.5	0.4	1.4	1.1	12.7	0.6	0.4

Intersection Summary	
HCM 6th Ctrl Delay	25.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.982	0.850				
Flt Protected	0.958					
Satd. Flow (prot)	3042	1365	6071	0	0	6071
Flt Permitted	0.958					
Satd. Flow (perm)	3042	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	2	2				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	502	328	2439	0	0	2428
Future Volume (vph)	502	328	2439	0	0	2428
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	523	342	2541	0	0	2529
Shared Lane Traffic (%)		21%				
Lane Group Flow (vph)	595	270	2541	0	0	2529

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	502	328	2439	2428
Future Volume (vph)	502	328	2439	2428
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	16.8	16.8	36.6	36.6
Actuated g/C Ratio	0.27	0.27	0.59	0.59
v/c Ratio	0.73	0.74	0.71	0.71
Control Delay	26.3	33.7	11.0	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.3	33.7	11.0	11.0
LOS	C	C	B	B
Approach Delay	28.6		11.0	11.0
Approach LOS	C		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 62.4	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 69.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	595	270	2541	2529
v/c Ratio	0.73	0.74	0.71	0.71
Control Delay	26.3	33.7	11.0	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.3	33.7	11.0	11.0
Queue Length 50th (ft)	104	101	190	188
Queue Length 95th (ft)	154	#194	243	241
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	955	429	3562	3562
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.63	0.71	0.71

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

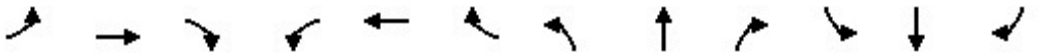
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	502	328	2439	0	0	2428
Future Volume (veh/h)	502	328	2439	0	0	2428
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	573	288	2541	0	0	2529
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	793	373	3633	0	0	3633
Arrive On Green	0.25	0.25	0.60	0.00	0.00	0.60
Sat Flow, veh/h	3188	1502	6592	0	0	6592
Grp Volume(v), veh/h	573	288	2541	0	0	2529
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	9.5	10.3	16.7	0.0	0.0	16.6
Cycle Q Clear(g_c), s	9.5	10.3	16.7	0.0	0.0	16.6
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	793	373	3633	0	0	3633
V/C Ratio(X)	0.72	0.77	0.70	0.00	0.00	0.70
Avail Cap(c_a), veh/h	1073	506	3841	0	0	3841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	20.2	8.1	0.0	0.0	8.1
Incr Delay (d2), s/veh	1.6	5.0	0.5	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	3.8	4.1	0.0	0.0	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.5	25.3	8.6	0.0	0.0	8.6
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	861		2541			2529
Approach Delay, s/veh	22.8		8.6			8.6
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		39.0			39.0	18.9
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		18.7			18.6	12.3
Green Ext Time (p_c), s		15.8			15.9	2.1

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

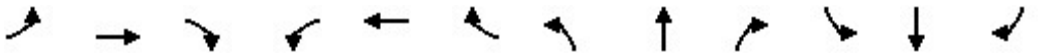
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			136			281			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



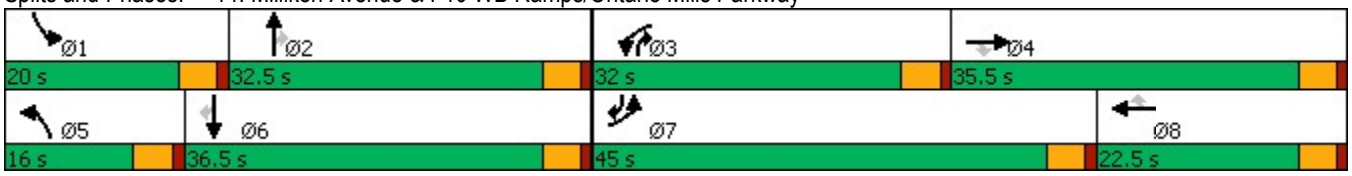
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	933	197	237	253	301	63	240	1027	453	332	1191	479
Future Volume (vph)	933	197	237	253	301	63	240	1027	453	332	1191	479
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	972	205	247	264	314	66	250	1070	472	346	1241	499
Shared Lane Traffic (%)												
Lane Group Flow (vph)	972	205	247	264	314	66	250	1070	472	346	1241	499

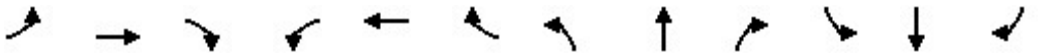
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	933	197	237	253	301	63	240	1027	453	332	1191	479
Future Volume (vph)	933	197	237	253	301	63	240	1027	453	332	1191	479
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	40.6	39.5	39.5	16.6	15.5	15.5	11.5	26.8	47.9	15.5	30.8	75.8
Actuated g/C Ratio	0.35	0.34	0.34	0.14	0.13	0.13	0.10	0.23	0.41	0.13	0.26	0.65
v/c Ratio	0.97	0.34	0.41	0.64	0.70	0.21	0.87	0.77	0.60	0.90	0.77	0.50
Control Delay	59.3	32.2	15.1	54.3	57.5	1.5	81.8	46.3	13.2	77.0	43.6	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	32.2	15.1	54.3	57.5	1.5	81.8	46.3	13.2	77.0	43.6	11.5
LOS	E	C	B	D	E	A	F	D	B	E	D	B
Approach Delay		47.8			50.4			42.5			41.5	
Approach LOS		D			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.4	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 44.3	Intersection LOS: D
Intersection Capacity Utilization 82.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	972	205	247	264	314	66	250	1070	472	346	1241	499
v/c Ratio	0.97	0.34	0.41	0.64	0.70	0.21	0.87	0.77	0.60	0.90	0.77	0.50
Control Delay	59.3	32.2	15.1	54.3	57.5	1.5	81.8	46.3	13.2	77.0	43.6	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	32.2	15.1	54.3	57.5	1.5	81.8	46.3	13.2	77.0	43.6	11.5
Queue Length 50th (ft)	375	117	55	98	121	0	98	220	104	136	252	159
Queue Length 95th (ft)	#531	197	137	138	171	0	#178	267	199	#229	301	251
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1007	598	605	683	519	347	286	1462	896	385	1671	996
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.34	0.41	0.39	0.61	0.19	0.87	0.73	0.53	0.90	0.74	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	933	197	237	253	301	63	240	1027	453	332	1191	479
Future Volume (veh/h)	933	197	237	253	301	63	240	1027	453	332	1191	479
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	972	205	247	264	314	66	250	1070	472	346	1241	499
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1013	625	530	328	395	176	291	1485	535	391	1694	940
Arrive On Green	0.35	0.35	0.35	0.11	0.12	0.12	0.10	0.24	0.24	0.13	0.28	0.28
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	972	205	247	264	314	66	250	1070	472	346	1241	499
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	37.6	9.7	14.6	10.2	10.4	4.7	9.7	18.5	28.0	13.4	21.2	21.4
Cycle Q Clear(g_c), s	37.6	9.7	14.6	10.2	10.4	4.7	9.7	18.5	28.0	13.4	21.2	21.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1013	625	530	328	395	176	291	1485	535	391	1694	940
V/C Ratio(X)	0.96	0.33	0.47	0.80	0.80	0.37	0.86	0.72	0.88	0.89	0.73	0.53
Avail Cap(c_a), veh/h	1025	625	530	696	527	235	291	1485	535	392	1697	941
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.7	27.2	28.8	49.8	49.4	46.8	50.9	39.9	34.7	48.9	37.6	12.0
Incr Delay (d2), s/veh	18.9	0.3	0.6	4.6	6.1	1.3	21.8	1.7	15.8	20.7	1.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	4.2	5.3	3.9	4.7	1.8	4.4	7.1	14.5	6.0	8.1	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	27.5	29.5	54.4	55.5	48.2	72.7	41.6	50.6	69.6	39.3	12.6
LnGrp LOS	E	C	C	D	E	D	E	D	D	E	D	B
Approach Vol, veh/h		1424			644			1792			2086	
Approach Delay, s/veh		47.0			54.3			48.3			37.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.9	32.5	17.5	45.1	16.0	36.4	44.5	18.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	15.4	30.0	12.2	16.6	11.7	23.4	39.6	12.4
Green Ext Time (p_c), s	0.0	0.0	0.8	1.8	0.0	6.1	0.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	45.0
HCM 6th LOS	D

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.994	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3066	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3066	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	5	10				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

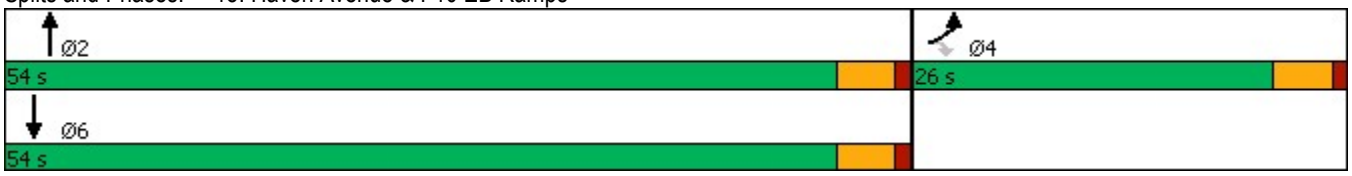
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	610	251	0	2574	2020	0
Future Volume (vph)	610	251	0	2574	2020	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	635	261	0	2681	2104	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	661	235	0	2681	2104	0

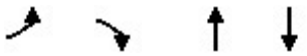
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	610	251	2574	2020
Future Volume (vph)	610	251	2574	2020
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	20.2	20.2	49.5	49.5
Actuated g/C Ratio	0.26	0.26	0.63	0.63
v/c Ratio	0.84	0.66	0.70	0.55
Control Delay	38.4	34.8	11.2	9.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	38.4	34.8	11.2	9.2
LOS	D	C	B	A
Approach Delay	37.4		11.2	9.2
Approach LOS	D		B	A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 78.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 14.6	Intersection LOS: B
Intersection Capacity Utilization 69.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	661	235	2681	2104
v/c Ratio	0.84	0.66	0.70	0.55
Control Delay	38.4	34.8	11.2	9.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	38.4	34.8	11.2	9.2
Queue Length 50th (ft)	157	108	237	159
Queue Length 95th (ft)	#237	192	279	189
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	841	380	3819	3819
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.79	0.62	0.70	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	610	251	0	2574	2020	0
Future Volume (veh/h)	610	251	0	2574	2020	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	635	261	0	2681	2104	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	771	363	0	3869	3869	0
Arrive On Green	0.24	0.24	0.00	0.63	0.63	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	635	261	0	2681	2104	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	13.8	11.6	0.0	20.9	14.0	0.0
Cycle Q Clear(g_c), s	13.8	11.6	0.0	20.9	14.0	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	771	363	0	3869	3869	0
V/C Ratio(X)	0.82	0.72	0.00	0.69	0.54	0.00
Avail Cap(c_a), veh/h	940	443	0	4137	4137	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.2	25.4	0.0	8.7	7.4	0.0
Incr Delay (d2), s/veh	5.0	4.4	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	4.4	0.0	5.5	3.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.2	29.7	0.0	9.2	7.6	0.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	896			2681	2104	
Approach Delay, s/veh	30.8			9.2	7.6	
Approach LOS	C			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		50.8		22.1		50.8
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		22.9		15.8		16.0
Green Ext Time (p_c), s		23.4		1.9		22.7

Intersection Summary	
HCM 6th Ctrl Delay	12.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		9				83
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	513	202	326	1213	1024	674
Future Volume (vph)	513	202	326	1213	1024	674
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	529	208	336	1251	1056	695
Shared Lane Traffic (%)						
Lane Group Flow (vph)	529	208	336	1251	1056	695

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	513	202	326	1213	1024	674
Future Volume (vph)	513	202	326	1213	1024	674
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.9	30.3	9.9	31.1	16.7	37.1
Actuated g/C Ratio	0.28	0.54	0.18	0.55	0.30	0.66
v/c Ratio	0.65	0.26	0.66	0.37	0.59	0.68
Control Delay	22.2	7.8	29.8	7.6	18.6	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	7.8	29.8	7.6	18.6	9.2
LOS	C	A	C	A	B	A
Approach Delay	18.1			12.3	14.9	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 56.1	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 14.5	Intersection LOS: B
Intersection Capacity Utilization 62.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	529	208	336	1251	1056	695
v/c Ratio	0.65	0.26	0.66	0.37	0.59	0.68
Control Delay	22.2	7.8	29.8	7.6	18.6	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	7.8	29.8	7.6	18.6	9.2
Queue Length 50th (ft)	83	34	59	67	92	100
Queue Length 95th (ft)	128	66	#100	87	122	198
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	939	831	542	3615	1983	1078
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.25	0.62	0.35	0.53	0.64

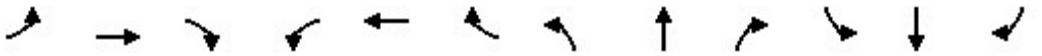
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	513	202	326	1213	1024	674
Future Volume (veh/h)	513	202	326	1213	1024	674
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	529	208	336	1251	1056	695
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	700	592	448	3577	2114	882
Arrive On Green	0.24	0.24	0.15	0.59	0.35	0.35
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	529	208	336	1251	1056	695
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	8.8	5.1	5.8	5.6	7.1	18.1
Cycle Q Clear(g_c), s	8.8	5.1	5.8	5.6	7.1	18.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	700	592	448	3577	2114	882
V/C Ratio(X)	0.76	0.35	0.75	0.35	0.50	0.79
Avail Cap(c_a), veh/h	1004	749	580	3854	2114	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	11.1	21.1	5.6	13.5	8.2
Incr Delay (d2), s/veh	2.0	0.4	4.0	0.1	0.2	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.9	2.0	1.2	2.1	9.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.4	11.5	25.1	5.7	13.7	13.0
LnGrp LOS	C	B	C	A	B	B
Approach Vol, veh/h	737			1587	1751	
Approach Delay, s/veh	17.9			9.8	13.4	
Approach LOS	B			A	B	

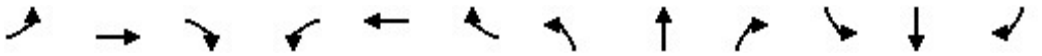
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		35.1		17.1	12.5	22.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		7.6		10.8	7.8	20.1
Green Ext Time (p_c), s		10.4		1.8	0.3	0.0

Intersection Summary		
HCM 6th Ctrl Delay		12.8
HCM 6th LOS		B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.954				0.850			0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4596	0	2891	3353	1500	2891	4818	1500	2891	6022	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4596	0	2891	3353	1500	2891	4818	1500	2891	6022	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		104				217			279		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



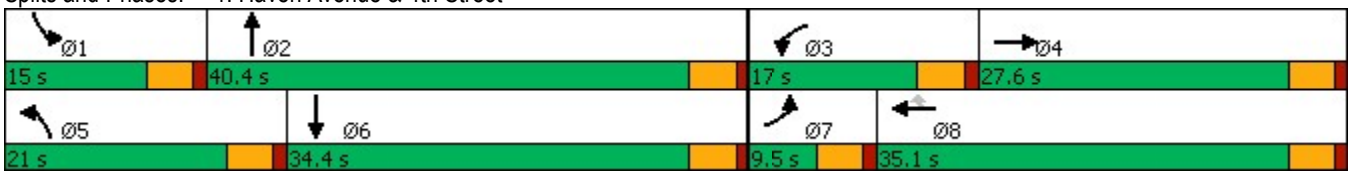
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	52	564	250	327	535	204	306	1424	481	210	1388	79
Future Volume (vph)	52	564	250	327	535	204	306	1424	481	210	1388	79
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	55	600	266	348	569	217	326	1515	512	223	1477	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	866	0	348	569	217	326	1515	512	223	1561	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	52	564	327	535	204	306	1424	481	210	1388
Future Volume (vph)	52	564	327	535	204	306	1424	481	210	1388
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	21.7	12.5	31.2	31.2	15.0	35.9	98.3	10.2	31.2
Actuated g/C Ratio	0.05	0.22	0.13	0.32	0.32	0.15	0.37	1.00	0.10	0.32
v/c Ratio	0.37	0.79	0.95	0.54	0.35	0.74	0.86	0.34	0.74	0.81
Control Delay	53.5	37.7	79.7	30.5	5.4	50.9	35.4	0.6	59.2	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	37.7	79.7	30.5	5.4	50.9	35.4	0.6	59.2	35.4
LOS	D	D	E	C	A	D	D	A	E	D
Approach Delay		38.7		40.8			30.0			38.4
Approach LOS		D		D			C			D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 98.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 35.7	Intersection LOS: D
Intersection Capacity Utilization 79.6%	ICU Level of Service D
Analysis Period (min) 15	

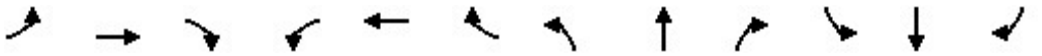
Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	55	866	348	569	217	326	1515	512	223	1561
v/c Ratio	0.37	0.79	0.95	0.54	0.35	0.74	0.86	0.34	0.74	0.81
Control Delay	53.5	37.7	79.7	30.5	5.4	50.9	35.4	0.6	59.2	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	37.7	79.7	30.5	5.4	50.9	35.4	0.6	59.2	35.4
Queue Length 50th (ft)	18	167	115	158	0	102	327	0	72	270
Queue Length 95th (ft)	38	216	#205	214	52	149	391	0	#124	318
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	147	1159	367	1075	628	485	1759	1500	308	1917
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.75	0.95	0.53	0.35	0.67	0.86	0.34	0.72	0.81

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



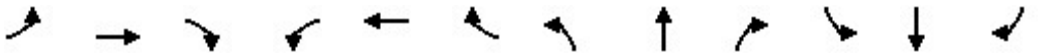
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	564	250	327	535	204	306	1424	481	210	1388	79
Future Volume (veh/h)	52	564	250	327	535	204	306	1424	481	210	1388	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	55	600	266	348	569	217	326	1515	0	223	1477	84
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	116	725	314	375	1037	463	391	1790		280	1974	112
Arrive On Green	0.04	0.22	0.22	0.13	0.31	0.31	0.13	0.37	0.00	0.10	0.33	0.33
Sat Flow, veh/h	2910	3307	1432	2910	3367	1502	2910	4837	1502	2910	5945	338
Grp Volume(v), veh/h	55	585	281	348	569	217	326	1515	0	223	1135	426
Grp Sat Flow(s),veh/h/ln	1455	1612	1514	1455	1683	1502	1455	1612	1502	1455	1524	1711
Q Serve(g_s), s	1.8	16.8	17.3	11.5	13.6	11.3	10.6	27.9	0.0	7.3	21.4	21.4
Cycle Q Clear(g_c), s	1.8	16.8	17.3	11.5	13.6	11.3	10.6	27.9	0.0	7.3	21.4	21.4
Prop In Lane	1.00		0.95	1.00		1.00	1.00		1.00	1.00		0.20
Lane Grp Cap(c), veh/h	116	707	332	375	1037	463	391	1790		280	1518	568
V/C Ratio(X)	0.47	0.83	0.85	0.93	0.55	0.47	0.83	0.85		0.80	0.75	0.75
Avail Cap(c_a), veh/h	150	768	361	375	1062	474	495	1790		315	1518	568
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	45.6	36.1	36.3	41.8	27.9	27.1	40.9	28.0	0.0	42.9	28.8	28.8
Incr Delay (d2), s/veh	3.0	7.0	16.0	29.0	0.6	0.7	9.5	5.1	0.0	12.0	3.4	8.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	7.2	7.8	5.6	5.5	4.1	4.3	11.2	0.0	3.1	8.1	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	43.1	52.4	70.8	28.5	27.9	50.5	33.2	0.0	54.9	32.2	37.6
LnGrp LOS	D	D	D	E	C	C	D	C		D	C	D
Approach Vol, veh/h		921			1134			1841	A		1784	
Approach Delay, s/veh		46.3			41.4			36.2			36.3	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.8	40.4	17.0	25.8	17.5	36.7	8.4	34.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	9.3	29.9	13.5	19.3	12.6	23.4	3.8	15.6
Green Ext Time (p_c), s	0.1	4.5	0.0	2.0	0.4	4.8	0.0	4.1

Intersection Summary	
HCM 6th Ctrl Delay	38.9
HCM 6th LOS	D

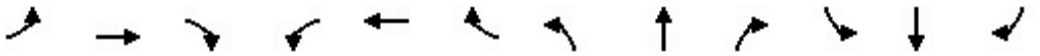
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.850			0.850		0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	1667	6071	0	1583	4818	1500	1667	1765	1500	1583	2850	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	1667	6071	0	1583	4818	1500	1667	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				182			201		394	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



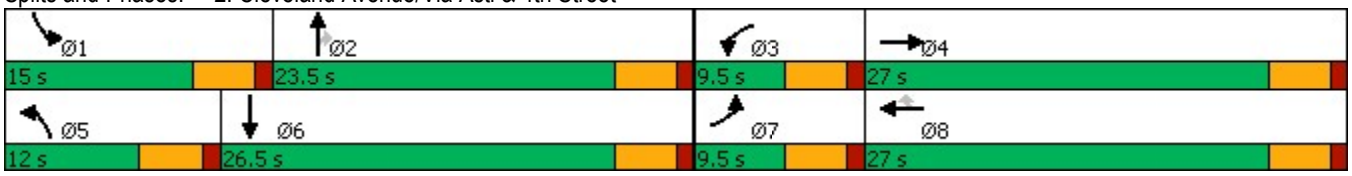
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1337	4	3	1078	177	0	0	4	174	0	1
Future Volume (vph)	0	1337	4	3	1078	177	0	0	4	174	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1378	4	3	1111	182	0	0	4	179	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1382	0	3	1111	182	0	0	4	179	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT	Ø5	Ø7
Lane Configurations									
Traffic Volume (vph)	1337	3	1078	177	4	174	0		
Future Volume (vph)	1337	3	1078	177	4	174	0		
Turn Type	NA	Prot	NA	Perm	Perm	Prot	NA		
Protected Phases	4	3	8			1	6	5	7
Permitted Phases				8	2				
Detector Phase	4	3	8	8	2	1	6		
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	22.5	9.5	22.5	9.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	23.5	15.0	26.5	12.0	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	31.3%	20.0%	35.3%	16%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
Lead/Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min	None	None
Act Effct Green (s)	21.3	5.1	22.9	22.9	5.6	10.1	20.2		
Actuated g/C Ratio	0.41	0.10	0.44	0.44	0.11	0.19	0.39		
v/c Ratio	0.56	0.02	0.53	0.24	0.01	0.58	0.00		
Control Delay	13.3	24.3	11.5	2.5	0.0	30.5	0.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	13.3	24.3	11.5	2.5	0.0	30.5	0.0		
LOS	B	C	B	A	A	C	A		
Approach Delay	13.3		10.3				30.3		
Approach LOS	B		B				C		

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 52.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 46.7%	ICU Level of Service A
Analysis Period (min) 15	

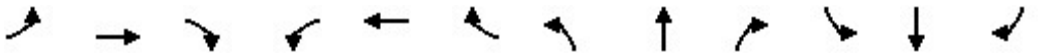
Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT
Lane Group Flow (vph)	1382	3	1111	182	4	179	1
v/c Ratio	0.56	0.02	0.53	0.24	0.01	0.58	0.00
Control Delay	13.3	24.3	11.5	2.5	0.0	30.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.3	24.3	11.5	2.5	0.0	30.5	0.0
Queue Length 50th (ft)	84	1	86	0	0	50	0
Queue Length 95th (ft)	152	8	115	24	0	#141	0
Internal Link Dist (ft)	2546		362				358
Turn Bay Length (ft)		130		145	165	50	
Base Capacity (vph)	2644	153	2246	796	678	321	1439
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.02	0.49	0.23	0.01	0.56	0.00

Intersection Summary

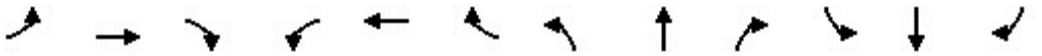
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1337	4	3	1078	177	0	0	4	174	0	1
Future Volume (veh/h)	0	1337	4	3	1078	177	0	0	4	174	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	0	1378	4	3	1111	182	0	0	4	179	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	2334	7	7	2266	704	3	188	159	222	574	512
Arrive On Green	0.00	0.37	0.37	0.00	0.47	0.47	0.00	0.00	0.11	0.14	0.00	0.34
Sat Flow, veh/h	1594	6322	18	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	0	996	386	3	1111	182	0	0	4	179	0	1
Grp Sat Flow(s),veh/h/ln	1594	1524	1769	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.0	8.3	8.3	0.1	7.5	3.5	0.0	0.0	0.1	5.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	8.3	8.3	0.1	7.5	3.5	0.0	0.0	0.1	5.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	3	1687	653	7	2266	704	3	188	159	222	574	512
V/C Ratio(X)	0.00	0.59	0.59	0.46	0.49	0.26	0.00	0.00	0.03	0.80	0.00	0.00
Avail Cap(c_a), veh/h	169	2179	843	169	2306	716	253	713	604	354	784	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.0	12.0	23.5	8.7	7.6	0.0	0.0	18.9	19.7	0.0	10.3
Incr Delay (d2), s/veh	0.0	0.3	0.9	43.3	0.2	0.2	0.0	0.0	0.1	6.9	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.3	2.8	0.1	2.0	0.9	0.0	0.0	0.0	2.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.3	12.9	66.7	8.8	7.8	0.0	0.0	19.0	26.6	0.0	10.3
LnGrp LOS	A	B	B	E	A	A	A	A	B	C	A	B
Approach Vol, veh/h		1382			1296			4			180	
Approach Delay, s/veh		12.5			8.8			19.0			26.5	
Approach LOS		B			A			B			C	

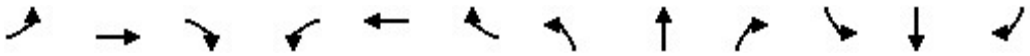
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	9.5	4.7	21.9	0.0	20.6	0.0	26.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	7.1	2.1	2.1	10.3	0.0	2.0	0.0	9.5
Green Ext Time (p_c), s	0.1	0.0	0.0	7.1	0.0	0.0	0.0	6.8

Intersection Summary	
HCM 6th Ctrl Delay	11.7
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.994				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4789	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.725				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4789	0	1208	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			11				219			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



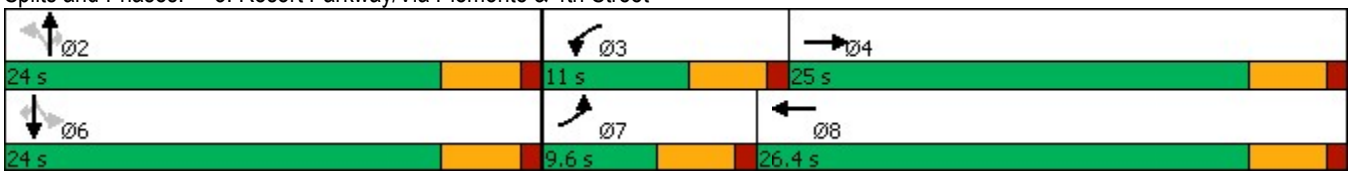
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	1488	8	5	1223	47	3	0	8	47	1	16
Future Volume (vph)	11	1488	8	5	1223	47	3	0	8	47	1	16
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	1534	8	5	1261	48	3	0	8	48	1	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1542	0	5	1309	0	3	0	8	0	49	16

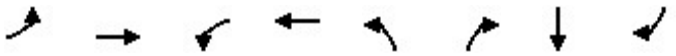
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	11	1488	5	1223	3	8	47	1	16
Future Volume (vph)	11	1488	5	1223	3	8	47	1	16
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	20.3	5.8	20.4	7.0	7.0		7.0	7.0
Actuated g/C Ratio	0.14	0.53	0.15	0.54	0.18	0.18		0.18	0.18
v/c Ratio	0.03	0.48	0.02	0.51	0.01	0.02		0.21	0.04
Control Delay	17.8	7.0	17.2	7.2	15.0	0.1		17.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	17.8	7.0	17.2	7.2	15.0	0.1		17.4	0.2
LOS	B	A	B	A	B	A		B	A
Approach Delay		7.1		7.3				13.2	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 38.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 45.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	11	1542	5	1309	3	8	49	16
v/c Ratio	0.03	0.48	0.02	0.51	0.01	0.02	0.21	0.04
Control Delay	17.8	7.0	17.2	7.2	15.0	0.1	17.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	7.0	17.2	7.2	15.0	0.1	17.4	0.2
Queue Length 50th (ft)	1	40	1	43	1	0	9	0
Queue Length 95th (ft)	7	127	9	137	6	0	35	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	397	3431	277	2830	634	892	677	840
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.45	0.02	0.46	0.00	0.01	0.07	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1488	8	5	1223	47	3	0	8	47	1	16
Future Volume (veh/h)	11	1488	8	5	1223	47	3	0	8	47	1	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	11	1534	8	5	1261	48	3	0	8	48	1	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	2926	15	11	2183	83	354	253	215	400	6	215
Arrive On Green	0.01	0.46	0.46	0.01	0.46	0.46	0.14	0.00	0.14	0.14	0.14	0.14
Sat Flow, veh/h	2910	6305	33	1594	4782	182	1318	1772	1502	1373	43	1502
Grp Volume(v), veh/h	11	1112	430	5	850	459	3	0	8	49	0	16
Grp Sat Flow(s),veh/h/ln	1455	1524	1766	1594	1612	1739	1318	1772	1502	1416	0	1502
Q Serve(g_s), s	0.1	6.0	6.0	0.1	6.8	6.8	0.1	0.0	0.2	1.0	0.0	0.3
Cycle Q Clear(g_c), s	0.1	6.0	6.0	0.1	6.8	6.8	1.1	0.0	0.2	1.1	0.0	0.3
Prop In Lane	1.00		0.02	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	42	2122	820	11	1472	794	354	253	215	406	0	215
V/C Ratio(X)	0.26	0.52	0.52	0.46	0.58	0.58	0.01	0.00	0.04	0.12	0.00	0.07
Avail Cap(c_a), veh/h	424	2680	1035	296	2020	1089	901	988	837	992	0	837
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.0	6.6	6.6	17.3	7.0	7.0	13.8	0.0	12.9	13.3	0.0	13.0
Incr Delay (d2), s/veh	3.2	0.2	0.5	27.8	0.4	0.7	0.0	0.0	0.1	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.2	1.4	0.1	1.5	1.7	0.0	0.0	0.0	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	6.8	7.2	45.1	7.4	7.7	13.8	0.0	13.0	13.4	0.0	13.1
LnGrp LOS	C	A	A	D	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1553			1314			11			65	
Approach Delay, s/veh		7.0			7.6			13.2			13.4	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	4.7	20.7		9.5	5.0	20.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		3.1	2.1	8.0		3.1	2.1	8.8				
Green Ext Time (p_c), s		0.0	0.0	8.0		0.2	0.0	7.2				

Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.993					0.865
Flt Protected						
Satd. Flow (prot)	4784	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4784	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1468	75	0	1296	0	16
Future Volume (vph)	1468	75	0	1296	0	16
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1545	79	0	1364	0	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1624	0	0	1364	0	17

Intersection Summary

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1468	75	0	1296	0	16
Future Vol, veh/h	1468	75	0	1296	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1545	79	0	1364	0	17

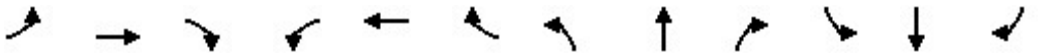
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	812
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	276
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	276
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	18.9
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	276	-	-	-
HCM Lane V/C Ratio	0.061	-	-	-
HCM Control Delay (s)	18.9	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5943	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5943	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			253			323			95		33	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



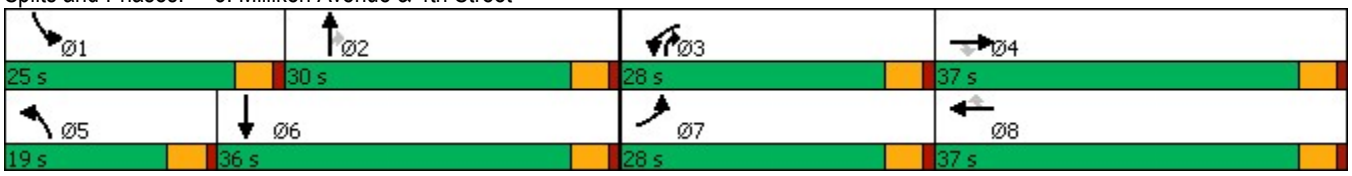
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	280	1155	403	535	899	327	328	993	372	439	963	158
Future Volume (vph)	280	1155	403	535	899	327	328	993	372	439	963	158
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	295	1216	424	563	946	344	345	1045	392	462	1014	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	1216	424	563	946	344	345	1045	392	462	1180	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	280	1155	403	535	899	327	328	993	372	439	963
Future Volume (vph)	280	1155	403	535	899	327	328	993	372	439	963
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	17.4	32.5	32.5	23.5	38.6	38.6	14.5	25.1	53.1	20.5	31.1
Actuated g/C Ratio	0.15	0.27	0.27	0.20	0.32	0.32	0.12	0.21	0.44	0.17	0.26
v/c Ratio	0.70	0.93	0.72	0.99	0.61	0.49	0.99	0.82	0.55	0.94	0.75
Control Delay	57.6	55.6	23.1	84.0	36.9	7.2	97.3	51.2	21.3	76.6	43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	55.6	23.1	84.0	36.9	7.2	97.3	51.2	21.3	76.6	43.1
LOS	E	E	C	F	D	A	F	D	C	E	D
Approach Delay		48.8			45.7			53.6			52.5
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 50.0	Intersection LOS: D
Intersection Capacity Utilization 86.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	295	1216	424	563	946	344	345	1045	392	462	1180
v/c Ratio	0.70	0.93	0.72	0.99	0.61	0.49	0.99	0.82	0.55	0.94	0.75
Control Delay	57.6	55.6	23.1	84.0	36.9	7.2	97.3	51.2	21.3	76.6	43.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	55.6	23.1	84.0	36.9	7.2	97.3	51.2	21.3	76.6	43.1
Queue Length 50th (ft)	113	337	121	226	226	11	139	225	164	184	237
Queue Length 95th (ft)	154	#427	248	#345	291	91	#238	267	261	#285	280
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	568	1309	591	568	1554	702	350	1295	719	495	1590
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.93	0.72	0.99	0.61	0.49	0.99	0.81	0.55	0.93	0.74

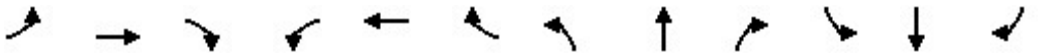
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	1155	403	535	899	327	328	993	372	439	963	158
Future Volume (veh/h)	280	1155	403	535	899	327	328	993	372	439	963	158
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	295	1216	424	563	946	344	345	1045	392	462	1014	166
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	354	1310	407	570	1669	518	352	1295	613	497	1398	226
Arrive On Green	0.12	0.27	0.27	0.20	0.34	0.34	0.12	0.21	0.21	0.17	0.26	0.26
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5327	862
Grp Volume(v), veh/h	295	1216	424	563	946	344	345	1045	392	462	869	311
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1617
Q Serve(g_s), s	11.9	29.4	32.5	23.1	19.1	23.4	14.2	19.6	25.1	18.8	20.8	21.1
Cycle Q Clear(g_c), s	11.9	29.4	32.5	23.1	19.1	23.4	14.2	19.6	25.1	18.8	20.8	21.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.53
Lane Grp Cap(c), veh/h	354	1310	407	570	1669	518	352	1295	613	497	1200	424
V/C Ratio(X)	0.83	0.93	1.04	0.99	0.57	0.66	0.98	0.81	0.64	0.93	0.72	0.73
Avail Cap(c_a), veh/h	570	1310	407	570	1669	518	352	1295	613	497	1200	424
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	42.6	43.8	48.1	32.0	33.4	52.6	44.9	28.4	49.0	40.3	40.4
Incr Delay (d2), s/veh	5.7	11.6	56.1	34.5	0.5	3.2	42.8	3.9	2.2	24.1	2.2	6.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	13.0	18.3	11.1	7.5	8.9	7.3	7.7	9.3	8.5	8.0	9.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	54.2	99.9	82.6	32.5	36.6	95.4	48.8	30.7	73.1	42.5	46.9
LnGrp LOS	E	D	F	F	C	D	F	D	C	E	D	D
Approach Vol, veh/h		1935			1853			1782			1642	
Approach Delay, s/veh		64.7			48.5			53.8			51.9	
Approach LOS		E			D			D			D	

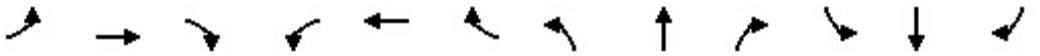
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	30.0	28.0	37.0	19.0	36.0	19.1	45.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	20.8	27.1	25.1	34.5	16.2	23.1	13.9	25.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	4.8	0.7	4.2

Intersection Summary	
HCM 6th Ctrl Delay	54.9
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.942	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3025	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3025	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			148			286			355		108	400
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



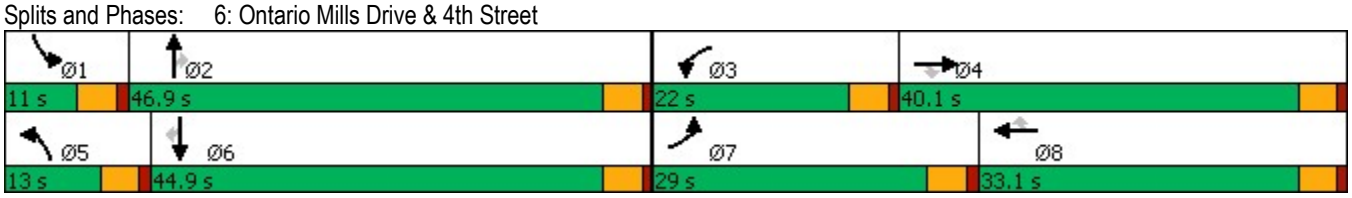
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	779	1305	156	431	1074	529	182	318	496	110	632	869
Future Volume (vph)	779	1305	156	431	1074	529	182	318	496	110	632	869
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	811	1359	163	449	1119	551	190	331	517	115	658	905
Shared Lane Traffic (%)												46%
Lane Group Flow (vph)	811	1359	163	449	1119	551	190	331	517	115	1074	489

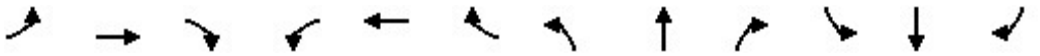
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	779	1305	156	431	1074	529	182	318	496	110	632	869
Future Volume (vph)	779	1305	156	431	1074	529	182	318	496	110	632	869
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	35.6	35.6	17.5	28.6	28.6	8.5	42.4	42.4	6.5	40.4	40.4
Actuated g/C Ratio	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
v/c Ratio	1.37	0.95	0.30	1.07	0.97	0.96	1.70	0.28	0.68	1.35	0.99	0.68
Control Delay	216.2	56.3	8.0	111.4	66.7	50.8	382.5	28.7	14.9	260.6	59.8	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	216.2	56.3	8.0	111.4	66.7	50.8	382.5	28.7	14.9	260.6	59.8	11.8
LOS	F	E	A	F	E	D	F	C	B	F	E	B
Approach Delay		108.5			72.0			86.6			59.6	
Approach LOS		F			E			F			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.70	
Intersection Signal Delay: 83.1	Intersection LOS: F
Intersection Capacity Utilization 102.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



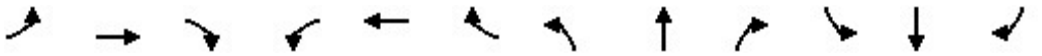


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	811	1359	163	449	1119	551	190	331	517	115	1074	489
v/c Ratio	1.37	0.95	0.30	1.07	0.97	0.96	1.70	0.28	0.68	1.35	0.99	0.68
Control Delay	216.2	56.3	8.0	111.4	66.7	50.8	382.5	28.7	14.9	260.6	59.8	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	216.2	56.3	8.0	111.4	66.7	50.8	382.5	28.7	14.9	260.6	59.8	11.8
Queue Length 50th (ft)	~428	377	8	~197	316	230	~216	96	100	~116	417	53
Queue Length 95th (ft)	#553	#476	60	#303	#415	#464	#366	134	233	#239	#577	192
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	590	1429	549	421	1148	575	112	1184	759	85	1090	724
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.37	0.95	0.30	1.07	0.97	0.96	1.70	0.28	0.68	1.35	0.99	0.68

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



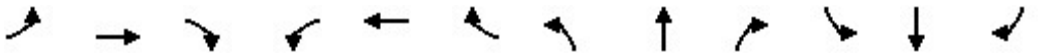
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	779	1305	156	431	1074	529	182	318	496	110	632	869
Future Volume (veh/h)	779	1305	156	431	1074	529	182	318	496	110	632	869
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	811	1359	162	449	1119	551	190	331	517	115	658	905
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	811	1359	162	449	1119	551	190	331	517	115	658	905
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	24.5	33.0	10.2	17.5	27.5	28.6	8.5	8.5	40.7	6.5	40.4	34.3
Cycle Q Clear(g_c), s	24.5	33.0	10.2	17.5	27.5	28.6	8.5	8.5	40.7	6.5	40.4	34.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
V/C Ratio(X)	1.36	0.95	0.36	1.06	0.97	1.54	1.68	0.28	0.97	1.33	1.10	0.90
Avail Cap(c_a), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	41.3	33.3	51.3	45.3	45.7	55.8	27.8	38.3	56.8	39.8	37.8
Incr Delay (d2), s/veh	174.9	13.2	0.5	59.8	19.7	256.4	342.6	0.1	32.5	209.2	68.3	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.3	14.7	3.8	9.9	13.0	36.1	14.2	3.4	19.5	7.6	28.6	13.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	222.6	54.5	33.8	111.1	65.0	302.1	398.3	28.0	70.7	265.9	108.1	48.2
LnGrp LOS	F	D	C	F	E	F	F	C	E	F	F	D
Approach Vol, veh/h		2332			2119			1038			1678	
Approach Delay, s/veh		111.5			136.4			117.1			86.6	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	46.9	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	8.5	42.7	19.5	35.0	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	113.9
HCM 6th LOS	F

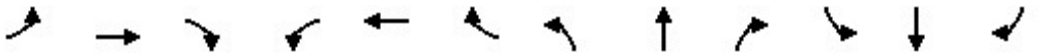
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.981			0.943				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	2891	4818	1500	1583	4726	0	1583	3162	0	1504	1646	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	2891	4818	1500	1583	4726	0	1583	3162	0	1504	1646	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132		19			50				317
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



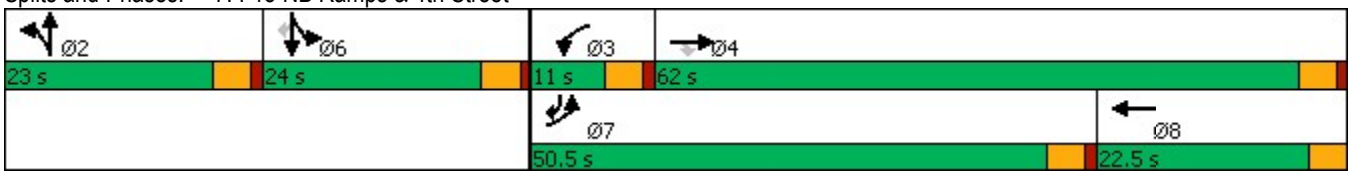
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1108	647	124	32	745	107	126	76	47	175	84	1183
Future Volume (vph)	1108	647	124	32	745	107	126	76	47	175	84	1183
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1179	688	132	34	793	114	134	81	50	186	89	1259
Shared Lane Traffic (%)										27%		
Lane Group Flow (vph)	1179	688	132	34	907	0	134	131	0	136	139	1259

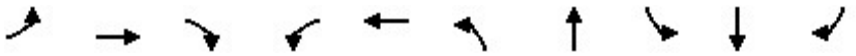
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1108	647	124	32	745	126	76	175	84	1183
Future Volume (vph)	1108	647	124	32	745	126	76	175	84	1183
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	46.2	62.5	62.5	6.3	19.1	14.1	14.1	14.8	14.8	65.5
Actuated g/C Ratio	0.42	0.56	0.56	0.06	0.17	0.13	0.13	0.13	0.13	0.59
v/c Ratio	0.98	0.25	0.15	0.38	1.10	0.67	0.29	0.68	0.64	0.75
Control Delay	55.6	14.7	3.3	65.8	104.4	63.6	29.3	64.3	59.9	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.6	14.7	3.3	65.8	104.4	63.6	29.3	64.3	59.9	15.7
LOS	E	B	A	E	F	E	C	E	E	B
Approach Delay		38.1			103.0		46.6		24.0	
Approach LOS		D			F		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.3	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 46.9	Intersection LOS: D
Intersection Capacity Utilization 85.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1179	688	132	34	907	134	131	136	139	1259
v/c Ratio	0.98	0.25	0.15	0.38	1.10	0.67	0.29	0.68	0.64	0.75
Control Delay	55.6	14.7	3.3	65.8	104.4	63.6	29.3	64.3	59.9	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.6	14.7	3.3	65.8	104.4	63.6	29.3	64.3	59.9	15.7
Queue Length 50th (ft)	428	99	0	24	~270	93	27	98	101	271
Queue Length 95th (ft)	#652	144	33	61	#398	164	59	174	176	398
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1200	2706	900	92	826	264	569	264	289	1684
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.25	0.15	0.37	1.10	0.51	0.23	0.52	0.48	0.75

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1108	647	124	32	745	107	126	76	47	175	84	1183
Future Volume (veh/h)	1108	647	124	32	745	107	126	76	47	175	84	1183
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1179	688	132	34	793	114	134	81	50	138	157	1259
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1169	2606	809	46	709	101	167	217	124	271	302	1718
Arrive On Green	0.40	0.54	0.54	0.03	0.17	0.17	0.10	0.10	0.10	0.17	0.17	0.17
Sat Flow, veh/h	2910	4837	1502	1594	4276	611	1594	2063	1180	1594	1772	3003
Grp Volume(v), veh/h	1179	688	132	34	597	310	134	65	66	138	157	1259
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1662	1594	1683	1560	1594	1772	1502
Q Serve(g_s), s	46.0	8.8	5.1	2.4	19.0	19.0	9.4	4.1	4.5	9.0	9.2	19.5
Cycle Q Clear(g_c), s	46.0	8.8	5.1	2.4	19.0	19.0	9.4	4.1	4.5	9.0	9.2	19.5
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.76	1.00		1.00
Lane Grp Cap(c), veh/h	1169	2606	809	46	535	276	167	177	164	271	302	1718
V/C Ratio(X)	1.01	0.26	0.16	0.74	1.12	1.13	0.80	0.37	0.40	0.51	0.52	0.73
Avail Cap(c_a), veh/h	1169	2606	809	90	535	276	257	272	252	271	302	1718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	14.2	13.4	55.2	47.8	47.8	50.1	47.7	47.9	43.2	43.3	18.1
Incr Delay (d2), s/veh	28.5	0.1	0.1	20.4	74.5	92.2	9.7	1.3	1.6	1.6	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.4	3.2	1.7	1.2	13.1	14.9	4.2	1.8	1.8	3.7	4.2	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.7	14.3	13.5	75.6	122.3	140.0	59.8	49.0	49.5	44.7	44.8	19.7
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	B
Approach Vol, veh/h		1999			941			265			1554	
Approach Delay, s/veh		42.8			126.4			54.6			24.5	
Approach LOS		D			F			D			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.5	7.8	66.2		24.0	50.5	23.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.5	6.5	57.5		19.5	46.0	* 19				
Max Q Clear Time (g_c+I1), s		11.4	4.4	10.8		21.5	48.0	21.0				
Green Ext Time (p_c), s		0.6	0.0	6.2		0.0	0.0	0.0				

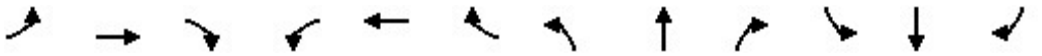
Intersection Summary		
HCM 6th Ctrl Delay		54.0
HCM 6th LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

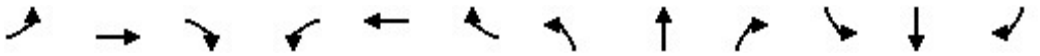
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50				236			253			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



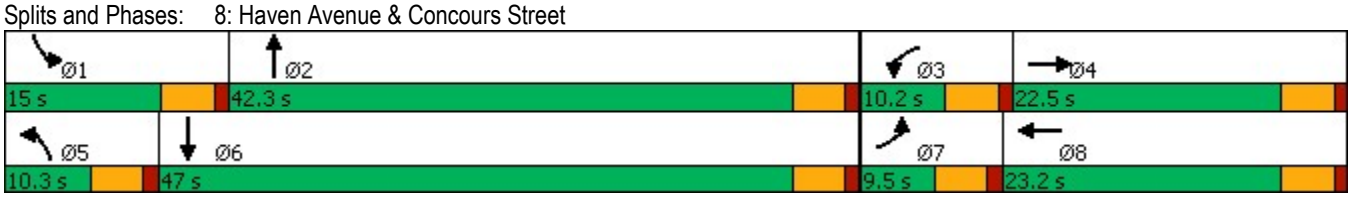
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	12	25	47	195	54	60	45	1871	269	274	1756	31
Future Volume (vph)	12	25	47	195	54	60	45	1871	269	274	1756	31
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	27	50	207	57	64	48	1990	286	291	1868	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	77	0	207	57	64	48	1990	286	291	1868	33

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	12	25	195	54	60	45	1871	269	274	1756	31
Future Volume (vph)	12	25	195	54	60	45	1871	269	274	1756	31
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.1	6.4	5.8	12.5	75.2	5.8	36.8	75.2	10.5	46.0	75.2
Actuated g/C Ratio	0.07	0.09	0.08	0.17	1.00	0.08	0.49	1.00	0.14	0.61	1.00
v/c Ratio	0.07	0.25	0.69	0.10	0.04	0.22	0.67	0.19	0.72	0.50	0.02
Control Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.4	0.3	44.3	10.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.4	0.3	44.3	10.3	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.9		35.7			14.9			14.7	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 75.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

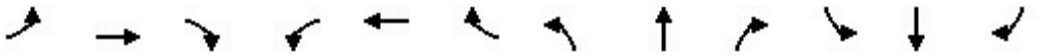
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	77	207	57	64	48	1990	286	291	1868	33
v/c Ratio	0.07	0.25	0.69	0.10	0.04	0.22	0.67	0.19	0.72	0.50	0.02
Control Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.4	0.3	44.3	10.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.4	0.3	44.3	10.3	0.0
Queue Length 50th (ft)	3	6	35	11	0	11	204	0	71	161	0
Queue Length 95th (ft)	11	26	#70	31	0	28	258	0	#131	205	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	194	770	301	842	1500	225	3084	1500	407	3710	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.10	0.69	0.07	0.04	0.21	0.65	0.19	0.71	0.50	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



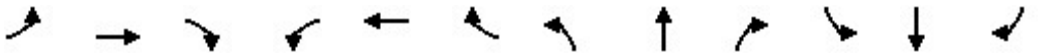
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	25	47	195	54	60	45	1871	269	274	1756	31
Future Volume (veh/h)	12	25	47	195	54	60	45	1871	269	274	1756	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	13	27	50	207	57	0	48	1990	0	291	1868	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	112	100	309	433		126	2885		371	3399	
Arrive On Green	0.02	0.07	0.07	0.08	0.13	0.00	0.04	0.47	0.00	0.13	0.56	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	13	27	50	207	57	0	48	1990	0	291	1868	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.3	1.1	2.3	3.6	1.1	0.0	1.1	18.0	0.0	6.9	13.8	0.0
Cycle Q Clear(g_c), s	0.3	1.1	2.3	3.6	1.1	0.0	1.1	18.0	0.0	6.9	13.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	46	112	100	309	433		126	2885		371	3399	
V/C Ratio(X)	0.28	0.24	0.50	0.67	0.13		0.38	0.69		0.79	0.55	
Avail Cap(c_a), veh/h	206	429	382	320	891		239	3260		432	3665	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.4	31.3	31.8	31.7	27.3	0.0	32.9	14.6	0.0	29.9	10.0	0.0
Incr Delay (d2), s/veh	3.2	1.1	3.8	5.1	0.1	0.0	1.9	0.5	0.0	8.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.5	0.9	1.3	0.4	0.0	0.4	5.6	0.0	2.7	3.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.6	32.4	35.6	36.8	27.4	0.0	34.8	15.1	0.0	37.9	10.1	0.0
LnGrp LOS	D	C	D	D	C		C	B		D	B	
Approach Vol, veh/h		90			264	A		2038	A		2159	A
Approach Delay, s/veh		34.9			34.8			15.6			13.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	38.0	10.0	9.2	7.6	43.9	5.6	13.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	8.9	20.0	5.6	4.3	3.1	15.8	2.3	3.1
Green Ext Time (p_c), s	0.2	13.4	0.0	0.3	0.0	17.0	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

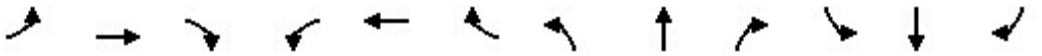
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.944									0.989	
Flt Protected	0.950	0.970					0.950					
Satd. Flow (prot)	1593	1535	0	0	1765	0	1676	4818	0	1765	4765	0
Flt Permitted	0.950	0.970					0.950					
Satd. Flow (perm)	1593	1535	0	0	1765	0	1676	4818	0	1765	4765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143									15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



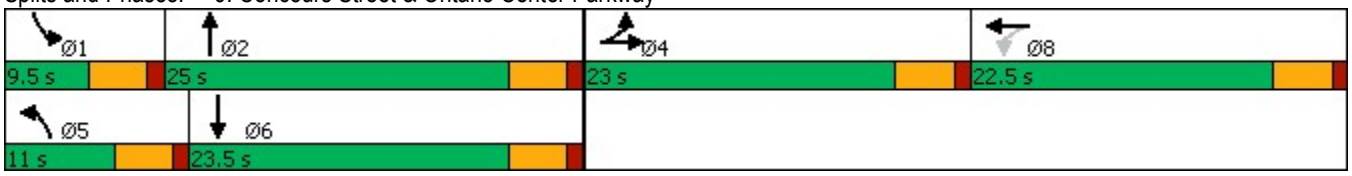
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	13	0	3	0	0	0	5	305	1	0	228	18
Future Volume (vph)	13	0	3	0	0	0	5	305	1	0	228	18
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	14	0	3	0	0	0	6	339	1	0	253	20
Shared Lane Traffic (%)	38%											
Lane Group Flow (vph)	9	8	0	0	0	0	6	340	0	0	273	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	13	0	5	305	228		
Future Volume (vph)	13	0	5	305	228		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	5.9	5.9	5.9	26.8	25.4		
Actuated g/C Ratio	0.20	0.20	0.20	0.93	0.88		
v/c Ratio	0.03	0.02	0.02	0.08	0.07		
Control Delay	12.5	0.1	12.6	1.1	3.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	12.5	0.1	12.6	1.1	3.0		
LOS	B	A	B	A	A		
Approach Delay		6.7		1.3	3.0		
Approach LOS		A		A	A		

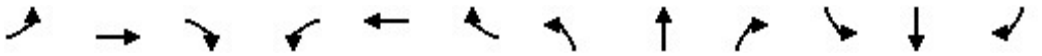
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 28.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.08	
Intersection Signal Delay: 2.1	Intersection LOS: A
Intersection Capacity Utilization 17.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	9	8	6	340	273
v/c Ratio	0.03	0.02	0.02	0.08	0.07
Control Delay	12.5	0.1	12.6	1.1	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	0.1	12.6	1.1	3.0
Queue Length 50th (ft)	1	0	1	0	0
Queue Length 95th (ft)	11	0	8	15	25
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	1063	1072	392	4468	4241
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.02	0.08	0.06

Intersection Summary



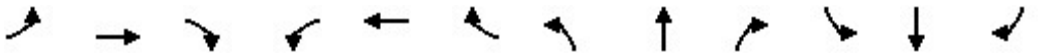
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	0	3	0	0	0	5	305	1	0	228	18
Future Volume (veh/h)	13	0	3	0	0	0	5	305	1	0	228	18
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	17	0	0	0	0	0	6	339	1	0	253	20
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	76	40	0	0	9	0	14	2519	7	9	1199	93
Arrive On Green	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.51	0.51	0.00	0.26	0.26
Sat Flow, veh/h	3375	1772	0	0	1772	0	1688	4979	15	1688	4577	356
Grp Volume(v), veh/h	17	0	0	0	0	0	6	219	121	0	177	96
Grp Sat Flow(s),veh/h/ln	1688	1772	0	0	1772	0	1688	1612	1769	1688	1612	1708
Q Serve(g_s), s	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.7	0.0	0.8	0.8
Cycle Q Clear(g_c), s	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.7	0.7	0.0	0.8	0.8
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.01	1.00		0.21
Lane Grp Cap(c), veh/h	76	40	0	0	9	0	14	1632	895	9	845	447
V/C Ratio(X)	0.22	0.00	0.00	0.00	0.00	0.00	0.43	0.13	0.13	0.00	0.21	0.21
Avail Cap(c_a), veh/h	3271	1717	0	0	1671	0	575	3464	1900	442	3210	1700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	0.0	0.0	0.0	0.0	9.4	2.5	2.5	0.0	5.5	5.5
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.0	0.0	0.0	19.9	0.0	0.1	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.6	0.0	0.0	0.0	0.0	0.0	29.4	2.5	2.6	0.0	5.6	5.7
LnGrp LOS	B	A	A	A	A	A	C	A	A	A	A	A
Approach Vol, veh/h		17			0			346			273	
Approach Delay, s/veh		10.6			0.0			3.0			5.7	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	14.2		4.9	4.7	9.5		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	2.7		2.1	2.1	2.8		0.0				
Green Ext Time (p_c), s	0.0	1.9		0.0	0.0	1.4		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	4.4
HCM 6th LOS	A

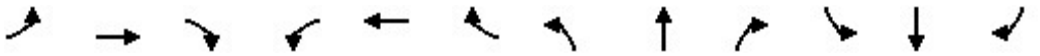
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			198			226			184			197
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



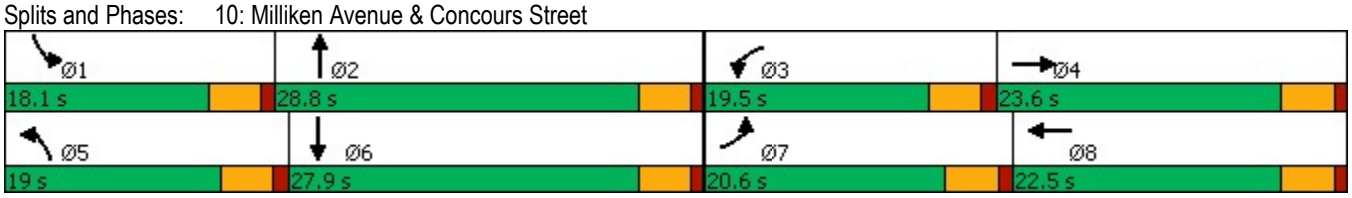
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	302	156	184	272	102	210	227	1216	254	330	1217	235
Future Volume (vph)	302	156	184	272	102	210	227	1216	254	330	1217	235
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	325	168	198	292	110	226	244	1308	273	355	1309	253
Shared Lane Traffic (%)												
Lane Group Flow (vph)	325	168	198	292	110	226	244	1308	273	355	1309	253

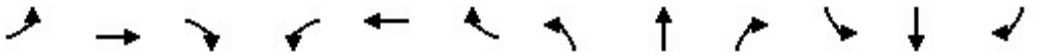
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	156	184	272	102	210	227	1216	254	330	1217	235
Future Volume (vph)	302	156	184	272	102	210	227	1216	254	330	1217	235
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	15.9	9.2	76.5	12.6	8.4	76.5	11.5	23.5	76.5	13.0	25.0	76.5
Actuated g/C Ratio	0.21	0.12	1.00	0.16	0.11	1.00	0.15	0.31	1.00	0.17	0.33	1.00
v/c Ratio	0.54	0.41	0.13	0.61	0.30	0.15	0.56	0.70	0.18	0.72	0.66	0.17
Control Delay	32.7	35.3	0.2	36.4	34.7	0.2	36.1	26.3	0.3	40.8	25.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	35.3	0.2	36.4	34.7	0.2	36.1	26.3	0.3	40.8	25.0	0.2
LOS	C	D	A	D	C	A	D	C	A	D	C	A
Approach Delay		24.0			23.1			23.7			24.6	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 76.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 24.0	Intersection LOS: C
Intersection Capacity Utilization 59.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street

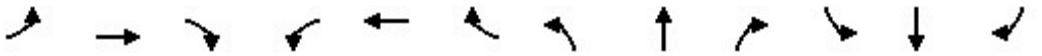




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	325	168	198	292	110	226	244	1308	273	355	1309	253
v/c Ratio	0.54	0.41	0.13	0.61	0.30	0.15	0.56	0.70	0.18	0.72	0.66	0.17
Control Delay	32.7	35.3	0.2	36.4	34.7	0.2	36.1	26.3	0.3	40.8	25.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	35.3	0.2	36.4	34.7	0.2	36.1	26.3	0.3	40.8	25.0	0.2
Queue Length 50th (ft)	76	40	0	69	26	0	57	161	0	85	155	0
Queue Length 95th (ft)	121	72	0	111	52	0	95	217	0	#150	221	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	650	843	1500	571	795	1500	552	1944	1500	518	1994	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.20	0.13	0.51	0.14	0.15	0.44	0.67	0.18	0.69	0.66	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



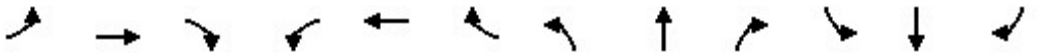
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	302	156	184	272	102	210	227	1216	254	330	1217	235
Future Volume (veh/h)	302	156	184	272	102	210	227	1216	254	330	1217	235
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	325	168	0	292	110	0	244	1308	0	355	1309	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	436	314		399	271		346	1963		458	2199	
Arrive On Green	0.15	0.09	0.00	0.14	0.08	0.00	0.12	0.32	0.00	0.16	0.36	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	325	168	0	292	110	0	244	1308	0	355	1309	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	6.6	3.0	0.0	6.0	1.9	0.0	5.0	11.5	0.0	7.3	10.8	0.0
Cycle Q Clear(g_c), s	6.6	3.0	0.0	6.0	1.9	0.0	5.0	11.5	0.0	7.3	10.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	436	314		399	271		346	1963		458	2199	
V/C Ratio(X)	0.75	0.53		0.73	0.41		0.71	0.67		0.77	0.60	
Avail Cap(c_a), veh/h	755	1036		703	977		680	2387		638	2298	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.3	26.8	0.0	25.7	27.1	0.0	26.3	18.2	0.0	25.1	16.1	0.0
Incr Delay (d2), s/veh	2.6	1.4	0.0	2.6	1.0	0.0	2.6	0.5	0.0	4.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	1.2	0.0	2.1	0.8	0.0	1.8	3.7	0.0	2.6	3.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	28.3	0.0	28.3	28.1	0.0	28.9	18.7	0.0	29.0	16.5	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		493	A		402	A		1552	A		1664	A
Approach Delay, s/veh		28.0			28.2			20.3			19.2	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.3	24.5	13.0	10.3	11.9	26.9	13.8	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	9.3	13.5	8.0	5.0	7.0	12.8	8.6	3.9
Green Ext Time (p_c), s	0.5	6.5	0.6	0.8	0.5	6.4	0.7	0.4

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

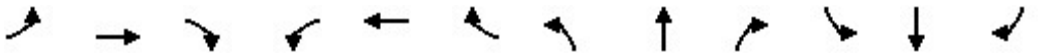
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			424			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



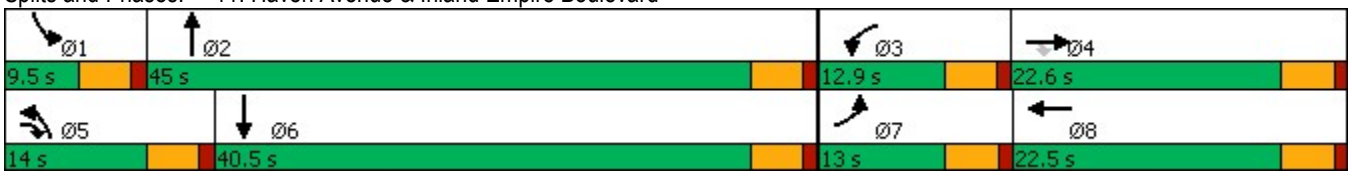
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	224	148	336	189	146	71	252	1890	570	55	1681	199
Future Volume (vph)	224	148	336	189	146	71	252	1890	570	55	1681	199
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	231	153	346	195	151	73	260	1948	588	57	1733	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	153	346	195	151	73	260	1948	588	57	1733	205

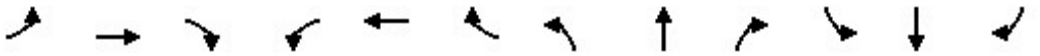
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	148	336	189	146	71	252	1890	570	55	1681	199
Future Volume (vph)	224	148	336	189	146	71	252	1890	570	55	1681	199
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	8.5	9.4	23.4	8.1	8.9	79.6	9.5	43.1	79.6	5.0	34.5	79.6
Actuated g/C Ratio	0.11	0.12	0.29	0.10	0.11	1.00	0.12	0.54	1.00	0.06	0.43	1.00
v/c Ratio	0.75	0.39	0.70	0.49	0.40	0.05	0.75	0.59	0.39	0.31	0.66	0.14
Control Delay	51.9	36.0	28.7	39.0	36.5	0.1	50.2	14.2	0.8	41.9	19.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	36.0	28.7	39.0	36.5	0.1	50.2	14.2	0.8	41.9	19.4	0.2
LOS	D	D	C	D	D	A	D	B	A	D	B	A
Approach Delay		37.6			31.3			14.7			18.1	
Approach LOS		D			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 79.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 19.8	Intersection LOS: B
Intersection Capacity Utilization 63.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	231	153	346	195	151	73	260	1948	588	57	1733	205
v/c Ratio	0.75	0.39	0.70	0.49	0.40	0.05	0.75	0.59	0.39	0.31	0.66	0.14
Control Delay	51.9	36.0	28.7	39.0	36.5	0.1	50.2	14.2	0.8	41.9	19.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	36.0	28.7	39.0	36.5	0.1	50.2	14.2	0.8	41.9	19.4	0.2
Queue Length 50th (ft)	59	38	124	33	37	0	67	200	0	14	190	0
Queue Length 95th (ft)	#119	67	220	57	66	0	#128	254	0	34	243	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	309	764	492	417	760	1500	346	3284	1500	182	2754	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.20	0.70	0.47	0.20	0.05	0.75	0.59	0.39	0.31	0.63	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	148	336	189	146	71	252	1890	570	55	1681	199
Future Volume (veh/h)	224	148	336	189	146	71	252	1890	570	55	1681	199
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	231	153	346	195	151	0	260	1948	0	57	1733	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	294	728	492	289	634		323	2754		128	2344	
Arrive On Green	0.10	0.22	0.22	0.07	0.19	0.00	0.11	0.45	0.00	0.04	0.38	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	231	153	346	195	151	0	260	1948	0	57	1733	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	6.5	3.1	16.8	4.0	3.2	0.0	7.3	21.5	0.0	1.6	20.5	0.0
Cycle Q Clear(g_c), s	6.5	3.1	16.8	4.0	3.2	0.0	7.3	21.5	0.0	1.6	20.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	294	728	492	289	634		323	2754		128	2344	
V/C Ratio(X)	0.79	0.21	0.70	0.67	0.24		0.80	0.71		0.45	0.74	
Avail Cap(c_a), veh/h	296	728	492	398	724		330	2951		174	2623	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.7	26.9	24.6	37.8	28.9	0.0	36.3	18.5	0.0	39.0	22.1	0.0
Incr Delay (d2), s/veh	13.0	0.1	4.5	2.7	0.2	0.0	13.2	0.7	0.0	2.4	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	1.2	6.3	1.3	1.3	0.0	3.1	7.2	0.0	0.6	7.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.8	27.1	29.1	40.6	29.1	0.0	49.5	19.2	0.0	41.4	23.1	0.0
LnGrp LOS	D	C	C	D	C		D	B		D	C	
Approach Vol, veh/h		730			346	A		2208	A		1790	A
Approach Delay, s/veh		35.2			35.5			22.8			23.7	
Approach LOS		D			D			C			C	

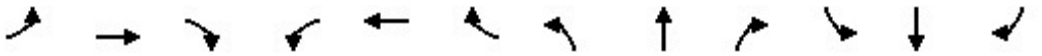
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	42.3	10.6	22.6	13.8	36.7	12.9	20.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	3.6	23.5	6.0	18.8	9.3	22.5	8.5	5.2
Green Ext Time (p_c), s	0.0	12.7	0.1	0.0	0.0	9.7	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	25.8
HCM 6th LOS	C

Notes

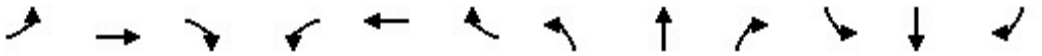
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			281			193			518			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



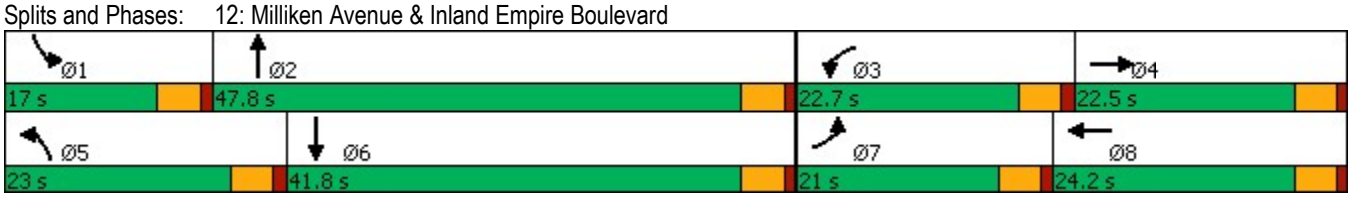
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	190	309	273	360	150	185	349	1278	794	192	1495	123
Future Volume (vph)	190	309	273	360	150	185	349	1278	794	192	1495	123
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	196	319	281	371	155	191	360	1318	819	198	1541	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	319	281	371	155	191	360	1318	819	198	1541	127

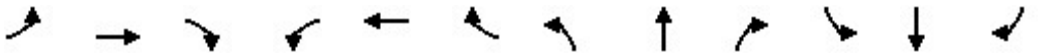
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	309	273	360	150	185	349	1278	794	192	1495	123
Future Volume (vph)	190	309	273	360	150	185	349	1278	794	192	1495	123
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	12.3	14.7	101.7	16.7	19.1	101.7	16.6	40.8	101.7	11.3	35.4	101.7
Actuated g/C Ratio	0.12	0.14	1.00	0.16	0.19	1.00	0.16	0.40	1.00	0.11	0.35	1.00
v/c Ratio	0.56	0.66	0.19	0.78	0.25	0.13	0.76	0.54	0.55	0.62	0.73	0.08
Control Delay	49.8	49.0	0.3	54.6	37.9	0.2	53.1	24.7	1.4	53.8	32.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	49.0	0.3	54.6	37.9	0.2	53.1	24.7	1.4	53.8	32.0	0.1
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		32.0			36.5			21.2			32.1	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 101.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 28.0	Intersection LOS: C
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	196	319	281	371	155	191	360	1318	819	198	1541	127
v/c Ratio	0.56	0.66	0.19	0.78	0.25	0.13	0.76	0.54	0.55	0.62	0.73	0.08
Control Delay	49.8	49.0	0.3	54.6	37.9	0.2	53.1	24.7	1.4	53.8	32.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	49.0	0.3	54.6	37.9	0.2	53.1	24.7	1.4	53.8	32.0	0.1
Queue Length 50th (ft)	67	111	0	126	47	0	122	197	0	67	267	0
Queue Length 95th (ft)	103	158	0	#195	81	0	178	243	0	108	323	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	474	600	1500	523	676	1500	532	2617	1500	359	2254	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.53	0.19	0.71	0.23	0.13	0.68	0.50	0.55	0.55	0.68	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	309	273	360	150	185	349	1278	794	192	1495	123
Future Volume (veh/h)	190	309	273	360	150	185	349	1278	794	192	1495	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	196	319	0	371	155	0	360	1318	0	198	1541	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	432		449	641		439	2544		267	2182	
Arrive On Green	0.09	0.13	0.00	0.15	0.19	0.00	0.15	0.42	0.00	0.09	0.36	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	196	319	0	371	155	0	360	1318	0	198	1541	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	5.7	7.9	0.0	10.7	3.4	0.0	10.4	13.9	0.0	5.7	18.8	0.0
Cycle Q Clear(g_c), s	5.7	7.9	0.0	10.7	3.4	0.0	10.4	13.9	0.0	5.7	18.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	269	432		449	641		439	2544		267	2182	
V/C Ratio(X)	0.73	0.74		0.83	0.24		0.82	0.52		0.74	0.71	
Avail Cap(c_a), veh/h	555	701		613	767		623	3053		421	2630	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.2	36.3	0.0	35.4	29.7	0.0	35.6	18.7	0.0	38.3	23.8	0.0
Incr Delay (d2), s/veh	3.8	2.5	0.0	6.7	0.2	0.0	5.9	0.2	0.0	4.1	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	3.3	0.0	4.1	1.4	0.0	3.9	4.7	0.0	2.2	6.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.9	38.8	0.0	42.1	29.9	0.0	41.4	18.9	0.0	42.3	24.5	0.0
LnGrp LOS	D	D		D	C		D	B		D	C	
Approach Vol, veh/h		515	A		526	A		1678	A		1739	A
Approach Delay, s/veh		40.0			38.5			23.7			26.6	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.4	40.6	17.9	15.6	17.6	35.4	12.5	21.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	7.7	15.9	12.7	9.9	12.4	20.8	7.7	5.4
Green Ext Time (p_c), s	0.3	11.4	0.7	1.2	0.7	10.2	0.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.924	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	2916	1365	6071	0	0	6071
Flt Permitted	0.976					
Satd. Flow (perm)	2916	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

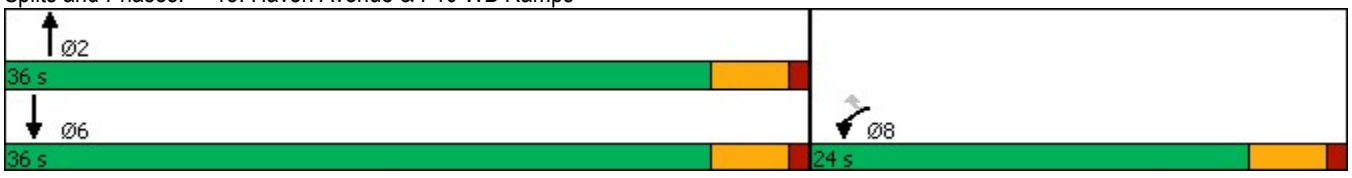
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	246	506	2163	0	0	1462
Future Volume (vph)	246	506	2163	0	0	1462
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	251	516	2207	0	0	1492
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	509	258	2207	0	0	1492

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	246	506	2163	1462
Future Volume (vph)	246	506	2163	1462
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	15.4	15.4	31.6	31.6
Actuated g/C Ratio	0.27	0.27	0.56	0.56
v/c Ratio	0.63	0.68	0.64	0.44
Control Delay	21.4	27.9	10.1	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	27.9	10.1	8.1
LOS	C	C	B	A
Approach Delay	23.6		10.1	8.1
Approach LOS	C		B	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 56.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 11.7	Intersection LOS: B
Intersection Capacity Utilization 74.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	509	258	2207	1492
v/c Ratio	0.63	0.68	0.64	0.44
Control Delay	21.4	27.9	10.1	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	27.9	10.1	8.1
Queue Length 50th (ft)	75	82	136	77
Queue Length 95th (ft)	117	157	196	114
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1019	478	3423	3423
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.54	0.64	0.44

Intersection Summary

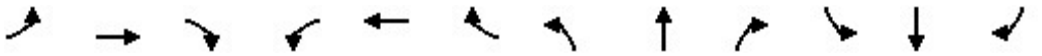
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	246	506	2163	0	0	1462
Future Volume (veh/h)	246	506	2163	0	0	1462
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	251	516	2207	0	0	1492
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	388	731	3499	0	0	3499
Arrive On Green	0.24	0.24	0.57	0.00	0.00	0.57
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	251	516	2207	0	0	1492
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	7.0	7.7	11.9	0.0	0.0	6.8
Cycle Q Clear(g_c), s	7.0	7.7	11.9	0.0	0.0	6.8
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	388	731	3499	0	0	3499
V/C Ratio(X)	0.65	0.71	0.63	0.00	0.00	0.43
Avail Cap(c_a), veh/h	631	1189	3897	0	0	3897
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	16.7	17.0	7.0	0.0	0.0	5.9
Incr Delay (d2), s/veh	1.8	1.3	0.3	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.5	2.6	0.0	0.0	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.6	18.3	7.3	0.0	0.0	6.0
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	767		2207			1492
Approach Delay, s/veh	18.4		7.3			6.0
Approach LOS	B		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	32.8			32.8	16.5
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s	13.9			8.8	9.7
Green Ext Time (p_c), s	14.4			12.0	2.3

Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

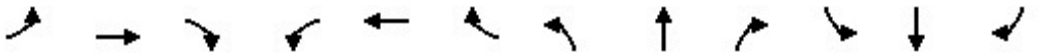
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			218			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



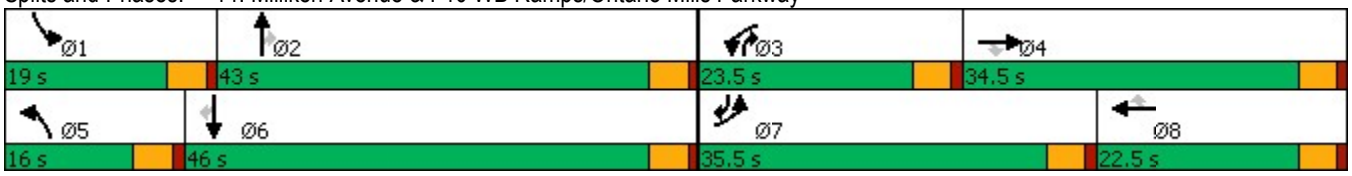
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	778	229	130	277	345	103	210	1361	420	305	1167	798
Future Volume (vph)	778	229	130	277	345	103	210	1361	420	305	1167	798
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	837	246	140	298	371	111	226	1463	452	328	1255	858
Shared Lane Traffic (%)												
Lane Group Flow (vph)	837	246	140	298	371	111	226	1463	452	328	1255	858

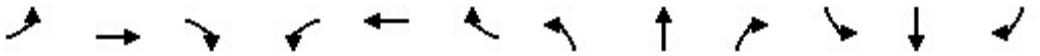
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	778	229	130	277	345	103	210	1361	420	305	1167	798
Future Volume (vph)	778	229	130	277	345	103	210	1361	420	305	1167	798
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	31.1	31.0	31.0	16.7	16.6	16.6	11.3	37.1	58.3	14.5	40.3	75.8
Actuated g/C Ratio	0.27	0.26	0.26	0.14	0.14	0.14	0.10	0.32	0.50	0.12	0.34	0.65
v/c Ratio	1.09	0.53	0.30	0.73	0.78	0.34	0.81	0.76	0.53	0.92	0.60	0.87
Control Delay	102.5	42.8	15.3	59.0	61.1	7.2	75.1	39.3	11.9	82.3	33.4	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.5	42.8	15.3	59.0	61.1	7.2	75.1	39.3	11.9	82.3	33.4	27.2
LOS	F	D	B	E	E	A	E	D	B	F	C	C
Approach Delay		80.5			52.6			37.3			37.8	
Approach LOS		F			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.3	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 47.3	Intersection LOS: D
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway



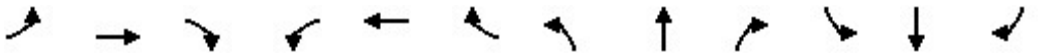


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	837	246	140	298	371	111	226	1463	452	328	1255	858
v/c Ratio	1.09	0.53	0.30	0.73	0.78	0.34	0.81	0.76	0.53	0.92	0.60	0.87
Control Delay	102.5	42.8	15.3	59.0	61.1	7.2	75.1	39.3	11.9	82.3	33.4	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.5	42.8	15.3	59.0	61.1	7.2	75.1	39.3	11.9	82.3	33.4	27.2
Queue Length 50th (ft)	~385	166	27	113	146	0	90	293	109	131	231	477
Queue Length 95th (ft)	#510	253	82	161	201	34	#155	338	199	#222	270	#821
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	765	466	466	468	515	345	284	1995	880	358	2151	989
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.53	0.30	0.64	0.72	0.32	0.80	0.73	0.51	0.92	0.58	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	778	229	130	277	345	103	210	1361	420	305	1167	798
Future Volume (veh/h)	778	229	130	277	345	103	210	1361	420	305	1167	798
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	837	246	140	298	371	111	226	1463	452	328	1255	858
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	771	489	414	354	446	199	273	1979	670	361	2163	931
Arrive On Green	0.27	0.28	0.28	0.12	0.13	0.13	0.09	0.32	0.32	0.12	0.35	0.35
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	837	246	140	298	371	111	226	1463	452	328	1255	858
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	31.0	13.7	8.7	11.7	12.6	8.1	8.9	24.9	27.9	13.0	19.6	41.5
Cycle Q Clear(g_c), s	31.0	13.7	8.7	11.7	12.6	8.1	8.9	24.9	27.9	13.0	19.6	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	771	489	414	354	446	199	273	1979	670	361	2163	931
V/C Ratio(X)	1.09	0.50	0.34	0.84	0.83	0.56	0.83	0.74	0.67	0.91	0.58	0.92
Avail Cap(c_a), veh/h	771	489	414	473	518	231	286	2007	677	361	2163	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.0	35.6	33.8	50.3	49.5	47.5	52.1	35.1	25.7	50.6	30.6	19.7
Incr Delay (d2), s/veh	57.9	0.8	0.5	10.0	9.8	2.4	17.4	1.5	2.6	26.1	0.4	14.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	17.2	6.0	3.2	4.8	5.9	3.2	3.9	9.4	10.3	6.0	7.2	22.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	100.9	36.4	34.3	60.3	59.3	50.0	69.5	36.6	28.3	76.7	31.0	33.9
LnGrp LOS	F	D	C	E	E	D	E	D	C	E	C	C
Approach Vol, veh/h		1223			780			2141			2441	
Approach Delay, s/veh		80.3			58.4			38.3			38.2	
Approach LOS		F			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	42.5	18.7	36.8	15.5	46.0	35.5	20.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	15.0	29.9	13.7	15.7	10.9	43.5	33.0	14.6
Green Ext Time (p_c), s	0.0	6.6	0.5	1.6	0.0	0.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	48.4
HCM 6th LOS	D

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3066	1365	0	6071	6071	0
Flt Permitted	0.955					
Satd. Flow (perm)	3066	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	5	5				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

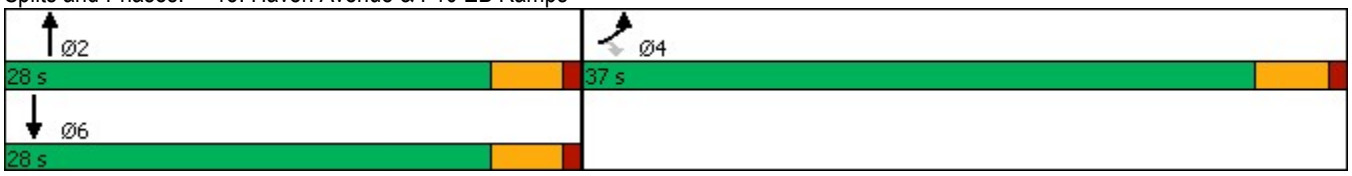
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1111	541	0	1632	1364	0
Future Volume (vph)	1111	541	0	1632	1364	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1145	558	0	1682	1406	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1201	502	0	1682	1406	0

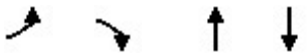
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1111	541	1632	1364
Future Volume (vph)	1111	541	1632	1364
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	29.2	29.2	23.4	23.4
Actuated g/C Ratio	0.47	0.47	0.38	0.38
v/c Ratio	0.83	0.77	0.73	0.61
Control Delay	19.7	23.1	19.3	17.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.7	23.1	19.3	17.4
LOS	B	C	B	B
Approach Delay	20.7		19.3	17.4
Approach LOS	C		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 61.6	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 19.2	Intersection LOS: B
Intersection Capacity Utilization 74.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1201	502	1682	1406
v/c Ratio	0.83	0.77	0.73	0.61
Control Delay	19.7	23.1	19.3	17.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	19.7	23.1	19.3	17.4
Queue Length 50th (ft)	186	159	166	131
Queue Length 95th (ft)	264	#300	208	166
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1631	727	2331	2331
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.74	0.69	0.72	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1111	541	0	1632	1364	0
Future Volume (veh/h)	1111	541	0	1632	1364	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1145	558	0	1682	1406	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1466	690	0	2325	2325	0
Arrive On Green	0.46	0.46	0.00	0.38	0.38	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1145	558	0	1682	1406	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	17.2	18.1	0.0	13.4	10.5	0.0
Cycle Q Clear(g_c), s	17.2	18.1	0.0	13.4	10.5	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1466	690	0	2325	2325	0
V/C Ratio(X)	0.78	0.81	0.00	0.72	0.60	0.00
Avail Cap(c_a), veh/h	1828	861	0	2528	2528	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	12.9	13.2	0.0	15.0	14.1	0.0
Incr Delay (d2), s/veh	1.8	4.7	0.0	1.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	5.9	0.0	4.1	3.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.7	17.8	0.0	15.9	14.5	0.0
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	1703			1682	1406	
Approach Delay, s/veh	15.7			15.9	14.5	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		26.1		30.6		26.1
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		15.4		20.1		12.5
Green Ext Time (p_c), s		6.3		6.0		7.0

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		11				127
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

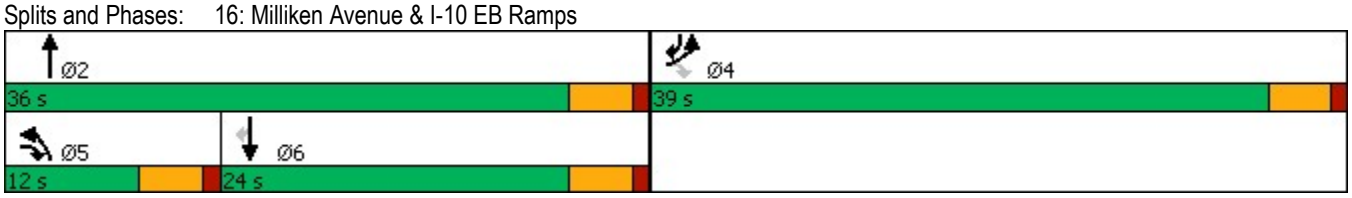
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	887	222	158	1154	843	756
Future Volume (vph)	887	222	158	1154	843	756
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	914	229	163	1190	869	779
Shared Lane Traffic (%)						
Lane Group Flow (vph)	914	229	163	1190	869	779

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	887	222	158	1154	843	756
Future Volume (vph)	887	222	158	1154	843	756
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	27.8	39.8	7.4	28.3	16.3	48.8
Actuated g/C Ratio	0.43	0.61	0.11	0.43	0.25	0.75
v/c Ratio	0.74	0.25	0.50	0.45	0.57	0.68
Control Delay	20.2	6.7	35.9	14.4	23.8	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	6.7	35.9	14.4	23.8	6.7
LOS	C	A	D	B	C	A
Approach Delay	17.5			17.0	15.7	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 65.4	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	914	229	163	1190	869	779
v/c Ratio	0.74	0.25	0.50	0.45	0.57	0.68
Control Delay	20.2	6.7	35.9	14.4	23.8	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	6.7	35.9	14.4	23.8	6.7
Queue Length 50th (ft)	155	36	34	97	91	89
Queue Length 95th (ft)	230	71	67	140	131	168
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1565	925	340	3002	1858	1301
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.25	0.48	0.40	0.47	0.60

Intersection Summary

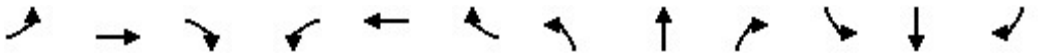
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	887	222	158	1154	843	756
Future Volume (veh/h)	887	222	158	1154	843	756
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	914	229	163	1190	869	779
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1113	699	242	2875	1925	1049
Arrive On Green	0.38	0.38	0.08	0.47	0.32	0.32
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	914	229	163	1190	869	779
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	17.5	5.9	3.4	7.9	7.0	19.5
Cycle Q Clear(g_c), s	17.5	5.9	3.4	7.9	7.0	19.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1113	699	242	2875	1925	1049
V/C Ratio(X)	0.82	0.33	0.67	0.41	0.45	0.74
Avail Cap(c_a), veh/h	1626	964	353	3110	1925	1049
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	10.4	27.5	10.7	16.9	5.8
Incr Delay (d2), s/veh	2.3	0.3	3.3	0.1	0.2	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.1	1.2	2.3	2.3	11.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.4	10.7	30.8	10.8	17.0	8.6
LnGrp LOS	B	B	C	B	B	A
Approach Vol, veh/h	1143			1353	1648	
Approach Delay, s/veh	17.7			13.2	13.1	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		33.6		28.1	9.6	24.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		9.9		19.5	5.4	21.5
Green Ext Time (p_c), s		9.1		4.2	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.4
HCM 6th LOS	B

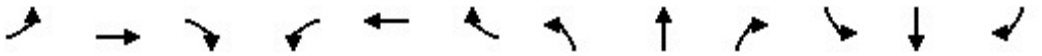
Appendix G

Intersection LOS Analysis Sheets
Opening Year With Related Projects With Project Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.954				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4596	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4596	0	2891	3353	1500	2891	4818	1500	2891	6034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		89				149			238		8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



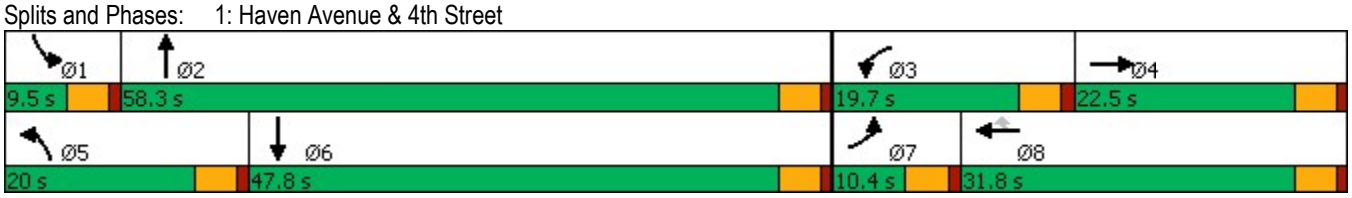
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	93	313	140	315	555	199	244	1666	513	114	1363	55
Future Volume (vph)	93	313	140	315	555	199	244	1666	513	114	1363	55
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	102	344	154	346	610	219	268	1831	564	125	1498	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	102	498	0	346	610	219	268	1831	564	125	1558	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	93	313	315	555	199	244	1666	513	114	1363
Future Volume (vph)	93	313	315	555	199	244	1666	513	114	1363
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	15.8	14.9	24.8	24.8	14.0	53.8	107.6	5.0	44.9
Actuated g/C Ratio	0.05	0.15	0.14	0.23	0.23	0.13	0.50	1.00	0.05	0.42
v/c Ratio	0.65	0.66	0.86	0.79	0.48	0.71	0.76	0.38	0.93	0.62
Control Delay	69.7	39.9	67.8	47.0	15.8	56.3	24.6	0.7	114.4	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.7	39.9	67.8	47.0	15.8	56.3	24.6	0.7	114.4	26.5
LOS	E	D	E	D	B	E	C	A	F	C
Approach Delay		45.0		47.3			22.8			33.0
Approach LOS		D		D			C			C

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 107.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 32.5	Intersection LOS: C
Intersection Capacity Utilization 73.5%	ICU Level of Service D
Analysis Period (min) 15	

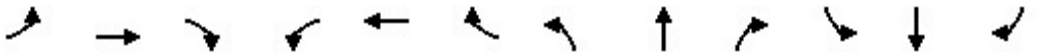
Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	102	498	346	610	219	268	1831	564	125	1558
v/c Ratio	0.65	0.66	0.86	0.79	0.48	0.71	0.76	0.38	0.93	0.62
Control Delay	69.7	39.9	67.8	47.0	15.8	56.3	24.6	0.7	114.4	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.7	39.9	67.8	47.0	15.8	56.3	24.6	0.7	114.4	26.5
Queue Length 50th (ft)	37	98	124	208	39	93	377	0	46	255
Queue Length 95th (ft)	#75	137	#204	274	110	138	440	0	#107	297
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	158	843	408	851	492	416	2410	1500	134	2520
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.59	0.85	0.72	0.45	0.64	0.76	0.38	0.93	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



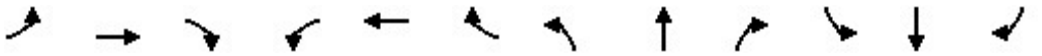
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	313	140	315	555	199	244	1666	513	114	1363	55
Future Volume (veh/h)	93	313	140	315	555	199	244	1666	513	114	1363	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	102	344	154	346	610	219	268	1831	0	125	1498	60
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	148	460	194	397	753	336	326	2459		137	2686	107
Arrive On Green	0.05	0.14	0.14	0.14	0.22	0.22	0.11	0.51	0.00	0.05	0.44	0.44
Sat Flow, veh/h	2910	3339	1405	2910	3367	1502	2910	4837	1502	2910	6057	242
Grp Volume(v), veh/h	102	332	166	346	610	219	268	1831	0	125	1130	428
Grp Sat Flow(s),veh/h/ln	1455	1612	1519	1455	1683	1502	1455	1612	1502	1455	1524	1728
Q Serve(g_s), s	3.6	10.5	11.2	12.3	18.2	14.0	9.5	31.7	0.0	4.5	19.4	19.4
Cycle Q Clear(g_c), s	3.6	10.5	11.2	12.3	18.2	14.0	9.5	31.7	0.0	4.5	19.4	19.4
Prop In Lane	1.00		0.93	1.00		1.00	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	148	445	209	397	753	336	326	2459		137	2027	766
V/C Ratio(X)	0.69	0.75	0.80	0.87	0.81	0.65	0.82	0.74		0.91	0.56	0.56
Avail Cap(c_a), veh/h	162	548	258	418	868	387	426	2459		137	2027	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.4	43.8	44.2	44.8	39.0	37.3	46.0	20.6	0.0	50.2	21.8	21.8
Incr Delay (d2), s/veh	10.6	4.3	12.9	17.2	5.1	3.1	9.5	2.1	0.0	50.4	1.1	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	4.4	5.0	5.4	8.0	5.4	3.9	11.8	0.0	2.6	7.0	8.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	48.2	57.1	62.0	44.1	40.5	55.4	22.7	0.0	100.6	22.9	24.7
LnGrp LOS	E	D	E	E	D	D	E	C		F	C	C
Approach Vol, veh/h		600			1175			2099	A		1683	
Approach Delay, s/veh		52.7			48.7			26.9			29.1	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	58.3	19.0	19.1	16.4	51.4	9.9	28.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	6.5	33.7	14.3	13.2	11.5	21.4	5.6	20.2
Green Ext Time (p_c), s	0.0	13.7	0.1	1.4	0.3	11.7	0.0	2.8

Intersection Summary	
HCM 6th Ctrl Delay	35.0
HCM 6th LOS	C

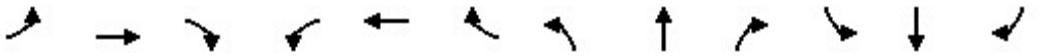
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.989				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6004	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6004	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22				164			164		320	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	38	544	41	1	815	109	43	1	1	176	0	3
Future Volume (vph)	38	544	41	1	815	109	43	1	1	176	0	3
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	42	604	46	1	906	121	48	1	1	196	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	650	0	1	906	121	48	1	1	196	3	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	38	544	1	815	109	43	1	1	176	0
Future Volume (vph)	38	544	1	815	109	43	1	1	176	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	15.0	26.7
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	21.4%	38.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	5.1	17.8	5.1	16.2	16.2	6.5	5.7	5.7	10.3	16.6
Actuated g/C Ratio	0.10	0.36	0.10	0.33	0.33	0.13	0.12	0.12	0.21	0.34
v/c Ratio	0.26	0.30	0.01	0.57	0.20	0.23	0.00	0.00	0.60	0.00
Control Delay	27.6	11.5	24.0	15.9	2.5	24.8	23.0	0.0	29.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	11.5	24.0	15.9	2.5	24.8	23.0	0.0	29.7	0.0
LOS	C	B	C	B	A	C	C	A	C	A
Approach Delay		12.5		14.4			24.3			29.3
Approach LOS		B		B			C			C

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 49.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 49.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	42	650	1	906	121	48	1	1	196	3
v/c Ratio	0.26	0.30	0.01	0.57	0.20	0.23	0.00	0.00	0.60	0.00
Control Delay	27.6	11.5	24.0	15.9	2.5	24.8	23.0	0.0	29.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	11.5	24.0	15.9	2.5	24.8	23.0	0.0	29.7	0.0
Queue Length 50th (ft)	11	33	0	66	0	12	0	0	48	0
Queue Length 95th (ft)	40	67	4	130	18	42	4	0	#145	0
Internal Link Dist (ft)		2546		362			269			358
Turn Bay Length (ft)	130		130		145	165		165	50	
Base Capacity (vph)	164	2455	164	1799	663	223	677	676	345	1485
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.26	0.01	0.50	0.18	0.22	0.00	0.00	0.57	0.00

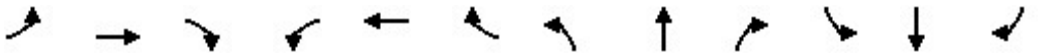
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	38	544	41	1	815	109	43	1	1	176	0	3
Future Volume (veh/h)	38	544	41	1	815	109	43	1	1	176	0	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	42	604	46	1	906	121	48	1	1	196	0	3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	1994	150	3	1443	448	80	194	165	243	357	318
Arrive On Green	0.05	0.34	0.34	0.00	0.30	0.30	0.05	0.11	0.11	0.15	0.00	0.21
Sat Flow, veh/h	1594	5828	437	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	42	472	178	1	906	121	48	1	1	196	0	3
Grp Sat Flow(s),veh/h/ln	1594	1524	1693	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	1.2	3.5	3.5	0.0	7.4	2.8	1.3	0.0	0.0	5.4	0.0	0.1
Cycle Q Clear(g_c), s	1.2	3.5	3.5	0.0	7.4	2.8	1.3	0.0	0.0	5.4	0.0	0.1
Prop In Lane	1.00		0.26	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	72	1564	579	3	1443	448	80	194	165	243	357	318
V/C Ratio(X)	0.58	0.30	0.31	0.29	0.63	0.27	0.60	0.01	0.01	0.81	0.00	0.01
Avail Cap(c_a), veh/h	175	1804	668	175	1909	593	238	719	609	367	819	731
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	11.0	11.0	22.7	13.8	12.2	21.2	18.1	18.1	18.7	0.0	14.2
Incr Delay (d2), s/veh	7.2	0.1	0.3	39.7	0.5	0.3	7.1	0.0	0.0	7.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.0	1.1	0.0	2.3	0.8	0.6	0.0	0.0	2.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.6	11.1	11.3	62.5	14.3	12.5	28.4	18.1	18.1	26.4	0.0	14.2
LnGrp LOS	C	B	B	E	B	B	C	B	B	C	A	B
Approach Vol, veh/h		692			1028			50			199	
Approach Delay, s/veh		12.2			14.1			28.0			26.2	
Approach LOS		B			B			C			C	

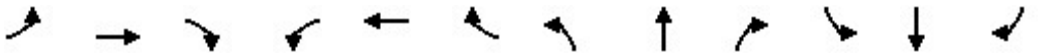
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	9.5	4.6	20.1	6.8	14.2	6.6	18.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	7.4	2.0	2.0	5.5	3.3	2.1	3.2	9.4
Green Ext Time (p_c), s	0.2	0.0	0.0	3.4	0.0	0.0	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.997				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	2891	6065	0	1583	4803	0	1583	1765	1500	0	1687	1500
Flt Permitted	0.950			0.950			0.731				0.740	
Satd. Flow (perm)	2891	6065	0	1583	4803	0	1218	1765	1500	0	1306	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			6				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



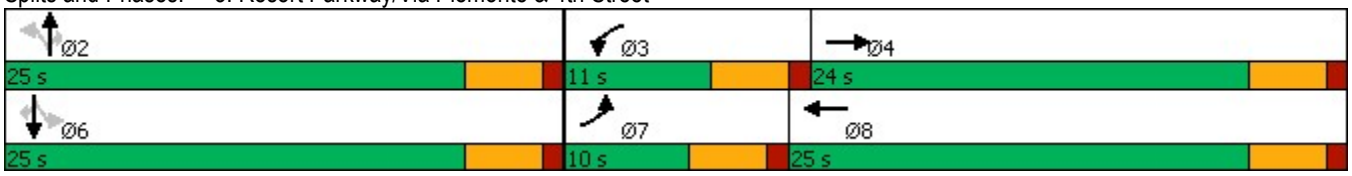
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	15	716	4	36	867	20	28	3	31	34	3	17
Future Volume (vph)	15	716	4	36	867	20	28	3	31	34	3	17
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	16	770	4	39	932	22	30	3	33	37	3	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	774	0	39	954	0	30	3	33	0	40	18

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	15	716	36	867	28	3	31	34	3	17
Future Volume (vph)	15	716	36	867	28	3	31	34	3	17
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.8	14.4	6.4	14.5	6.8	6.8	6.8		6.8	6.8
Actuated g/C Ratio	0.18	0.45	0.20	0.45	0.21	0.21	0.21		0.21	0.21
v/c Ratio	0.03	0.29	0.12	0.44	0.12	0.01	0.08		0.14	0.04
Control Delay	15.5	6.5	15.3	7.2	14.5	13.7	0.4		14.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	15.5	6.5	15.3	7.2	14.5	13.7	0.4		14.6	0.2
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		6.7		7.6		7.4			10.2	
Approach LOS		A		A		A			B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 32.2	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 42.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	16	774	39	954	30	3	33	40	18
v/c Ratio	0.03	0.29	0.12	0.44	0.12	0.01	0.08	0.14	0.04
Control Delay	15.5	6.5	15.3	7.2	14.5	13.7	0.4	14.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	6.5	15.3	7.2	14.5	13.7	0.4	14.6	0.2
Queue Length 50th (ft)	1	16	5	28	4	0	0	5	0
Queue Length 95th (ft)	8	58	31	93	25	6	0	30	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	521	3883	337	3234	820	1187	1045	878	1045
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.20	0.12	0.29	0.04	0.00	0.03	0.05	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	716	4	36	867	20	28	3	31	34	3	17
Future Volume (veh/h)	15	716	4	36	867	20	28	3	31	34	3	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	16	770	4	39	932	22	30	3	33	37	3	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	60	2261	12	73	1866	44	412	285	242	424	26	242
Arrive On Green	0.02	0.36	0.36	0.05	0.38	0.38	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	2910	6305	33	1594	4862	115	1314	1772	1502	1249	159	1502
Grp Volume(v), veh/h	16	558	216	39	618	336	30	3	33	40	0	18
Grp Sat Flow(s),veh/h/ln	1455	1524	1766	1594	1612	1751	1314	1772	1502	1408	0	1502
Q Serve(g_s), s	0.2	2.8	2.8	0.7	4.5	4.5	0.6	0.0	0.6	0.6	0.0	0.3
Cycle Q Clear(g_c), s	0.2	2.8	2.8	0.7	4.5	4.5	1.4	0.0	0.6	0.7	0.0	0.3
Prop In Lane	1.00		0.02	1.00		0.07	1.00		1.00	0.92		1.00
Lane Grp Cap(c), veh/h	60	1640	633	73	1238	672	412	285	242	450	0	242
V/C Ratio(X)	0.26	0.34	0.34	0.53	0.50	0.50	0.07	0.01	0.14	0.09	0.00	0.07
Avail Cap(c_a), veh/h	515	2869	1108	333	2127	1155	1068	1169	991	1146	0	991
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.0	7.3	7.3	14.5	7.3	7.3	11.8	11.0	11.2	11.2	0.0	11.1
Incr Delay (d2), s/veh	2.3	0.1	0.3	5.9	0.3	0.6	0.1	0.0	0.3	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.6	0.7	0.3	1.0	1.1	0.1	0.0	0.2	0.2	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.3	7.4	7.6	20.4	7.6	7.9	11.9	11.0	11.4	11.3	0.0	11.2
LnGrp LOS	B	A	A	C	A	A	B	B	B	B	A	B
Approach Vol, veh/h		790			993			66			58	
Approach Delay, s/veh		7.7			8.2			11.6			11.3	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.9	15.6		9.5	5.1	16.4				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		3.4	2.7	4.8		2.7	2.2	6.5				
Green Ext Time (p_c), s		0.1	0.0	4.5		0.2	0.0	5.4				

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	4798	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4798	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	774	21	0	880	0	23
Future Volume (vph)	774	21	0	880	0	23
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	841	23	0	957	0	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	864	0	0	957	0	25

Intersection Summary

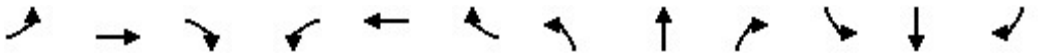
Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	774	21	0	880	0	23
Future Vol, veh/h	774	21	0	880	0	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	841	23	0	957	0	25

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	432
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	489
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	489
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

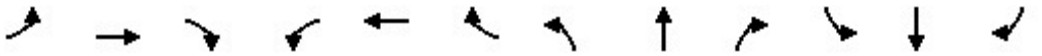
Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	489	-	-	-
HCM Lane V/C Ratio	0.051	-	-	-
HCM Control Delay (s)	12.8	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5986	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			239			285			73		24	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



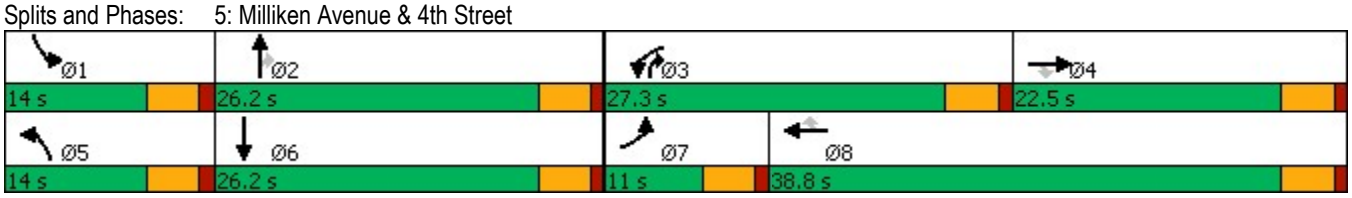
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	154	555	226	471	1318	407	236	1013	164	248	961	97
Future Volume (vph)	154	555	226	471	1318	407	236	1013	164	248	961	97
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	166	597	243	506	1417	438	254	1089	176	267	1033	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	597	243	506	1417	438	254	1089	176	267	1137	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	154	555	226	471	1318	407	236	1013	164	248	961
Future Volume (vph)	154	555	226	471	1318	407	236	1013	164	248	961
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	20.4	20.4	20.0	33.9	33.9	9.5	21.3	45.8	9.5	21.3
Actuated g/C Ratio	0.07	0.23	0.23	0.22	0.38	0.38	0.11	0.24	0.51	0.11	0.24
v/c Ratio	0.79	0.54	0.46	0.78	0.77	0.59	0.82	0.75	0.22	0.87	0.79
Control Delay	68.0	33.1	7.8	41.7	27.9	11.1	62.3	35.4	7.1	67.6	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	33.1	7.8	41.7	27.9	11.1	62.3	35.4	7.1	67.6	35.7
LOS	E	C	A	D	C	B	E	D	A	E	D
Approach Delay		32.8			27.7			36.6			41.8
Approach LOS		C			C			D			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 89.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 33.8	Intersection LOS: C
Intersection Capacity Utilization 71.5%	ICU Level of Service C
Analysis Period (min) 15	

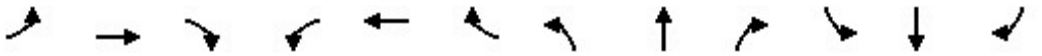
Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	166	597	243	506	1417	438	254	1089	176	267	1137
v/c Ratio	0.79	0.54	0.46	0.78	0.77	0.59	0.82	0.75	0.22	0.87	0.79
Control Delay	68.0	33.1	7.8	41.7	27.9	11.1	62.3	35.4	7.1	67.6	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.0	33.1	7.8	41.7	27.9	11.1	62.3	35.4	7.1	67.6	35.7
Queue Length 50th (ft)	48	110	2	138	253	59	74	166	28	78	172
Queue Length 95th (ft)	#102	153	63	189	311	154	#138	206	59	#147	212
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	210	1104	528	738	1852	752	308	1476	850	308	1474
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.54	0.46	0.69	0.77	0.58	0.82	0.74	0.21	0.87	0.77

Intersection Summary

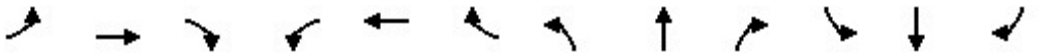
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	154	555	226	471	1318	407	236	1013	164	248	961	97
Future Volume (veh/h)	154	555	226	471	1318	407	236	1013	164	248	961	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	166	597	243	506	1417	438	254	1089	176	267	1033	104
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	222	1174	364	593	1792	556	316	1410	654	324	1328	133
Arrive On Green	0.08	0.24	0.24	0.20	0.37	0.37	0.11	0.23	0.23	0.11	0.23	0.23
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5675	567
Grp Volume(v), veh/h	166	597	243	506	1417	438	254	1089	176	267	831	306
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1670
Q Serve(g_s), s	4.8	9.1	12.5	14.3	22.3	22.1	7.3	14.3	6.4	7.7	14.5	14.7
Cycle Q Clear(g_c), s	4.8	9.1	12.5	14.3	22.3	22.1	7.3	14.3	6.4	7.7	14.5	14.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.34
Lane Grp Cap(c), veh/h	222	1174	364	593	1792	556	316	1410	654	324	1070	391
V/C Ratio(X)	0.75	0.51	0.67	0.85	0.79	0.79	0.80	0.77	0.27	0.82	0.78	0.78
Avail Cap(c_a), veh/h	222	1174	364	777	1943	603	324	1549	688	324	1162	424
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.6	27.9	29.2	32.8	23.9	23.9	37.2	30.7	15.4	37.1	30.6	30.7
Incr Delay (d2), s/veh	13.2	0.4	4.6	7.2	2.1	6.4	13.4	2.3	0.2	15.8	3.1	8.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	3.5	4.8	5.5	8.4	8.4	3.1	5.3	2.1	3.4	5.5	6.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.8	28.3	33.8	39.9	26.1	30.3	50.5	33.0	15.6	52.9	33.7	39.3
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	C	D
Approach Vol, veh/h		1006			2361			1519			1404	
Approach Delay, s/veh		33.5			29.8			33.9			38.6	
Approach LOS		C			C			C			D	

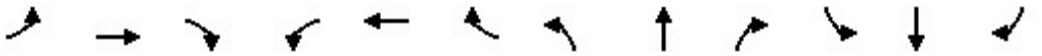
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	24.3	21.9	25.2	13.8	24.5	11.0	36.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	9.7	16.3	16.3	14.5	9.3	16.7	6.8	24.3
Green Ext Time (p_c), s	0.0	3.5	1.1	1.6	0.0	3.1	0.0	7.4

Intersection Summary	
HCM 6th Ctrl Delay	33.4
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.898	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2884	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2884	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		214	214
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



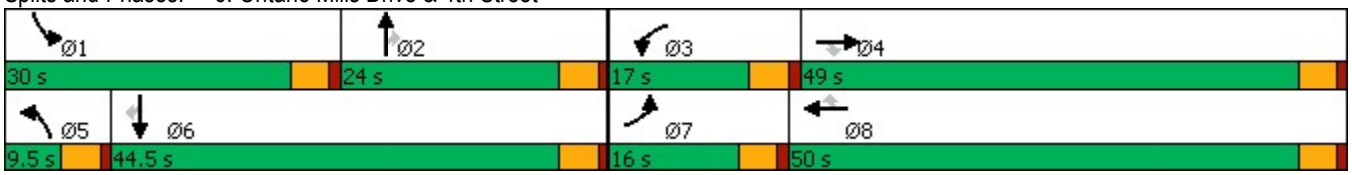
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	336	519	59	124	1381	172	72	71	86	194	223	942
Future Volume (vph)	336	519	59	124	1381	172	72	71	86	194	223	942
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	386	597	68	143	1587	198	83	82	99	223	256	1083
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	386	597	68	143	1587	198	83	82	99	223	798	541

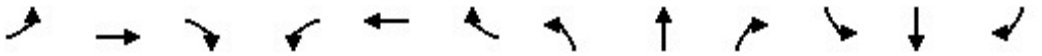
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	336	519	59	124	1381	172	72	71	86	194	223	942
Future Volume (vph)	336	519	59	124	1381	172	72	71	86	194	223	942
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.6	45.3	45.3	10.7	44.4	44.4	5.0	21.6	21.6	20.8	37.4	37.4
Actuated g/C Ratio	0.10	0.39	0.39	0.09	0.38	0.38	0.04	0.19	0.19	0.18	0.32	0.32
v/c Ratio	1.35	0.32	0.10	0.54	0.86	0.30	1.24	0.13	0.25	0.79	0.90dr	0.93
Control Delay	218.5	26.1	0.3	59.1	39.6	10.1	231.4	42.2	4.5	66.0	30.2	46.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	218.5	26.1	0.3	59.1	39.6	10.1	231.4	42.2	4.5	66.0	30.2	46.8
LOS	F	C	A	E	D	B	F	D	A	E	C	D
Approach Delay		95.1			38.0			87.5			41.1	
Approach LOS		F			D			F			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.5	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.35	
Intersection Signal Delay: 54.2	Intersection LOS: D
Intersection Capacity Utilization 84.9%	ICU Level of Service E
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 6: Ontario Mills Drive & 4th Street





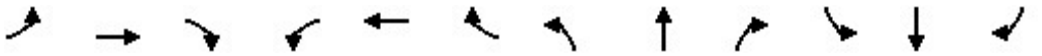
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	386	597	68	143	1587	198	83	82	99	223	798	541
v/c Ratio	1.35	0.32	0.10	0.54	0.86	0.30	1.24	0.13	0.25	0.79	0.90dr	0.93
Control Delay	218.5	26.1	0.3	59.1	39.6	10.1	231.4	42.2	4.5	66.0	30.2	46.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	218.5	26.1	0.3	59.1	39.6	10.1	231.4	42.2	4.5	66.0	30.2	46.8
Queue Length 50th (ft)	~205	118	0	55	412	31	~81	27	0	166	220	290
Queue Length 95th (ft)	#292	147	0	85	454	79	#179	51	19	238	283	#498
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	286	1879	668	311	1889	671	67	623	389	348	1135	610
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.35	0.32	0.10	0.46	0.84	0.30	1.24	0.13	0.25	0.64	0.70	0.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.



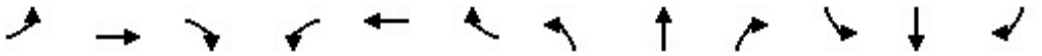
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	336	519	59	124	1381	172	72	71	86	194	223	942
Future Volume (veh/h)	336	519	59	124	1381	172	72	71	86	194	223	942
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	386	597	68	143	1587	198	83	82	99	223	256	1083
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	283	1946	604	192	1795	557	67	750	335	250	598	1014
Arrive On Green	0.10	0.40	0.40	0.07	0.37	0.37	0.04	0.22	0.22	0.16	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	386	597	68	143	1587	198	83	82	99	223	256	1083
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	11.5	10.0	3.4	5.7	36.4	11.3	5.0	2.3	6.5	16.2	13.2	40.0
Cycle Q Clear(g_c), s	11.5	10.0	3.4	5.7	36.4	11.3	5.0	2.3	6.5	16.2	13.2	40.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	283	1946	604	192	1795	557	67	750	335	250	598	1014
V/C Ratio(X)	1.37	0.31	0.11	0.75	0.88	0.36	1.23	0.11	0.30	0.89	0.43	1.07
Avail Cap(c_a), veh/h	283	1946	604	307	1858	577	67	750	335	343	598	1014
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.5	24.1	22.2	54.3	34.9	27.0	56.7	36.7	38.3	48.9	30.4	39.2
Incr Delay (d2), s/veh	185.9	0.1	0.1	5.7	5.4	0.4	185.3	0.1	0.5	19.1	0.5	48.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.5	3.8	1.2	2.2	14.9	4.1	5.5	1.0	2.4	7.8	5.7	21.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	239.4	24.2	22.3	60.0	40.2	27.4	242.1	36.7	38.8	68.1	30.9	87.5
LnGrp LOS	F	C	C	E	D	C	F	D	D	E	C	F
Approach Vol, veh/h		1051			1928			264			1562	
Approach Delay, s/veh		103.1			40.4			102.1			75.4	
Approach LOS		F			D			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.1	30.9	12.3	52.1	9.5	44.5	16.0	48.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	18.2	8.5	7.7	12.0	7.0	42.0	13.5	38.4
Green Ext Time (p_c), s	0.4	0.5	0.2	4.8	0.0	0.0	0.0	5.6

Intersection Summary	
HCM 6th Ctrl Delay	68.9
HCM 6th LOS	E

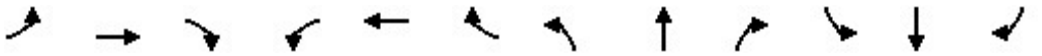
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.983			0.898				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.964	
Satd. Flow (prot)	2891	4818	1500	1583	4736	0	1583	3011	0	1504	1616	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.964	
Satd. Flow (perm)	2891	4818	1500	1583	4736	0	1583	3011	0	1504	1616	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		25			60				404
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



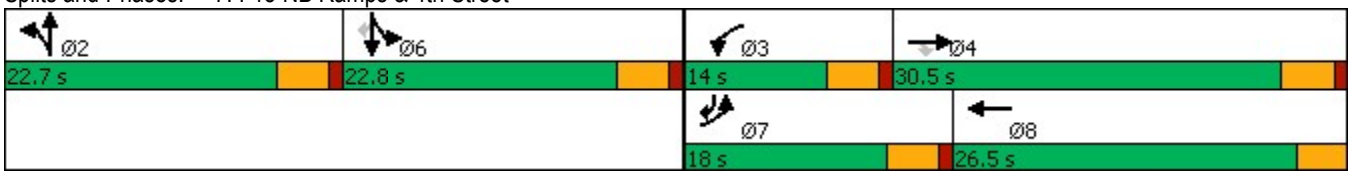
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	303	423	107	45	567	74	132	27	57	489	74	976
Future Volume (vph)	303	423	107	45	567	74	132	27	57	489	74	976
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	319	445	113	47	597	78	139	28	60	515	78	1027
Shared Lane Traffic (%)										43%		
Lane Group Flow (vph)	319	445	113	47	675	0	139	88	0	294	299	1027

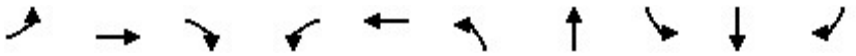
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	303	423	107	45	567	132	27	489	74	976
Future Volume (vph)	303	423	107	45	567	132	27	489	74	976
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	18.0	30.5	30.5	14.0	26.5	22.7	22.7	22.8	22.8	18.0
Total Split (%)	20.0%	33.9%	33.9%	15.6%	29.4%	25.2%	25.2%	25.3%	25.3%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	12.9	26.2	26.2	7.6	17.1	12.1	12.1	18.4	18.4	35.9
Actuated g/C Ratio	0.17	0.34	0.34	0.10	0.22	0.16	0.16	0.24	0.24	0.46
v/c Ratio	0.66	0.27	0.19	0.31	0.64	0.56	0.17	0.83	0.78	0.72
Control Delay	39.8	21.5	4.8	40.7	29.8	40.6	13.9	52.2	46.7	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.8	21.5	4.8	40.7	29.8	40.6	13.9	52.2	46.7	14.2
LOS	D	C	A	D	C	D	B	D	D	B
Approach Delay		26.0			30.5		30.3		27.1	
Approach LOS		C			C		C		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 77.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 27.7	Intersection LOS: C
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street

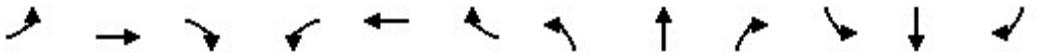




Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	319	445	113	47	675	139	88	294	299	1027
v/c Ratio	0.66	0.27	0.19	0.31	0.64	0.56	0.17	0.83	0.78	0.72
Control Delay	39.8	21.5	4.8	40.7	29.8	40.6	13.9	52.2	46.7	14.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.8	21.5	4.8	40.7	29.8	40.6	13.9	52.2	46.7	14.2
Queue Length 50th (ft)	75	62	0	22	105	64	6	145	146	130
Queue Length 95th (ft)	#146	100	32	59	155	127	26	#342	#335	269
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	508	1709	614	196	1436	375	759	358	385	1457
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.26	0.18	0.24	0.47	0.37	0.12	0.82	0.78	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	303	423	107	45	567	74	132	27	57	489	74	976
Future Volume (veh/h)	303	423	107	45	567	74	132	27	57	489	74	976
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	319	445	113	47	597	78	139	28	60	571	0	1027
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	411	1482	460	69	903	117	194	205	183	849	0	1224
Arrive On Green	0.14	0.31	0.31	0.04	0.21	0.21	0.12	0.12	0.12	0.27	0.00	0.27
Sat Flow, veh/h	2910	4837	1502	1594	4336	560	1594	1683	1502	3188	0	3003
Grp Volume(v), veh/h	319	445	113	47	442	233	139	28	60	571	0	1027
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1671	1594	1683	1502	1594	0	1502
Q Serve(g_s), s	7.3	4.8	3.9	2.0	8.6	8.8	5.8	1.0	2.5	11.0	0.0	18.3
Cycle Q Clear(g_c), s	7.3	4.8	3.9	2.0	8.6	8.8	5.8	1.0	2.5	11.0	0.0	18.3
Prop In Lane	1.00		1.00	1.00		0.33	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	411	1482	460	69	672	348	194	205	183	849	0	1224
V/C Ratio(X)	0.78	0.30	0.25	0.68	0.66	0.67	0.72	0.14	0.33	0.67	0.00	0.84
Avail Cap(c_a), veh/h	572	1832	569	220	1080	560	422	446	398	849	0	1224
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.4	18.2	17.9	32.4	24.9	25.0	29.0	26.9	27.6	22.5	0.0	18.3
Incr Delay (d2), s/veh	4.5	0.1	0.3	11.4	1.1	2.2	4.8	0.3	1.0	2.1	0.0	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	1.7	1.3	1.0	3.2	3.5	2.4	0.4	0.9	4.1	0.0	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	18.3	18.1	43.7	26.0	27.2	33.8	27.2	28.6	24.6	0.0	23.6
LnGrp LOS	C	B	B	D	C	C	C	C	C	C	A	C
Approach Vol, veh/h		877			722			227			1598	
Approach Delay, s/veh		23.6			27.6			31.6			24.0	
Approach LOS		C			C			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		12.9	7.5	25.5		22.8	14.2	18.8				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	13.5	* 23				
Max Q Clear Time (g_c+I1), s		7.8	4.0	6.8		20.3	9.3	10.8				
Green Ext Time (p_c), s		0.6	0.0	3.3		0.0	0.5	3.5				

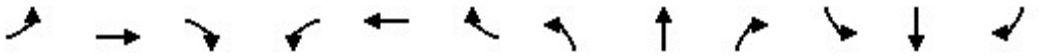
Intersection Summary	
HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

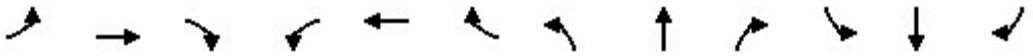
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.904				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3031	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		90				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



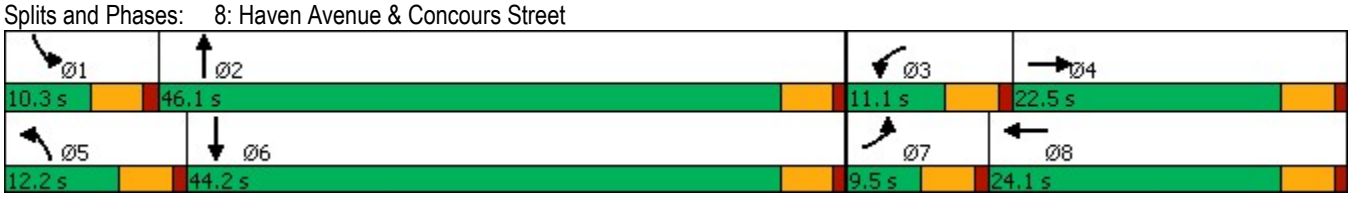
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	21	45	81	180	59	18	71	1972	164	139	1570	44
Future Volume (vph)	21	45	81	180	59	18	71	1972	164	139	1570	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	23	50	90	200	66	20	79	2191	182	154	1744	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	140	0	200	66	20	79	2191	182	154	1744	49

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	21	45	180	59	18	71	1972	164	139	1570	44
Future Volume (vph)	21	45	180	59	18	71	1972	164	139	1570	44
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.0	6.6	14.4	79.0	7.0	41.6	79.0	5.8	42.4	79.0
Actuated g/C Ratio	0.06	0.09	0.08	0.18	1.00	0.09	0.53	1.00	0.07	0.54	1.00
v/c Ratio	0.13	0.40	0.61	0.11	0.01	0.31	0.69	0.12	0.73	0.53	0.03
Control Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.5	0.0
LOS	D	B	D	C	A	D	B	A	E	B	A
Approach Delay		20.6		37.5			15.0			16.6	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 79	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 58.4%	ICU Level of Service B
Analysis Period (min) 15	

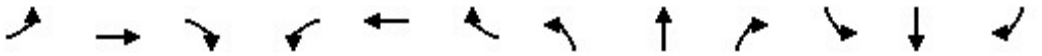
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	23	140	200	66	20	79	2191	182	154	1744	49
v/c Ratio	0.13	0.40	0.61	0.11	0.01	0.31	0.69	0.12	0.73	0.53	0.03
Control Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	17.9	43.8	29.8	0.0	37.2	15.4	0.2	57.4	13.5	0.0
Queue Length 50th (ft)	5	12	34	13	0	19	215	0	39	162	0
Queue Length 95th (ft)	17	38	#58	34	0	40	276	0	#87	211	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	183	760	329	832	1500	281	3197	1500	212	3261	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.18	0.61	0.08	0.01	0.28	0.69	0.12	0.73	0.53	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



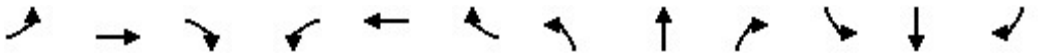
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	45	81	180	59	18	71	1972	164	139	1570	44
Future Volume (veh/h)	21	45	81	180	59	18	71	1972	164	139	1570	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	23	50	90	200	66	0	79	2191	0	154	1744	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	74	154	137	301	477		158	3124		220	3252	
Arrive On Green	0.03	0.09	0.09	0.08	0.14	0.00	0.05	0.51	0.00	0.08	0.53	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	23	50	90	200	66	0	79	2191	0	154	1744	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.6	2.0	4.3	3.6	1.3	0.0	1.9	20.1	0.0	3.8	13.7	0.0
Cycle Q Clear(g_c), s	0.6	2.0	4.3	3.6	1.3	0.0	1.9	20.1	0.0	3.8	13.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	74	154	137	301	477		158	3124		220	3252	
V/C Ratio(X)	0.31	0.33	0.66	0.66	0.14		0.50	0.70		0.70	0.54	
Avail Cap(c_a), veh/h	198	412	368	356	897		305	3448		229	3290	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.2	31.3	32.3	33.1	27.6	0.0	33.8	13.6	0.0	33.2	11.2	0.0
Incr Delay (d2), s/veh	2.3	1.2	5.2	3.6	0.1	0.0	2.4	0.6	0.0	8.7	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.9	1.7	1.2	0.5	0.0	0.7	6.2	0.0	1.6	4.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	32.5	37.5	36.7	27.8	0.0	36.2	14.2	0.0	41.9	11.4	0.0
LnGrp LOS	D	C	D	D	C		D	B		D	B	
Approach Vol, veh/h		163			266	A		2270	A		1898	A
Approach Delay, s/veh		36.0			34.5			15.0			13.9	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.1	42.2	10.1	11.2	8.5	43.7	6.4	14.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	5.8	22.1	5.6	6.3	3.9	15.7	2.6	3.3
Green Ext Time (p_c), s	0.0	15.6	0.1	0.5	0.1	14.7	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B

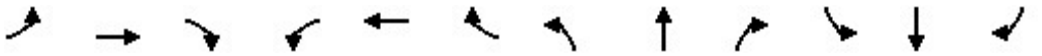
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.992			0.973			0.994			0.980	
Flt Protected	0.950	0.955			0.971		0.950			0.950		
Satd. Flow (prot)	1593	1588	0	0	1667	0	1676	4789	0	1676	4721	0
Flt Permitted	0.950	0.955					0.950			0.950		
Satd. Flow (perm)	1593	1588	0	0	1717	0	1676	4789	0	1676	4721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143			1			7			36	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



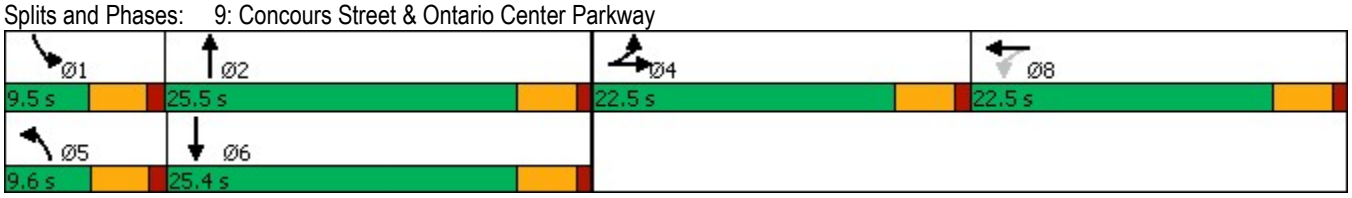
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	101	0	3	3	1	1	48	497	21	1	684	108
Future Volume (vph)	101	0	3	3	1	1	48	497	21	1	684	108
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	112	0	3	3	1	1	53	552	23	1	760	120
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	58	57	0	0	5	0	53	575	0	1	880	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	101	0	3	1	48	497	1	684
Future Volume (vph)	101	0	3	1	48	497	1	684
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.5	7.5		6.1	5.5	26.4	5.4	24.5
Actuated g/C Ratio	0.18	0.18		0.15	0.13	0.63	0.13	0.59
v/c Ratio	0.20	0.14		0.02	0.24	0.19	0.00	0.32
Control Delay	19.7	0.7		19.8	23.8	6.7	22.0	8.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	0.7		19.8	23.8	6.7	22.0	8.4
LOS	B	A		B	C	A	C	A
Approach Delay		10.3		19.8		8.2		8.5
Approach LOS		B		B		A		A

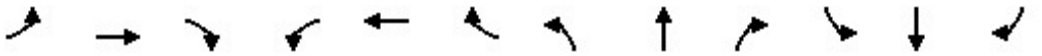
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 41.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.32	
Intersection Signal Delay: 8.5	Intersection LOS: A
Intersection Capacity Utilization 36.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	58	57	5	53	575	1	880
v/c Ratio	0.20	0.14	0.02	0.24	0.19	0.00	0.32
Control Delay	19.7	0.7	19.8	23.8	6.7	22.0	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	0.7	19.8	23.8	6.7	22.0	8.4
Queue Length 50th (ft)	10	0	1	9	16	0	26
Queue Length 95th (ft)	49	0	10	48	79	5	121
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	734	808	791	218	3052	214	2889
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.01	0.24	0.19	0.00	0.30

Intersection Summary



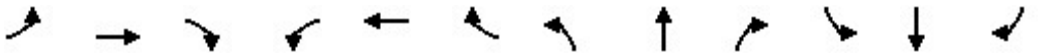
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	0	3	3	1	1	48	497	21	1	684	108
Future Volume (veh/h)	101	0	3	3	1	1	48	497	21	1	684	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	115	0	0	3	1	1	53	552	23	1	760	120
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	168	0	7	2	2	96	1885	78	5	1434	225
Arrive On Green	0.10	0.00	0.00	0.01	0.01	0.01	0.06	0.40	0.40	0.00	0.34	0.34
Sat Flow, veh/h	3375	1772	0	997	332	332	1688	4764	198	1688	4217	661
Grp Volume(v), veh/h	115	0	0	5	0	0	53	373	202	1	580	300
Grp Sat Flow(s),veh/h/ln	1688	1772	0	1662	0	0	1688	1612	1736	1688	1612	1653
Q Serve(g_s), s	1.1	0.0	0.0	0.1	0.0	0.0	1.1	2.8	2.9	0.0	5.2	5.3
Cycle Q Clear(g_c), s	1.1	0.0	0.0	0.1	0.0	0.0	1.1	2.8	2.9	0.0	5.2	5.3
Prop In Lane	1.00		0.00	0.60		0.20	1.00		0.11	1.00		0.40
Lane Grp Cap(c), veh/h	321	168	0	11	0	0	96	1276	687	5	1096	562
V/C Ratio(X)	0.36	0.00	0.00	0.44	0.00	0.00	0.55	0.29	0.29	0.21	0.53	0.53
Avail Cap(c_a), veh/h	1691	888	0	833	0	0	240	1885	1015	235	1876	962
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.2	0.0	0.0	17.8	0.0	0.0	16.5	7.4	7.4	17.9	9.5	9.6
Incr Delay (d2), s/veh	0.7	0.0	0.0	25.1	0.0	0.0	4.8	0.1	0.2	21.1	0.4	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.1	0.0	0.0	0.5	0.7	0.8	0.0	1.4	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.9	0.0	0.0	42.8	0.0	0.0	21.3	7.5	7.7	39.0	9.9	10.4
LnGrp LOS	B	A	A	D	A	A	C	A	A	D	A	B
Approach Vol, veh/h		115			5			628			881	
Approach Delay, s/veh		15.9			42.8			8.7			10.1	
Approach LOS		B			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	18.7		7.9	6.6	16.7		4.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	4.9		3.1	3.1	7.3		2.1				
Green Ext Time (p_c), s	0.0	3.3		0.3	0.0	4.9		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		10.1	
HCM 6th LOS		B	

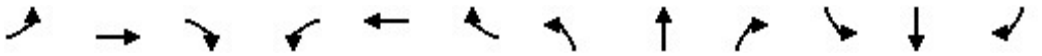
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			291
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



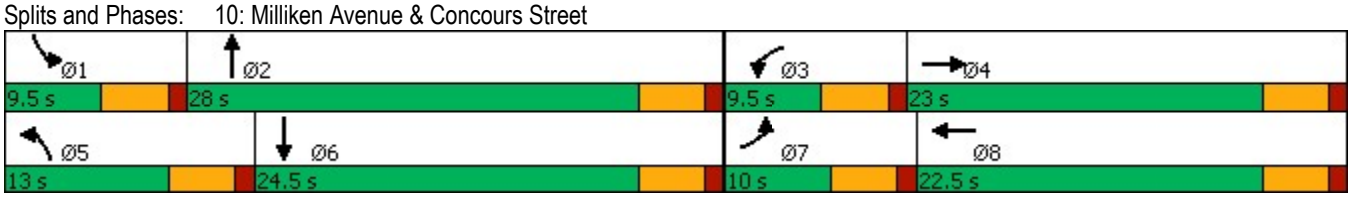
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	100	24	124	60	78	55	193	1024	67	103	1109	250
Future Volume (vph)	100	24	124	60	78	55	193	1024	67	103	1109	250
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	116	28	144	70	91	64	224	1191	78	120	1290	291
Shared Lane Traffic (%)												
Lane Group Flow (vph)	116	28	144	70	91	64	224	1191	78	120	1290	291

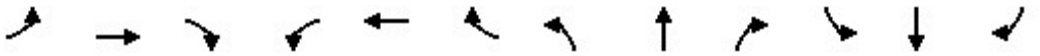
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	24	124	60	78	55	193	1024	67	103	1109	250
Future Volume (vph)	100	24	124	60	78	55	193	1024	67	103	1109	250
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.7	8.9	54.8	7.4	7.1	54.8	8.3	28.3	54.8	5.2	21.0	54.8
Actuated g/C Ratio	0.10	0.16	1.00	0.14	0.13	1.00	0.15	0.52	1.00	0.09	0.38	1.00
v/c Ratio	0.39	0.05	0.10	0.18	0.21	0.04	0.51	0.38	0.05	0.44	0.55	0.19
Control Delay	29.8	22.7	0.1	25.1	24.7	0.1	28.1	12.4	0.1	31.6	16.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	22.7	0.1	25.1	24.7	0.1	28.1	12.4	0.1	31.6	16.3	0.3
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		14.3			17.8			14.1			14.6	
Approach LOS		B			B			B			B	

Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 54.8		
Natural Cycle: 65		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.55		
Intersection Signal Delay: 14.6	Intersection LOS: B	
Intersection Capacity Utilization 44.8%	ICU Level of Service A	
Analysis Period (min) 15		

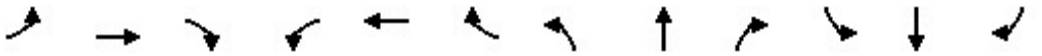
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	116	28	144	70	91	64	224	1191	78	120	1290	291
v/c Ratio	0.39	0.05	0.10	0.18	0.21	0.04	0.51	0.38	0.05	0.44	0.55	0.19
Control Delay	29.8	22.7	0.1	25.1	24.7	0.1	28.1	12.4	0.1	31.6	16.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	22.7	0.1	25.1	24.7	0.1	28.1	12.4	0.1	31.6	16.3	0.3
Queue Length 50th (ft)	20	4	0	9	15	0	38	88	0	21	109	0
Queue Length 95th (ft)	41	14	0	28	32	0	67	114	0	42	139	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	301	1176	1500	391	1144	1500	466	3136	1500	274	2326	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.02	0.10	0.18	0.08	0.04	0.48	0.38	0.05	0.44	0.55	0.19

Intersection Summary



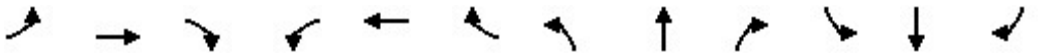
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	24	124	60	78	55	193	1024	67	103	1109	250
Future Volume (veh/h)	100	24	124	60	78	55	193	1024	67	103	1109	250
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	116	28	0	70	91	0	224	1191	0	120	1290	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	237	383		183	320		331	2250		241	2062	
Arrive On Green	0.08	0.11	0.00	0.06	0.10	0.00	0.11	0.37	0.00	0.08	0.34	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	116	28	0	70	91	0	224	1191	0	120	1290	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.8	0.4	0.0	1.1	1.2	0.0	3.6	7.4	0.0	1.9	8.6	0.0
Cycle Q Clear(g_c), s	1.8	0.4	0.0	1.1	1.2	0.0	3.6	7.4	0.0	1.9	8.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	237	383		183	320		331	2250		241	2062	
V/C Ratio(X)	0.49	0.07		0.38	0.28		0.68	0.53		0.50	0.63	
Avail Cap(c_a), veh/h	330	1286		300	1251		511	2957		300	2516	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.3	19.2	0.0	21.8	20.4	0.0	20.6	12.0	0.0	21.3	13.5	0.0
Incr Delay (d2), s/veh	1.6	0.1	0.0	1.3	0.5	0.0	2.4	0.2	0.0	1.6	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.1	0.0	0.4	0.5	0.0	1.2	2.1	0.0	0.6	2.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	19.3	0.0	23.1	20.9	0.0	23.1	12.2	0.0	22.9	13.8	0.0
LnGrp LOS	C	B		C	C		C	B		C	B	
Approach Vol, veh/h		144	A		161	A		1415	A		1410	A
Approach Delay, s/veh		22.1			21.8			13.9			14.6	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	22.4	7.6	10.0	10.0	20.9	8.5	9.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	3.9	9.4	3.1	2.4	5.6	10.6	3.8	3.2
Green Ext Time (p_c), s	0.0	7.1	0.0	0.1	0.2	5.8	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

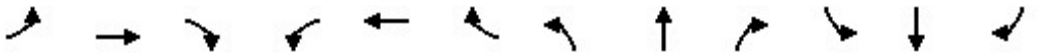
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			407			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



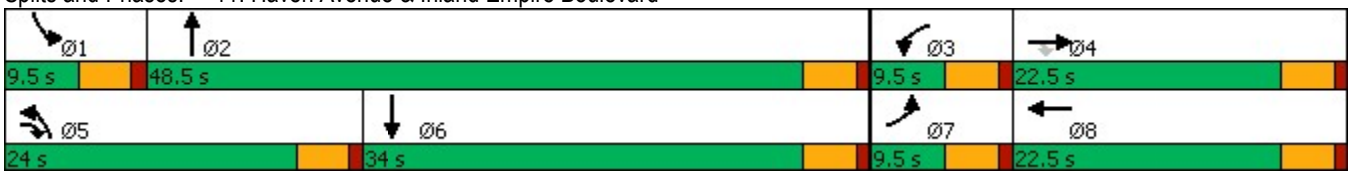
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	90	113	260	118	124	21	498	2233	647	52	1511	128
Future Volume (vph)	90	113	260	118	124	21	498	2233	647	52	1511	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	97	122	280	127	133	23	535	2401	696	56	1625	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	122	280	127	133	23	535	2401	696	56	1625	138

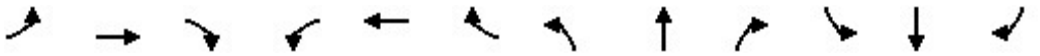
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	113	260	118	124	21	498	2233	647	52	1511	128
Future Volume (vph)	90	113	260	118	124	21	498	2233	647	52	1511	128
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.2	8.6	28.3	5.2	8.6	74.0	18.3	48.6	74.0	5.2	29.3	74.0
Actuated g/C Ratio	0.07	0.12	0.38	0.07	0.12	1.00	0.25	0.66	1.00	0.07	0.40	1.00
v/c Ratio	0.47	0.31	0.45	0.46	0.34	0.02	0.75	0.60	0.46	0.27	0.68	0.09
Control Delay	45.5	35.4	15.0	42.7	35.7	0.0	35.4	12.0	1.0	40.3	22.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	35.4	15.0	42.7	35.7	0.0	35.4	12.0	1.0	40.3	22.1	0.1
LOS	D	D	B	D	D	A	D	B	A	D	C	A
Approach Delay		25.9			35.9			13.4			21.0	
Approach LOS		C			D			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard

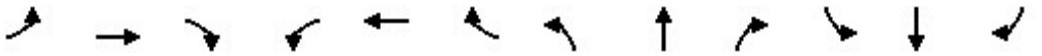




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	97	122	280	127	133	23	535	2401	696	56	1625	138
v/c Ratio	0.47	0.31	0.45	0.46	0.34	0.02	0.75	0.60	0.46	0.27	0.68	0.09
Control Delay	45.5	35.4	15.0	42.7	35.7	0.0	35.4	12.0	1.0	40.3	22.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.5	35.4	15.0	42.7	35.7	0.0	35.4	12.0	1.0	40.3	22.1	0.1
Queue Length 50th (ft)	25	30	71	22	33	0	129	244	0	14	201	0
Queue Length 95th (ft)	#54	56	134	42	60	0	#207	310	0	32	256	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	205	856	659	279	856	1500	799	3917	1500	205	2540	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.14	0.42	0.46	0.16	0.02	0.67	0.61	0.46	0.27	0.64	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	113	260	118	124	21	498	2233	647	52	1511	128
Future Volume (veh/h)	90	113	260	118	124	21	498	2233	647	52	1511	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	97	122	280	127	133	0	535	2401	0	56	1625	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	586	576	227	597		610	3095		127	2083	
Arrive On Green	0.05	0.17	0.17	0.06	0.18	0.00	0.21	0.51	0.00	0.04	0.34	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	97	122	280	127	133	0	535	2401	0	56	1625	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	2.7	2.6	11.7	2.6	2.8	0.0	14.7	26.5	0.0	1.6	19.8	0.0
Cycle Q Clear(g_c), s	2.7	2.6	11.7	2.6	2.8	0.0	14.7	26.5	0.0	1.6	19.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	157	586	576	227	597		610	3095		127	2083	
V/C Ratio(X)	0.62	0.21	0.49	0.56	0.22		0.88	0.78		0.44	0.78	
Avail Cap(c_a), veh/h	176	732	641	239	732		685	3239		176	2171	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.3	29.3	19.3	38.0	29.2	0.0	31.7	16.6	0.0	38.6	24.5	0.0
Incr Delay (d2), s/veh	5.4	0.2	0.6	2.6	0.2	0.0	11.4	1.2	0.0	2.4	1.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	1.0	4.0	0.9	1.1	0.0	6.0	8.6	0.0	0.6	7.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.7	29.5	20.0	40.7	29.4	0.0	43.1	17.7	0.0	41.0	26.3	0.0
LnGrp LOS	D	C	B	D	C		D	B		D	C	
Approach Vol, veh/h		499			260	A		2936	A		1681	A
Approach Delay, s/veh		26.9			34.9			22.4			26.8	
Approach LOS		C			C			C			C	

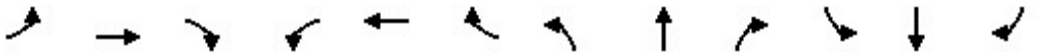
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.1	46.5	9.2	18.9	21.9	32.8	9.0	19.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	3.6	28.5	4.6	13.7	16.7	21.8	4.7	4.8
Green Ext Time (p_c), s	0.0	13.6	0.0	0.7	0.6	5.8	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	24.8
HCM 6th LOS	C

Notes

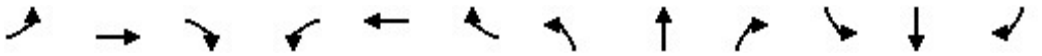
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



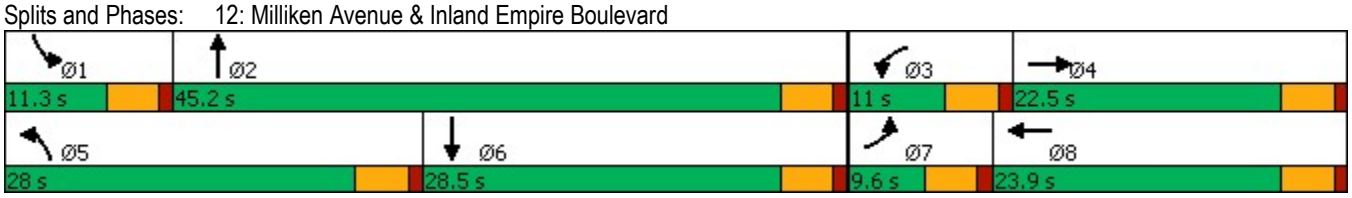
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	71	41	52	99	89	35	406	1156	110	82	1053	141
Future Volume (vph)	71	41	52	99	89	35	406	1156	110	82	1053	141
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	83	48	60	115	103	41	472	1344	128	95	1224	164
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	48	60	115	103	41	472	1344	128	95	1224	164

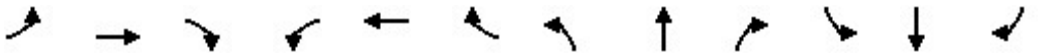
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	41	52	99	89	35	406	1156	110	82	1053	141
Future Volume (vph)	71	41	52	99	89	35	406	1156	110	82	1053	141
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.7	7.1	64.9	8.9	8.1	64.9	16.6	37.8	64.9	7.1	22.4	64.9
Actuated g/C Ratio	0.09	0.11	1.00	0.14	0.12	1.00	0.26	0.58	1.00	0.11	0.35	1.00
v/c Ratio	0.33	0.13	0.04	0.29	0.25	0.03	0.64	0.38	0.09	0.30	0.58	0.11
Control Delay	37.4	32.1	0.1	33.7	32.0	0.0	28.1	11.6	0.1	34.9	20.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	32.1	0.1	33.7	32.0	0.0	28.1	11.6	0.1	34.9	20.9	0.1
LOS	D	C	A	C	C	A	C	B	A	C	C	A
Approach Delay		24.4			27.7			14.8			19.5	
Approach LOS		C			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 64.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 51.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	83	48	60	115	103	41	472	1344	128	95	1224	164
v/c Ratio	0.33	0.13	0.04	0.29	0.25	0.03	0.64	0.38	0.09	0.30	0.58	0.11
Control Delay	37.4	32.1	0.1	33.7	32.0	0.0	28.1	11.6	0.1	34.9	20.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	32.1	0.1	33.7	32.0	0.0	28.1	11.6	0.1	34.9	20.9	0.1
Queue Length 50th (ft)	18	10	0	25	22	0	98	110	0	20	129	0
Queue Length 95th (ft)	40	26	0	51	45	0	141	136	0	44	179	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	253	1036	1500	408	1117	1500	1167	3928	1500	337	2503	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.05	0.04	0.28	0.09	0.03	0.40	0.34	0.09	0.28	0.49	0.11

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	41	52	99	89	35	406	1156	110	82	1053	141
Future Volume (veh/h)	71	41	52	99	89	35	406	1156	110	82	1053	141
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	83	48	0	115	103	0	472	1344	0	95	1224	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	185	284		212	315		617	2830		197	1951	
Arrive On Green	0.06	0.08	0.00	0.07	0.09	0.00	0.21	0.46	0.00	0.07	0.32	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	83	48	0	115	103	0	472	1344	0	95	1224	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	1.6	0.8	0.0	2.2	1.7	0.0	8.8	8.8	0.0	1.8	9.9	0.0
Cycle Q Clear(g_c), s	1.6	0.8	0.0	2.2	1.7	0.0	8.8	8.8	0.0	1.8	9.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	185	284		212	315		617	2830		197	1951	
V/C Ratio(X)	0.45	0.17		0.54	0.33		0.77	0.47		0.48	0.63	
Avail Cap(c_a), veh/h	256	1047		327	1128		1181	4285		342	2527	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.1	24.6	0.0	25.9	24.5	0.0	21.5	10.7	0.0	26.0	16.7	0.0
Incr Delay (d2), s/veh	1.7	0.3	0.0	2.2	0.6	0.0	2.0	0.1	0.0	1.8	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.3	0.0	0.8	0.6	0.0	2.9	2.5	0.0	0.6	3.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.8	24.9	0.0	28.1	25.1	0.0	23.5	10.8	0.0	27.8	17.1	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		131	A		218	A		1816	A		1319	A
Approach Delay, s/veh		26.8			26.7			14.1			17.9	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	31.4	8.7	9.4	16.8	23.0	8.2	9.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	3.8	10.8	4.2	2.8	10.8	11.9	3.6	3.7
Green Ext Time (p_c), s	0.1	12.1	0.1	0.1	1.4	6.6	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.940	0.850				
Flt Protected	0.971					
Satd. Flow (prot)	2951	1365	6071	0	0	6071
Flt Permitted	0.971					
Satd. Flow (perm)	2951	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

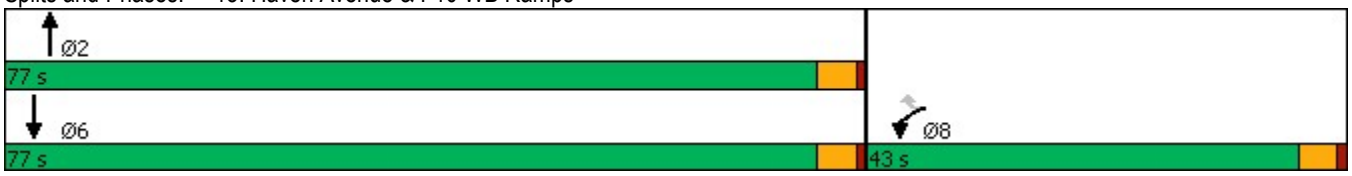
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	505	726	2745	0	0	1589
Future Volume (vph)	505	726	2745	0	0	1589
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	555	798	3016	0	0	1746
Shared Lane Traffic (%)		46%				
Lane Group Flow (vph)	922	431	3016	0	0	1746

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	505	726	2745	1589
Future Volume (vph)	505	726	2745	1589
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	38.5	38.5	72.5	72.5
Actuated g/C Ratio	0.32	0.32	0.60	0.60
v/c Ratio	0.97	0.98	0.82	0.48
Control Delay	64.1	80.3	21.2	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	64.1	80.3	21.2	13.7
LOS	E	F	C	B
Approach Delay	69.2		21.2	13.7
Approach LOS	E		C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 29.7	Intersection LOS: C
Intersection Capacity Utilization 83.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	922	431	3016	1746
v/c Ratio	0.97	0.98	0.82	0.48
Control Delay	64.1	80.3	21.2	13.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	64.1	80.3	21.2	13.7
Queue Length 50th (ft)	361	362	502	205
Queue Length 95th (ft)	#502	#598	552	233
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	947	438	3667	3667
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.97	0.98	0.82	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

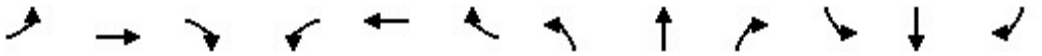
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	505	726	2745	0	0	1589
Future Volume (veh/h)	505	726	2745	0	0	1589
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	451	909	3016	0	0	1746
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	512	964	3673	0	0	3673
Arrive On Green	0.32	0.32	0.60	0.00	0.00	0.60
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	451	909	3016	0	0	1746
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	31.6	34.7	45.9	0.0	0.0	18.8
Cycle Q Clear(g_c), s	31.6	34.7	45.9	0.0	0.0	18.8
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	512	964	3673	0	0	3673
V/C Ratio(X)	0.88	0.94	0.82	0.00	0.00	0.48
Avail Cap(c_a), veh/h	521	982	3751	0	0	3751
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	37.9	38.9	18.4	0.0	0.0	13.0
Incr Delay (d2), s/veh	15.9	16.6	1.5	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.4	14.8	15.5	0.0	0.0	6.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.8	55.5	19.9	0.0	0.0	13.1
LnGrp LOS	D	E	B	A	A	B
Approach Vol, veh/h	1360		3016			1746
Approach Delay, s/veh	54.9		19.9			13.1
Approach LOS	D		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		75.5			75.5	42.3
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s		47.9			20.8	36.7
Green Ext Time (p_c), s		23.1			21.9	1.1

Intersection Summary	
HCM 6th Ctrl Delay	25.8
HCM 6th LOS	C

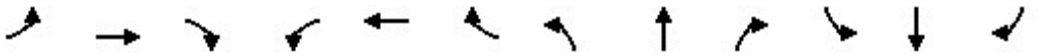
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			182			338			235
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



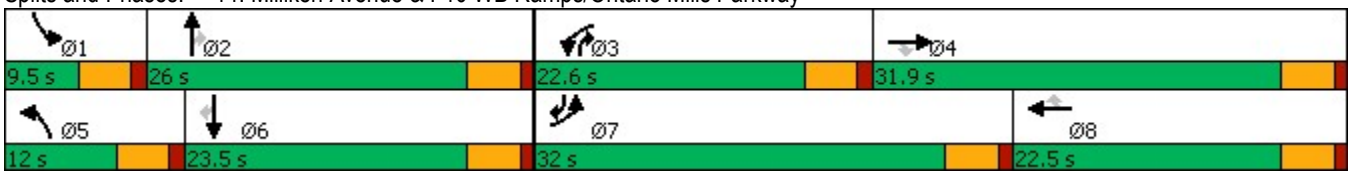
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	683	89	237	162	185	34	154	904	301	83	775	253
Future Volume (vph)	683	89	237	162	185	34	154	904	301	83	775	253
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	767	100	266	182	208	38	173	1016	338	93	871	284
Shared Lane Traffic (%)												
Lane Group Flow (vph)	767	100	266	182	208	38	173	1016	338	93	871	284

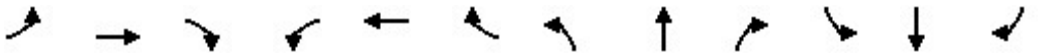
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	683	89	237	162	185	34	154	904	301	83	775	253
Future Volume (vph)	683	89	237	162	185	34	154	904	301	83	775	253
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	25.0	24.7	24.7	10.5	10.3	10.3	7.5	22.4	37.4	5.1	17.5	47.0
Actuated g/C Ratio	0.32	0.31	0.31	0.13	0.13	0.13	0.10	0.29	0.48	0.06	0.22	0.60
v/c Ratio	0.84	0.18	0.41	0.47	0.47	0.11	0.62	0.59	0.38	0.50	0.64	0.29
Control Delay	34.9	21.6	5.1	36.5	36.4	0.6	47.3	27.3	3.0	48.0	30.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	21.6	5.1	36.5	36.4	0.6	47.3	27.3	3.0	48.0	30.6	2.6
LOS	C	C	A	D	D	A	D	C	A	D	C	A
Approach Delay		26.7			33.2			24.1			25.6	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 78.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 61.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	767	100	266	182	208	38	173	1016	338	93	871	284
v/c Ratio	0.84	0.18	0.41	0.47	0.47	0.11	0.62	0.59	0.38	0.50	0.64	0.29
Control Delay	34.9	21.6	5.1	36.5	36.4	0.6	47.3	27.3	3.0	48.0	30.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	21.6	5.1	36.5	36.4	0.6	47.3	27.3	3.0	48.0	30.6	2.6
Queue Length 50th (ft)	182	36	0	45	53	0	45	135	0	24	118	9
Queue Length 95th (ft)	#268	76	51	74	85	0	#88	176	41	#52	155	40
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1024	623	701	674	777	487	279	1746	1007	186	1485	1039
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.16	0.38	0.27	0.27	0.08	0.62	0.58	0.34	0.50	0.59	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	683	89	237	162	185	34	154	904	301	83	775	253
Future Volume (veh/h)	683	89	237	162	185	34	154	904	301	83	775	253
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	767	100	266	182	208	38	173	1016	338	93	871	284
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	892	561	475	270	345	154	246	1663	549	174	1513	833
Arrive On Green	0.31	0.32	0.32	0.09	0.10	0.10	0.08	0.27	0.27	0.06	0.25	0.25
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	767	100	266	182	208	38	173	1016	338	93	871	284
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	17.3	2.9	10.3	4.2	4.1	1.6	4.0	10.1	12.8	2.2	8.7	7.2
Cycle Q Clear(g_c), s	17.3	2.9	10.3	4.2	4.1	1.6	4.0	10.1	12.8	2.2	8.7	7.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	892	561	475	270	345	154	246	1663	549	174	1513	833
V/C Ratio(X)	0.86	0.18	0.56	0.68	0.60	0.25	0.70	0.61	0.62	0.53	0.58	0.34
Avail Cap(c_a), veh/h	1148	696	590	756	869	388	313	1880	602	209	1661	869
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.8	17.3	19.8	30.6	29.9	28.8	31.1	22.1	18.1	31.8	23.0	8.5
Incr Delay (d2), s/veh	5.5	0.2	1.0	2.9	1.7	0.8	5.0	0.5	1.6	2.5	0.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	1.1	3.5	1.5	1.7	0.6	1.5	3.5	4.3	0.8	3.0	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	17.4	20.8	33.5	31.6	29.6	36.0	22.6	19.7	34.3	23.4	8.8
LnGrp LOS	C	B	C	C	C	C	D	C	B	C	C	A
Approach Vol, veh/h		1133			428			1527			1248	
Approach Delay, s/veh		25.5			32.3			23.5			20.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	23.5	11.0	26.6	10.4	21.8	25.9	11.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	4.2	14.8	6.2	12.3	6.0	10.7	19.3	6.1
Green Ext Time (p_c), s	0.0	4.2	0.4	1.3	0.1	4.3	2.1	1.0

Intersection Summary	
HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

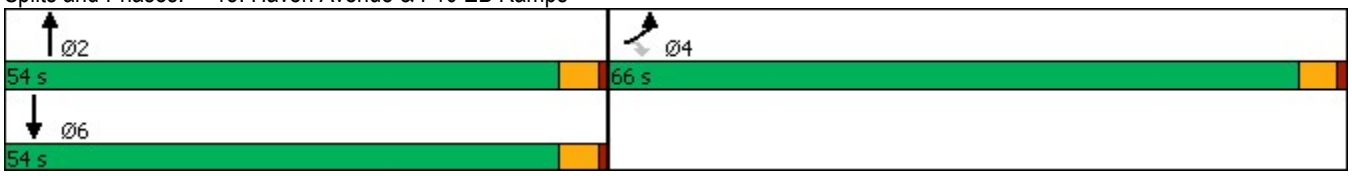
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1313	592	0	1764	1575	0
Future Volume (vph)	1313	592	0	1764	1575	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1475	665	0	1982	1770	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1542	598	0	1982	1770	0

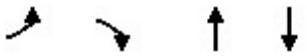
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1313	592	1764	1575
Future Volume (vph)	1313	592	1764	1575
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	61.5	61.5	49.4	49.4
Actuated g/C Ratio	0.51	0.51	0.41	0.41
v/c Ratio	0.98	0.85	0.79	0.71
Control Delay	47.7	38.9	33.7	31.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	47.7	38.9	33.7	31.2
LOS	D	D	C	C
Approach Delay	45.2		33.7	31.2
Approach LOS	D		C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 37.1	Intersection LOS: D
Intersection Capacity Utilization 83.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1542	598	1982	1770
v/c Ratio	0.98	0.85	0.79	0.71
Control Delay	47.7	38.9	33.7	31.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	47.7	38.9	33.7	31.2
Queue Length 50th (ft)	582	424	383	325
Queue Length 95th (ft)	#750	#668	424	363
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1572	701	2506	2506
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.98	0.85	0.79	0.71

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1313	592	0	1764	1575	0
Future Volume (veh/h)	1313	592	0	1764	1575	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1475	665	0	1982	1770	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1621	764	0	2504	2504	0
Arrive On Green	0.51	0.51	0.00	0.41	0.41	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1475	665	0	1982	1770	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	47.3	43.6	0.0	31.7	26.9	0.0
Cycle Q Clear(g_c), s	47.3	43.6	0.0	31.7	26.9	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1621	764	0	2504	2504	0
V/C Ratio(X)	0.91	0.87	0.00	0.79	0.71	0.00
Avail Cap(c_a), veh/h	1755	827	0	2702	2702	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.1	24.2	0.0	28.7	27.3	0.0
Incr Delay (d2), s/veh	7.1	9.5	0.0	1.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.6	16.7	0.0	11.6	9.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.2	33.7	0.0	30.3	28.1	0.0
LnGrp LOS	C	C	A	C	C	A
Approach Vol, veh/h	2140			1982	1770	
Approach Delay, s/veh	32.7			30.3	28.1	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		50.4		61.3		50.4
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		33.7		49.3		28.9
Green Ext Time (p_c), s		12.2		7.5		13.5

Intersection Summary		
HCM 6th Ctrl Delay	30.5	
HCM 6th LOS	C	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		6				424
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	654	587	159	708	743	443
Future Volume (vph)	654	587	159	708	743	443
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	752	675	183	814	854	509
Shared Lane Traffic (%)						
Lane Group Flow (vph)	752	675	183	814	854	509

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	654	587	159	708	743	443
Future Volume (vph)	654	587	159	708	743	443
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	27.0	27.0	52.0	25.0	38.0
Total Split (%)	42.2%	30.0%	30.0%	57.8%	27.8%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	24.5	41.5	12.3	34.0	17.0	46.2
Actuated g/C Ratio	0.36	0.61	0.18	0.50	0.25	0.68
v/c Ratio	0.72	0.74	0.35	0.27	0.56	0.44
Control Delay	24.2	15.0	28.1	10.4	25.3	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	15.0	28.1	10.4	25.3	2.4
LOS	C	B	C	B	C	A
Approach Delay	19.8			13.7	16.7	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

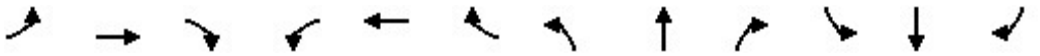
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	752	675	183	814	854	509
v/c Ratio	0.72	0.74	0.35	0.27	0.56	0.44
Control Delay	24.2	15.0	28.1	10.4	25.3	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.2	15.0	28.1	10.4	25.3	2.4
Queue Length 50th (ft)	131	174	35	53	87	9
Queue Length 95th (ft)	237	295	69	84	154	46
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1498	1168	1006	4452	1924	1315
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.58	0.18	0.18	0.44	0.39

Intersection Summary

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	654	587	159	708	743	443
Future Volume (veh/h)	654	587	159	708	743	443
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	752	675	183	814	854	509
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1312	819	276	2530	1543	1057
Arrive On Green	0.45	0.45	0.09	0.42	0.25	0.25
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	752	675	183	814	854	509
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	12.8	24.9	4.1	6.0	8.2	10.2
Cycle Q Clear(g_c), s	12.8	24.9	4.1	6.0	8.2	10.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1312	819	276	2530	1543	1057
V/C Ratio(X)	0.57	0.82	0.66	0.32	0.55	0.48
Avail Cap(c_a), veh/h	1453	892	976	4314	1862	1136
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.6	12.6	29.3	13.2	21.8	4.5
Incr Delay (d2), s/veh	0.4	5.9	2.7	0.1	0.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	1.3	1.5	1.9	2.8	8.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.1	18.5	32.0	13.3	22.1	4.8
LnGrp LOS	B	B	C	B	C	A
Approach Vol, veh/h	1427			997	1363	
Approach Delay, s/veh	16.2			16.8	15.6	
Approach LOS	B			B	B	

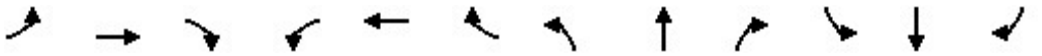
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		32.4		34.8	10.9	21.5
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	22.5	20.5
Max Q Clear Time (g_c+I1), s		8.0		26.9	6.1	12.2
Green Ext Time (p_c), s		6.8		3.4	0.5	4.8

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.956				0.850			0.850		0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4606	0	2891	3353	1500	2891	4818	1500	2891	5907	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4606	0	2891	3353	1500	2891	4818	1500	2891	5907	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		85				136			177		57	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	364	725	300	237	609	150	334	1733	278	228	1696	370
Future Volume (vph)	364	725	300	237	609	150	334	1733	278	228	1696	370
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	396	788	326	258	662	163	363	1884	302	248	1843	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	396	1114	0	258	662	163	363	1884	302	248	2245	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	364	725	237	609	150	334	1733	278	228	1696
Future Volume (vph)	364	725	237	609	150	334	1733	278	228	1696
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.5	32.5	9.5	24.5	24.5	9.5	52.5	120.0	7.5	50.5
Actuated g/C Ratio	0.15	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	0.94	0.85	1.13	0.97	0.39	1.59	0.89	0.20	1.38	0.89
Control Delay	82.3	45.6	149.0	75.0	13.2	322.0	37.9	0.3	242.4	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	45.6	149.0	75.0	13.2	322.0	37.9	0.3	242.4	36.9
LOS	F	D	F	E	B	F	D	A	F	D
Approach Delay		55.2		83.3			73.9			57.4
Approach LOS		E		F			E			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.59	
Intersection Signal Delay: 66.2	Intersection LOS: E
Intersection Capacity Utilization 88.9%	ICU Level of Service E
Analysis Period (min) 15	

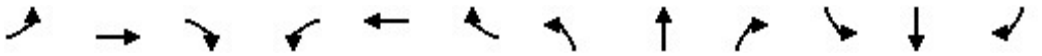
Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	396	1114	258	662	163	363	1884	302	248	2245
v/c Ratio	0.94	0.85	1.13	0.97	0.39	1.59	0.89	0.20	1.38	0.89
Control Delay	82.3	45.6	149.0	75.0	13.2	322.0	37.9	0.3	242.4	36.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.3	45.6	149.0	75.0	13.2	322.0	37.9	0.3	242.4	36.9
Queue Length 50th (ft)	158	279	~119	269	17	~206	484	0	~130	451
Queue Length 95th (ft)	#255	339	#206	#392	78	#305	557	0	#216	506
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	421	1309	228	684	414	228	2107	1500	180	2518
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.85	1.13	0.97	0.39	1.59	0.89	0.20	1.38	0.89

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



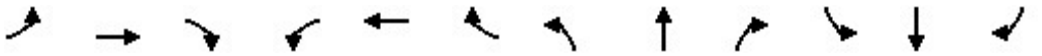
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	364	725	300	237	609	150	334	1733	278	228	1696	370
Future Volume (veh/h)	364	725	300	237	609	150	334	1733	278	228	1696	370
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	396	788	326	258	662	163	363	1884	0	248	1843	402
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	424	912	374	230	687	307	230	2116		182	2124	462
Arrive On Green	0.15	0.27	0.27	0.08	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	2910	3366	1382	2910	3367	1502	2910	4837	1502	2910	5047	1098
Grp Volume(v), veh/h	396	755	359	258	662	163	363	1884	0	248	1669	576
Grp Sat Flow(s),veh/h/ln	1455	1612	1523	1455	1683	1502	1455	1612	1502	1455	1524	1574
Q Serve(g_s), s	16.1	26.7	27.0	9.5	23.4	11.6	9.5	43.1	0.0	7.5	40.0	40.1
Cycle Q Clear(g_c), s	16.1	26.7	27.0	9.5	23.4	11.6	9.5	43.1	0.0	7.5	40.0	40.1
Prop In Lane	1.00		0.91	1.00		1.00	1.00		1.00	1.00		0.70
Lane Grp Cap(c), veh/h	424	873	413	230	687	307	230	2116		182	1924	662
V/C Ratio(X)	0.93	0.86	0.87	1.12	0.96	0.53	1.58	0.89		1.36	0.87	0.87
Avail Cap(c_a), veh/h	424	873	413	230	687	307	230	2116		182	1924	662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	41.6	41.7	55.3	47.3	42.6	55.3	31.1	0.0	56.3	31.7	31.7
Incr Delay (d2), s/veh	27.6	9.0	17.9	95.3	25.4	1.8	278.9	6.1	0.0	194.8	5.6	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	11.6	12.1	6.5	12.2	4.5	12.4	17.5	0.0	7.7	15.4	17.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	78.3	50.6	59.7	150.5	72.7	44.4	334.2	37.2	0.0	251.0	37.3	46.3
LnGrp LOS	E	D	E	F	E	D	F	D		F	D	D
Approach Vol, veh/h		1510			1083			2247	A		2493	
Approach Delay, s/veh		60.0			87.0			85.2			60.6	
Approach LOS		E			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	14.0	37.0	14.0	55.0	22.0	29.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	9.5	45.1	11.5	29.0	11.5	42.1	18.1	25.4
Green Ext Time (p_c), s	0.0	6.2	0.0	2.2	0.0	7.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	71.9
HCM 6th LOS	E

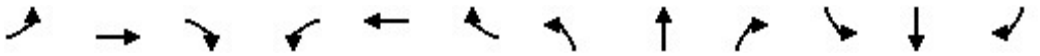
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.995				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	6040	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	6040	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				203			133		176	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	4	1961	65	1	1220	193	64	0	9	151	0	12
Future Volume (vph)	4	1961	65	1	1220	193	64	0	9	151	0	12
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	4	2064	68	1	1284	203	67	0	9	159	0	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	2132	0	1	1284	203	67	0	9	159	13	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	1961	1	1220	193	64	9	151	0
Future Volume (vph)	4	1961	1	1220	193	64	9	151	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.0	37.9	5.0	37.9	37.9	6.9	5.5	9.9	10.6
Actuated g/C Ratio	0.07	0.55	0.07	0.55	0.55	0.10	0.08	0.14	0.15
v/c Ratio	0.03	0.64	0.01	0.48	0.22	0.42	0.04	0.69	0.02
Control Delay	32.2	12.1	32.0	10.6	2.2	38.4	0.3	47.4	0.1
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	12.1	32.0	10.6	2.2	38.4	0.3	47.4	0.1
LOS	C	B	C	B	A	D	A	D	A
Approach Delay		12.1		9.5					43.8
Approach LOS		B		A					D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 13.0	Intersection LOS: B
Intersection Capacity Utilization 55.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	4	2132	1	1284	203	67	9	159	13
v/c Ratio	0.03	0.64	0.01	0.48	0.22	0.42	0.04	0.69	0.02
Control Delay	32.2	12.1	32.0	10.6	2.2	38.4	0.3	47.4	0.1
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	32.2	12.1	32.0	10.6	2.2	38.4	0.3	47.4	0.1
Queue Length 50th (ft)	2	151	0	102	0	26	0	62	0
Queue Length 95th (ft)	11	257	5	183	31	69	0	#169	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	115	3351	115	2670	921	168	516	229	1028
Starvation Cap Reductn	0	0	0	320	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.64	0.01	0.55	0.22	0.40	0.02	0.69	0.01

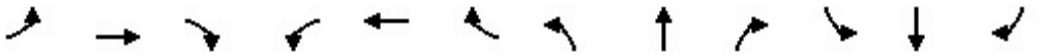
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1961	65	1	1220	193	64	0	9	151	0	12
Future Volume (veh/h)	4	1961	65	1	1220	193	64	0	9	151	0	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	4	2064	68	1	1284	203	67	0	9	159	0	13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	9	3142	104	3	2470	767	87	139	118	194	246	219
Arrive On Green	0.01	0.51	0.51	0.00	0.51	0.51	0.05	0.00	0.08	0.12	0.00	0.15
Sat Flow, veh/h	1594	6106	201	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	4	1545	587	1	1284	203	67	0	9	159	0	13
Grp Sat Flow(s),veh/h/ln	1594	1524	1736	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.2	15.7	15.7	0.0	11.2	4.9	2.6	0.0	0.4	6.2	0.0	0.5
Cycle Q Clear(g_c), s	0.2	15.7	15.7	0.0	11.2	4.9	2.6	0.0	0.4	6.2	0.0	0.5
Prop In Lane	1.00		0.12	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	9	2352	893	3	2470	767	87	139	118	194	246	219
V/C Ratio(X)	0.47	0.66	0.66	0.40	0.52	0.26	0.77	0.00	0.08	0.82	0.00	0.06
Avail Cap(c_a), veh/h	125	2727	1036	125	2886	896	183	536	454	248	578	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.5	11.3	11.3	31.7	10.4	8.8	29.6	0.0	27.1	27.2	0.0	23.4
Incr Delay (d2), s/veh	34.9	0.5	1.2	79.4	0.2	0.2	13.3	0.0	0.3	15.3	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	4.5	5.3	0.1	3.4	1.4	1.3	0.0	0.1	3.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.4	11.8	12.5	111.1	10.5	9.0	42.9	0.0	27.4	42.5	0.0	23.5
LnGrp LOS	E	B	B	F	B	A	D	A	C	D	A	C
Approach Vol, veh/h		2136			1488			76			172	
Approach Delay, s/veh		12.1			10.4			41.1			41.0	
Approach LOS		B			B			D			D	

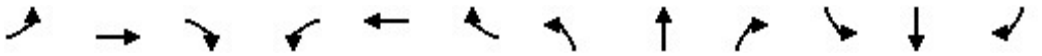
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.2	9.5	4.6	37.2	8.0	13.8	4.8	36.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	8.2	2.4	2.0	17.7	4.6	2.5	2.2	13.2
Green Ext Time (p_c), s	0.1	0.0	0.0	14.9	0.0	0.0	0.0	11.4

Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4798	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.727				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4798	0	1212	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			7				153			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



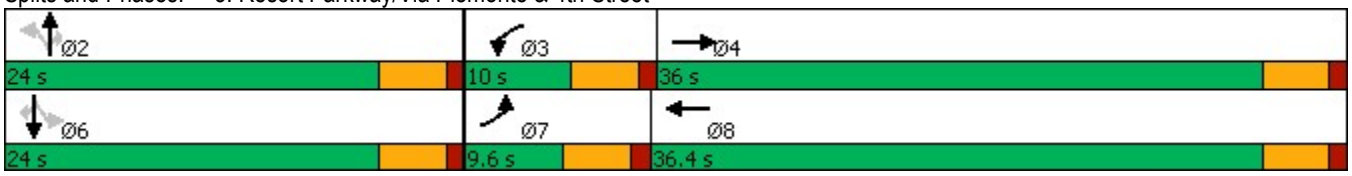
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	29	2082	8	65	1373	38	36	0	45	43	1	20
Future Volume (vph)	29	2082	8	65	1373	38	36	0	45	43	1	20
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	31	2192	8	68	1445	40	38	0	47	45	1	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	2200	0	68	1485	0	38	0	47	0	46	21

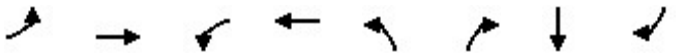
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	29	2082	65	1373	36	45	43	1	20
Future Volume (vph)	29	2082	65	1373	36	45	43	1	20
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	31.9	5.6	33.9	7.4	7.4		7.4	7.4
Actuated g/C Ratio	0.10	0.59	0.10	0.63	0.14	0.14		0.14	0.14
v/c Ratio	0.11	0.61	0.42	0.49	0.23	0.14		0.26	0.07
Control Delay	26.0	9.1	34.0	7.1	25.8	0.9		26.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.0	9.1	34.0	7.1	25.8	0.9		26.2	0.5
LOS	C	A	C	A	C	A		C	A
Approach Delay		9.4		8.3				18.2	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 53.9	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 56.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	31	2200	68	1485	38	47	46	21
v/c Ratio	0.11	0.61	0.42	0.49	0.23	0.14	0.26	0.07
Control Delay	26.0	9.1	34.0	7.1	25.8	0.9	26.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	9.1	34.0	7.1	25.8	0.9	26.2	0.5
Queue Length 50th (ft)	5	141	23	56	12	0	15	0
Queue Length 95th (ft)	17	199	#66	161	35	0	41	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	277	3593	163	3040	444	647	473	609
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.61	0.42	0.49	0.09	0.07	0.10	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	2082	8	65	1373	38	36	0	45	43	1	20
Future Volume (veh/h)	29	2082	8	65	1373	38	36	0	45	43	1	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	31	2192	8	68	1445	40	38	0	47	45	1	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	102	3538	13	98	2839	79	241	182	154	281	5	154
Arrive On Green	0.04	0.56	0.56	0.06	0.59	0.59	0.10	0.00	0.10	0.10	0.10	0.10
Sat Flow, veh/h	2910	6316	23	1594	4839	134	1312	1772	1502	1324	45	1502
Grp Volume(v), veh/h	31	1586	614	68	963	522	38	0	47	46	0	21
Grp Sat Flow(s),veh/h/ln	1455	1524	1768	1594	1612	1748	1312	1772	1502	1369	0	1502
Q Serve(g_s), s	0.5	11.5	11.5	2.1	8.6	8.6	1.4	0.0	1.4	1.5	0.0	0.6
Cycle Q Clear(g_c), s	0.5	11.5	11.5	2.1	8.6	8.6	2.9	0.0	1.4	1.5	0.0	0.6
Prop In Lane	1.00		0.01	1.00		0.08	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	102	2561	990	98	1892	1025	241	182	154	286	0	154
V/C Ratio(X)	0.30	0.62	0.62	0.69	0.51	0.51	0.16	0.00	0.30	0.16	0.00	0.14
Avail Cap(c_a), veh/h	303	2938	1136	179	2099	1137	628	705	597	689	0	597
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.1	7.3	7.3	22.5	6.0	6.0	21.7	0.0	20.4	20.4	0.0	20.0
Incr Delay (d2), s/veh	1.6	0.3	0.8	8.4	0.2	0.4	0.3	0.0	1.1	0.3	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.6	3.1	0.9	1.9	2.2	0.4	0.0	0.5	0.5	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.7	7.6	8.1	31.0	6.2	6.4	22.0	0.0	21.5	20.7	0.0	20.4
LnGrp LOS	C	A	A	C	A	A	C	A	C	C	A	C
Approach Vol, veh/h		2231			1553			85			67	
Approach Delay, s/veh		8.0			7.3			21.7			20.6	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	7.5	32.0		9.5	6.2	33.3				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		4.9	4.1	13.5		3.5	2.5	10.6				
Green Ext Time (p_c), s		0.2	0.0	14.0		0.2	0.0	11.0				

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	4798	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4798	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	2114	63	0	1449	0	52
Future Volume (vph)	2114	63	0	1449	0	52
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	2202	66	0	1509	0	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2268	0	0	1509	0	54

Intersection Summary

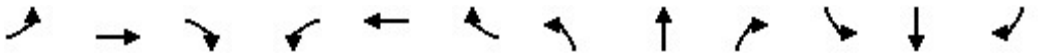
Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2114	63	0	1449	0	52
Future Vol, veh/h	2114	63	0	1449	0	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2202	66	0	1509	0	54

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1134
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	169
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	169
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

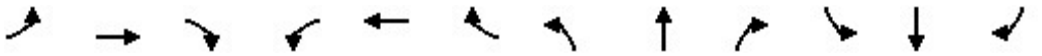
Approach	EB	WB	NB
HCM Control Delay, s	0	0	36
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	169	-	-	-
HCM Lane V/C Ratio	0.321	-	-	-
HCM Control Delay (s)	36	-	-	-
HCM Lane LOS	E	-	-	-
HCM 95th %tile Q(veh)	1.3	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5955	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5955	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			207			285			55		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



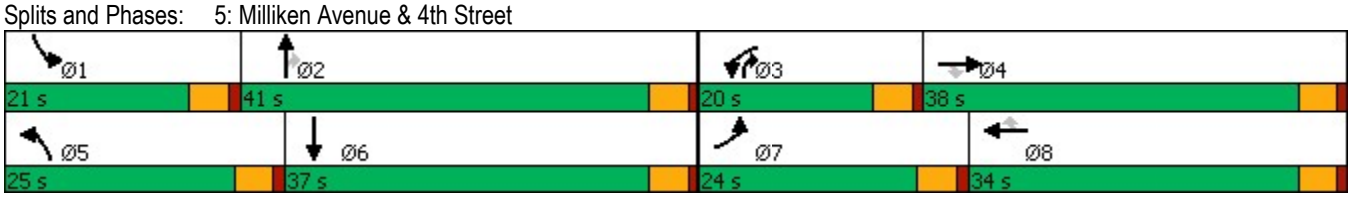
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	440	1316	279	391	1095	326	426	1651	386	462	1050	150
Future Volume (vph)	440	1316	279	391	1095	326	426	1651	386	462	1050	150
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	458	1371	291	407	1141	340	444	1720	402	481	1094	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	458	1371	291	407	1141	340	444	1720	402	481	1250	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	440	1316	279	391	1095	326	426	1651	386	462	1050
Future Volume (vph)	440	1316	279	391	1095	326	426	1651	386	462	1050
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.5	33.5	33.5	15.5	29.5	29.5	20.2	36.5	56.5	16.5	32.8
Actuated g/C Ratio	0.16	0.28	0.28	0.13	0.25	0.25	0.17	0.30	0.47	0.14	0.27
v/c Ratio	0.98	1.02	0.51	1.09	0.96	0.58	0.91	0.93	0.55	1.21	0.76
Control Delay	86.4	72.4	14.4	121.9	63.7	12.2	73.5	50.8	22.6	160.4	42.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	72.4	14.4	121.9	63.7	12.2	73.5	50.8	22.6	160.4	42.6
LOS	F	E	B	F	E	B	E	D	C	F	D
Approach Delay		67.4			67.0			50.3			75.3
Approach LOS		E			E			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 63.7	Intersection LOS: E
Intersection Capacity Utilization 96.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

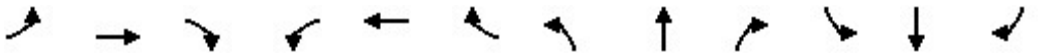


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	458	1371	291	407	1141	340	444	1720	402	481	1250
v/c Ratio	0.98	1.02	0.51	1.09	0.96	0.58	0.91	0.93	0.55	1.21	0.76
Control Delay	86.4	72.4	14.4	121.9	63.7	12.2	73.5	50.8	22.6	160.4	42.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	72.4	14.4	121.9	63.7	12.2	73.5	50.8	22.6	160.4	42.6
Queue Length 50th (ft)	184	~412	50	~182	321	34	175	375	186	~234	253
Queue Length 95th (ft)	#291	#509	136	#285	#418	126	#269	#450	285	#342	297
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	469	1345	567	373	1184	583	493	1846	735	397	1648
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	1.02	0.51	1.09	0.96	0.58	0.90	0.93	0.55	1.21	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

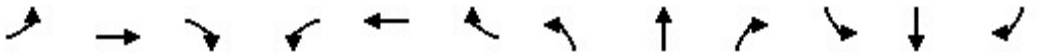
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	440	1316	279	391	1095	326	426	1651	386	462	1050	150
Future Volume (veh/h)	440	1316	279	391	1095	326	426	1651	386	462	1050	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	458	1371	291	407	1141	340	444	1720	402	481	1094	156
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	473	1352	420	376	1191	370	487	1849	650	401	1487	210
Arrive On Green	0.16	0.28	0.28	0.13	0.25	0.25	0.17	0.30	0.30	0.14	0.27	0.27
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5436	769
Grp Volume(v), veh/h	458	1371	291	407	1141	340	444	1720	402	481	918	332
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1634
Q Serve(g_s), s	18.7	33.5	20.8	15.5	27.9	26.4	18.0	32.8	24.9	16.5	21.9	22.2
Cycle Q Clear(g_c), s	18.7	33.5	20.8	15.5	27.9	26.4	18.0	32.8	24.9	16.5	21.9	22.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.47
Lane Grp Cap(c), veh/h	473	1352	420	376	1191	370	487	1849	650	401	1250	447
V/C Ratio(X)	0.97	1.01	0.69	1.08	0.96	0.92	0.91	0.93	0.62	1.20	0.73	0.74
Avail Cap(c_a), veh/h	473	1352	420	376	1191	370	498	1856	652	401	1250	447
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.9	43.2	38.6	52.2	44.6	44.0	49.0	40.5	26.3	51.7	39.6	39.7
Incr Delay (d2), s/veh	32.9	28.0	4.9	69.9	17.0	27.7	20.7	9.0	1.8	111.9	2.3	6.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	16.7	8.2	9.3	12.9	12.6	7.9	13.3	9.1	12.2	8.4	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	82.8	71.2	43.4	122.1	61.6	71.7	69.7	49.5	28.1	163.6	41.9	46.2
LnGrp LOS	F	F	D	F	E	E	E	D	C	F	D	D
Approach Vol, veh/h		2120			1888			2566			1731	
Approach Delay, s/veh		69.9			76.4			49.6			76.5	
Approach LOS		E			E			D			E	

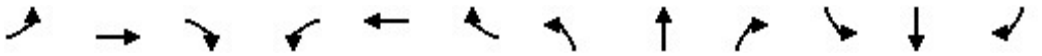
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	40.8	20.0	38.0	24.6	37.3	24.0	34.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	34.8	17.5	35.5	20.0	24.2	20.7	29.9
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.1	5.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	66.5
HCM 6th LOS	E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.920	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2955	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	2955	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			121			196			262		229	390
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



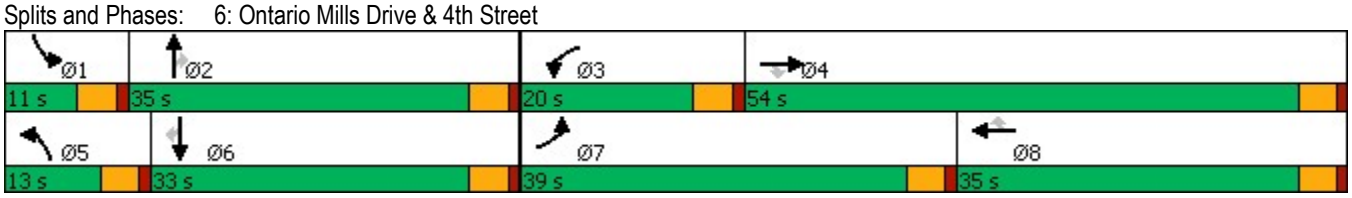
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	986	1463	120	244	1141	456	141	310	360	104	312	718
Future Volume (vph)	986	1463	120	244	1141	456	141	310	360	104	312	718
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1072	1590	130	265	1240	496	153	337	391	113	339	780
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	1072	1590	130	265	1240	496	153	337	391	113	729	390

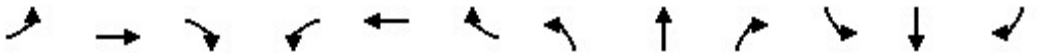
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	986	1463	120	244	1141	456	141	310	360	104	312	718
Future Volume (vph)	986	1463	120	244	1141	456	141	310	360	104	312	718
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.5	50.7	50.7	14.3	30.5	30.5	8.5	28.7	28.7	6.5	26.7	26.7
Actuated g/C Ratio	0.29	0.43	0.43	0.12	0.26	0.26	0.07	0.24	0.24	0.05	0.23	0.23
v/c Ratio	1.27	0.77	0.18	0.76	1.00	0.93	1.34	0.41	0.70	1.31	0.86	0.64
Control Delay	167.0	32.5	5.3	64.8	69.2	52.1	245.3	39.3	20.4	243.7	41.5	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.0	32.5	5.3	64.8	69.2	52.1	245.3	39.3	20.4	243.7	41.5	9.1
LOS	F	C	A	E	E	D	F	D	C	F	D	A
Approach Delay		82.9			64.4			66.7			49.8	
Approach LOS		F			E			E			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.34	
Intersection Signal Delay: 69.5	Intersection LOS: E
Intersection Capacity Utilization 97.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



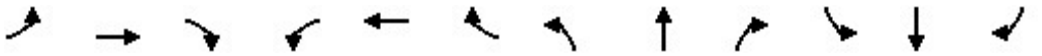


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1072	1590	130	265	1240	496	153	337	391	113	729	390
v/c Ratio	1.27	0.77	0.18	0.76	1.00	0.93	1.34	0.41	0.70	1.31	0.86	0.64
Control Delay	167.0	32.5	5.3	64.8	69.2	52.1	245.3	39.3	20.4	243.7	41.5	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.0	32.5	5.3	64.8	69.2	52.1	245.3	39.3	20.4	243.7	41.5	9.1
Queue Length 50th (ft)	~545	389	4	103	~360	248	~156	114	87	~113	209	0
Queue Length 95th (ft)	#676	452	42	150	#465	#466	#293	159	204	#234	292	97
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	844	2065	712	379	1243	532	114	865	581	86	886	625
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.27	0.77	0.18	0.70	1.00	0.93	1.34	0.39	0.67	1.31	0.82	0.62

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



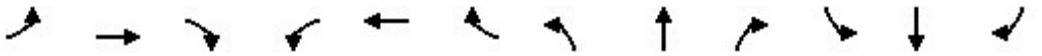
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	986	1463	120	244	1141	456	141	310	360	104	312	718
Future Volume (veh/h)	986	1463	120	244	1141	456	141	310	360	104	312	718
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1072	1590	130	265	1240	496	153	337	391	113	339	780
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	837	2097	651	315	1229	382	113	856	382	86	421	713
Arrive On Green	0.29	0.43	0.43	0.11	0.25	0.25	0.07	0.25	0.25	0.05	0.24	0.24
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	1072	1590	130	265	1240	496	153	337	391	113	339	780
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	34.5	33.3	6.4	10.7	30.5	30.5	8.5	10.0	30.5	6.5	21.6	28.5
Cycle Q Clear(g_c), s	34.5	33.3	6.4	10.7	30.5	30.5	8.5	10.0	30.5	6.5	21.6	28.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	837	2097	651	315	1229	382	113	856	382	86	421	713
V/C Ratio(X)	1.28	0.76	0.20	0.84	1.01	1.30	1.36	0.39	1.02	1.31	0.81	1.09
Avail Cap(c_a), veh/h	837	2097	651	376	1229	382	113	856	382	86	421	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	28.7	21.1	52.5	44.8	44.8	55.8	37.1	44.8	56.8	43.1	45.7
Incr Delay (d2), s/veh	135.7	1.6	0.1	13.8	27.8	152.9	206.9	0.3	52.5	200.3	10.9	62.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.0	13.0	2.3	4.5	15.2	27.4	9.9	4.1	16.8	7.4	10.7	16.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	178.5	30.3	21.2	66.3	72.5	197.6	262.6	37.4	97.2	257.1	54.1	107.8
LnGrp LOS	F	C	C	E	F	F	F	D	F	F	D	F
Approach Vol, veh/h		2792			2001			881			1232	
Approach Delay, s/veh		86.8			102.7			103.0			106.7	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	17.5	56.5	13.0	33.0	39.0	35.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.5	32.5	12.7	35.3	10.5	30.5	36.5	32.5
Green Ext Time (p_c), s	0.0	0.0	0.3	9.7	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	97.0
HCM 6th LOS	F

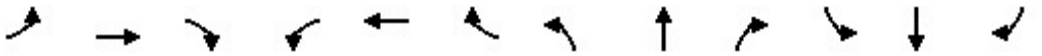
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.973			0.940				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.978	
Satd. Flow (prot)	2891	4818	1500	1583	4688	0	1583	3152	0	1504	1640	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.978	
Satd. Flow (perm)	2891	4818	1500	1583	4688	0	1583	3152	0	1504	1640	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			123		37			60				217
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



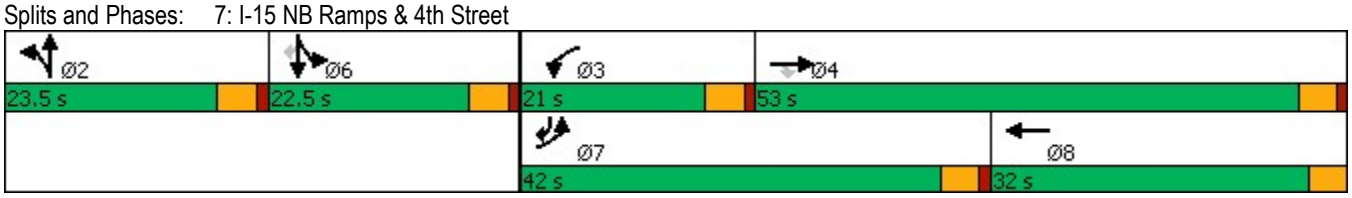
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	944	847	131	79	997	216	152	85	58	197	76	676
Future Volume (vph)	944	847	131	79	997	216	152	85	58	197	76	676
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	983	882	136	82	1039	225	158	89	60	205	79	704
Shared Lane Traffic (%)										32%		
Lane Group Flow (vph)	983	882	136	82	1264	0	158	149	0	139	145	704

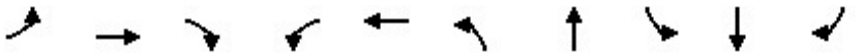
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	944	847	131	79	997	152	85	197	76	676
Future Volume (vph)	944	847	131	79	997	152	85	197	76	676
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	37.6	56.5	56.5	11.2	28.6	15.5	15.5	14.6	14.6	56.8
Actuated g/C Ratio	0.33	0.50	0.50	0.10	0.25	0.14	0.14	0.13	0.13	0.50
v/c Ratio	1.03	0.37	0.17	0.53	1.05	0.73	0.31	0.72	0.69	0.49
Control Delay	74.1	20.4	5.4	61.4	79.2	67.6	28.1	68.8	64.7	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.1	20.4	5.4	61.4	79.2	67.6	28.1	68.8	64.7	13.9
LOS	E	C	A	E	E	E	C	E	E	B
Approach Delay		45.8			78.1		48.4		29.1	
Approach LOS		D			E		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.4	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 51.8	Intersection LOS: D
Intersection Capacity Utilization 89.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	983	882	136	82	1264	158	149	139	145	704
v/c Ratio	1.03	0.37	0.17	0.53	1.05	0.73	0.31	0.72	0.69	0.49
Control Delay	74.1	20.4	5.4	61.4	79.2	67.6	28.1	68.8	64.7	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.1	20.4	5.4	61.4	79.2	67.6	28.1	68.8	64.7	13.9
Queue Length 50th (ft)	~410	153	5	59	~374	113	31	105	109	128
Queue Length 95th (ft)	#571	219	45	111	#499	190	63	182	185	190
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	959	2399	808	231	1209	266	579	239	261	1430
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.37	0.17	0.35	1.05	0.59	0.26	0.58	0.56	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	944	847	131	79	997	216	152	85	58	197	76	676
Future Volume (veh/h)	944	847	131	79	997	216	152	85	58	197	76	676
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	983	882	136	82	1039	225	158	89	60	142	167	704
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	942	2446	759	102	979	212	191	238	148	248	275	1439
Arrive On Green	0.32	0.51	0.51	0.06	0.25	0.25	0.12	0.12	0.12	0.16	0.16	0.16
Sat Flow, veh/h	2910	4837	1502	1594	3981	861	1594	1992	1240	1594	1772	3003
Grp Volume(v), veh/h	983	882	136	82	841	423	158	74	75	142	167	704
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1617	1594	1683	1549	1594	1772	1502
Q Serve(g_s), s	37.5	12.8	5.7	5.9	28.5	28.5	11.2	4.7	5.2	9.6	10.2	18.0
Cycle Q Clear(g_c), s	37.5	12.8	5.7	5.9	28.5	28.5	11.2	4.7	5.2	9.6	10.2	18.0
Prop In Lane	1.00		1.00	1.00		0.53	1.00		0.80	1.00		1.00
Lane Grp Cap(c), veh/h	942	2446	759	102	793	398	191	201	185	248	275	1439
V/C Ratio(X)	1.04	0.36	0.18	0.80	1.06	1.06	0.83	0.37	0.40	0.57	0.61	0.49
Avail Cap(c_a), veh/h	942	2446	759	227	793	398	261	276	254	248	275	1439
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	17.3	15.6	53.5	43.7	43.7	49.8	47.0	47.2	45.4	45.6	20.5
Incr Delay (d2), s/veh	41.4	0.1	0.1	13.6	49.3	62.6	14.6	1.1	1.4	3.2	3.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.6	4.7	2.0	2.7	16.7	18.2	5.2	2.0	2.1	4.0	4.8	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	80.5	17.4	15.7	67.1	93.0	106.3	64.4	48.1	48.6	48.6	49.4	20.8
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	C
Approach Vol, veh/h		2001			1346			307			1013	
Approach Delay, s/veh		48.3			95.6			56.6			29.4	
Approach LOS		D			F			E			C	

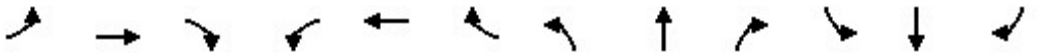
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.4	11.9	63.1		22.5	42.0	33.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		13.2	7.9	14.8		20.0	39.5	30.5				
Green Ext Time (p_c), s		0.6	0.1	7.9		0.0	0.0	0.0				

Intersection Summary		
HCM 6th Ctrl Delay	58.4	
HCM 6th LOS	E	

Notes

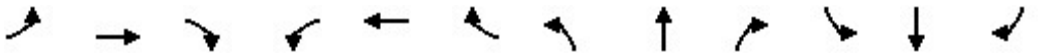
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3041	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



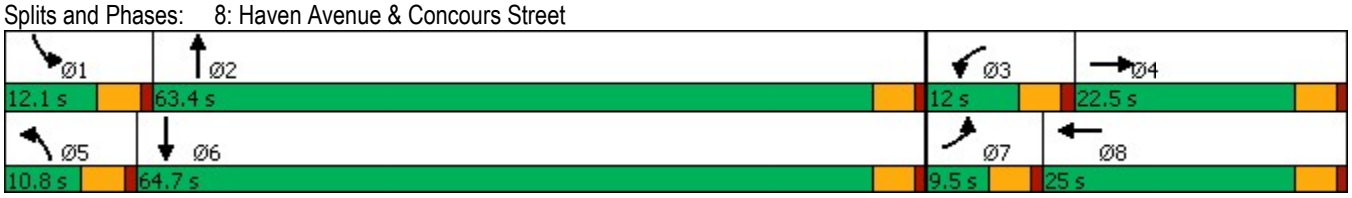
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	26	40	65	226	95	97	48	2594	258	178	2199	28
Future Volume (vph)	26	40	65	226	95	97	48	2594	258	178	2199	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	27	41	66	231	97	99	49	2647	263	182	2244	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	107	0	231	97	99	49	2647	263	182	2244	29

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	26	40	226	95	97	48	2594	258	178	2199	28
Future Volume (vph)	26	40	226	95	97	48	2594	258	178	2199	28
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.0	7.5	13.4	99.0	6.1	58.9	99.0	7.6	62.4	99.0
Actuated g/C Ratio	0.05	0.07	0.08	0.14	1.00	0.06	0.59	1.00	0.08	0.63	1.00
v/c Ratio	0.19	0.39	0.78	0.21	0.07	0.27	0.73	0.18	0.82	0.59	0.02
Control Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.1	0.3	74.3	12.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.1	0.3	74.3	12.1	0.0
LOS	D	C	E	D	A	D	B	A	E	B	A
Approach Delay		28.9		43.8			15.3			16.6	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 69.1%	ICU Level of Service C
Analysis Period (min) 15	

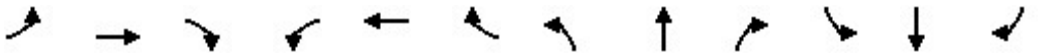
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	27	107	231	97	99	49	2647	263	182	2244	29
v/c Ratio	0.19	0.39	0.78	0.21	0.07	0.27	0.73	0.18	0.82	0.59	0.02
Control Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.1	0.3	74.3	12.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	23.9	63.6	41.3	0.1	48.8	16.1	0.3	74.3	12.1	0.0
Queue Length 50th (ft)	8	13	51	30	0	15	321	0	59	234	0
Queue Length 95th (ft)	23	39	#93	56	0	35	391	0	#121	288	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	145	606	298	693	1500	183	3611	1500	221	3825	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.18	0.78	0.14	0.07	0.27	0.73	0.18	0.82	0.59	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



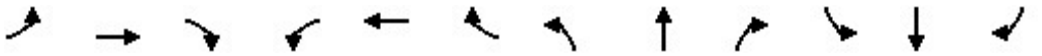
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	40	65	226	95	97	48	2594	258	178	2199	28
Future Volume (veh/h)	26	40	65	226	95	97	48	2594	258	178	2199	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	27	41	66	231	97	0	49	2647	0	182	2244	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	114	102	309	400		111	3564		233	3819	
Arrive On Green	0.03	0.07	0.07	0.08	0.12	0.00	0.04	0.58	0.00	0.08	0.63	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	27	41	66	231	97	0	49	2647	0	182	2244	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.9	2.2	4.1	5.4	2.5	0.0	1.6	30.3	0.0	5.8	20.7	0.0
Cycle Q Clear(g_c), s	0.9	2.2	4.1	5.4	2.5	0.0	1.6	30.3	0.0	5.8	20.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	78	114	102	309	400		111	3564		233	3819	
V/C Ratio(X)	0.35	0.36	0.65	0.75	0.24		0.44	0.74		0.78	0.59	
Avail Cap(c_a), veh/h	153	319	285	313	727		193	3783		233	3866	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.4	42.3	43.2	42.8	37.9	0.0	44.7	14.5	0.0	42.8	10.5	0.0
Incr Delay (d2), s/veh	2.6	1.9	6.8	9.3	0.3	0.0	2.7	0.8	0.0	15.6	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.0	1.7	2.0	1.0	0.0	0.6	9.6	0.0	2.6	6.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	44.2	50.0	52.2	38.3	0.0	47.4	15.2	0.0	58.5	10.7	0.0
LnGrp LOS	D	D	D	D	D		D	B		E	B	
Approach Vol, veh/h		134			328	A		2696	A		2426	A
Approach Delay, s/veh		47.8			48.0			15.8			14.3	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	60.0	11.9	10.9	8.1	64.0	7.0	15.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	7.8	32.3	7.4	6.1	3.6	22.7	2.9	4.5
Green Ext Time (p_c), s	0.0	23.2	0.0	0.4	0.0	26.5	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

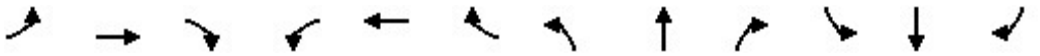
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.980			0.951						0.980	
Flt Protected	0.950	0.958			0.969		0.950			0.950		
Satd. Flow (prot)	1593	1574	0	0	1626	0	1676	4818	0	1676	4721	0
Flt Permitted	0.950	0.958					0.950			0.950		
Satd. Flow (perm)	1593	1574	0	0	1678	0	1676	4818	0	1676	4721	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						34	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



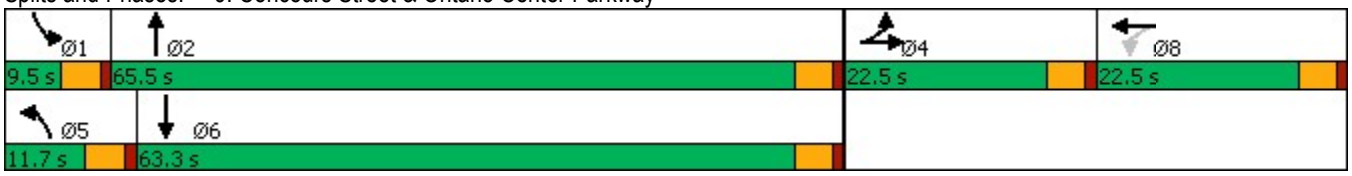
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	173	0	12	15	0	9	34	1803	5	1	1088	167
Future Volume (vph)	173	0	12	15	0	9	34	1803	5	1	1088	167
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	182	0	13	16	0	9	36	1898	5	1	1145	176
Shared Lane Traffic (%)	46%											
Lane Group Flow (vph)	98	97	0	0	25	0	36	1903	0	1	1321	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	173	0	15	0	34	1803	1	1088
Future Volume (vph)	173	0	15	0	34	1803	1	1088
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	11.0	11.0		5.8	6.9	52.7	5.3	47.8
Actuated g/C Ratio	0.14	0.14		0.07	0.09	0.68	0.07	0.62
v/c Ratio	0.44	0.32		0.12	0.24	0.58	0.01	0.45
Control Delay	41.3	12.2		1.1	44.4	9.2	45.0	10.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	12.2		1.1	44.4	9.2	45.0	10.3
LOS	D	B		A	D	A	D	B
Approach Delay		26.8		1.1		9.8		10.3
Approach LOS		C		A		A		B

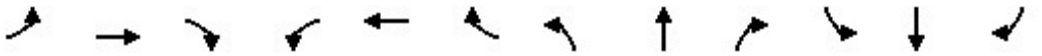
Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 77.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	98	97	25	36	1903	1	1321
v/c Ratio	0.44	0.32	0.12	0.24	0.58	0.01	0.45
Control Delay	41.3	12.2	1.1	44.4	9.2	45.0	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	12.2	1.1	44.4	9.2	45.0	10.3
Queue Length 50th (ft)	42	1	0	15	111	0	115
Queue Length 95th (ft)	118	50	0	58	364	7	224
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	389	456	481	163	3945	113	3772
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.21	0.05	0.22	0.48	0.01	0.35

Intersection Summary



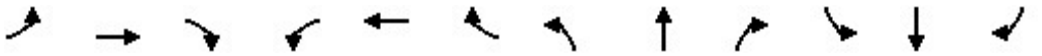
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	173	0	12	15	0	9	34	1803	5	1	1088	167
Future Volume (veh/h)	173	0	12	15	0	9	34	1803	5	1	1088	167
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	194	0	0	16	0	9	36	1898	5	1	1145	176
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	306	161	0	29	0	16	62	3017	8	3	2413	371
Arrive On Green	0.09	0.00	0.00	0.03	0.00	0.03	0.04	0.61	0.61	0.00	0.57	0.57
Sat Flow, veh/h	3375	1772	0	1034	0	582	1688	4981	13	1688	4230	650
Grp Volume(v), veh/h	194	0	0	25	0	0	36	1229	674	1	873	448
Grp Sat Flow(s),veh/h/ln	1688	1772	0	1616	0	0	1688	1612	1770	1688	1612	1655
Q Serve(g_s), s	3.6	0.0	0.0	1.0	0.0	0.0	1.4	15.9	15.9	0.0	10.5	10.5
Cycle Q Clear(g_c), s	3.6	0.0	0.0	1.0	0.0	0.0	1.4	15.9	15.9	0.0	10.5	10.5
Prop In Lane	1.00		0.00	0.64		0.36	1.00		0.01	1.00		0.39
Lane Grp Cap(c), veh/h	306	161	0	45	0	0	62	1954	1072	3	1840	944
V/C Ratio(X)	0.63	0.00	0.00	0.55	0.00	0.00	0.58	0.63	0.63	0.39	0.47	0.47
Avail Cap(c_a), veh/h	926	486	0	443	0	0	185	2999	1646	129	2891	1483
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.8	0.0	0.0	31.5	0.0	0.0	31.1	8.2	8.2	32.7	8.3	8.3
Incr Delay (d2), s/veh	2.2	0.0	0.0	10.2	0.0	0.0	8.4	0.3	0.6	75.4	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	0.5	0.0	0.0	0.7	4.4	4.9	0.1	3.0	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.0	0.0	0.0	41.7	0.0	0.0	39.5	8.6	8.8	108.2	8.5	8.7
LnGrp LOS	C	A	A	D	A	A	D	A	A	F	A	A
Approach Vol, veh/h		194			25			1939			1322	
Approach Delay, s/veh		31.0			41.7			9.2			8.6	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	44.2		10.4	6.9	41.9		6.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.0	17.9		5.6	3.4	12.5		3.0				
Green Ext Time (p_c), s	0.0	21.8		0.5	0.0	12.8		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		10.5	
HCM 6th LOS		B	

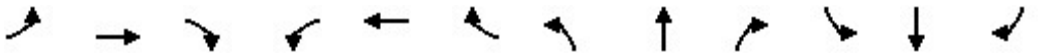
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			245			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



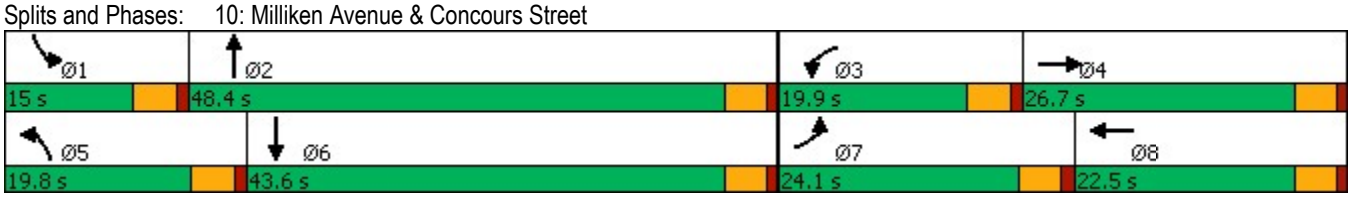
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	376	133	235	185	69	168	295	1880	141	214	1386	174
Future Volume (vph)	376	133	235	185	69	168	295	1880	141	214	1386	174
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	392	139	245	193	72	175	307	1958	147	223	1444	181
Shared Lane Traffic (%)												
Lane Group Flow (vph)	392	139	245	193	72	175	307	1958	147	223	1444	181

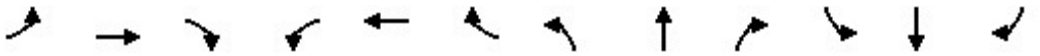
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	376	133	235	185	69	168	295	1880	141	214	1386	174
Future Volume (vph)	376	133	235	185	69	168	295	1880	141	214	1386	174
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	18.9	12.2	95.1	11.7	7.5	95.1	14.1	42.7	95.1	10.3	38.9	95.1
Actuated g/C Ratio	0.20	0.13	1.00	0.12	0.08	1.00	0.15	0.45	1.00	0.11	0.41	1.00
v/c Ratio	0.69	0.32	0.16	0.54	0.27	0.12	0.72	0.72	0.10	0.71	0.58	0.12
Control Delay	43.6	40.6	0.2	46.0	45.7	0.2	49.8	23.7	0.1	56.0	23.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	40.6	0.2	46.0	45.7	0.2	49.8	23.7	0.1	56.0	23.7	0.2
LOS	D	D	A	D	D	A	D	C	A	E	C	A
Approach Delay		29.4			27.7			25.6			25.3	
Approach LOS		C			C			C			C	

Intersection Summary		
Cycle Length: 110		
Actuated Cycle Length: 95.1		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.72		
Intersection Signal Delay: 26.2	Intersection LOS: C	
Intersection Capacity Utilization 67.9%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 10: Milliken Avenue & Concours Street

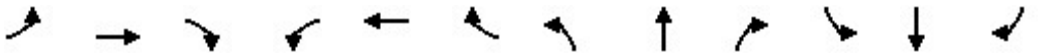




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	392	139	245	193	72	175	307	1958	147	223	1444	181
v/c Ratio	0.69	0.32	0.16	0.54	0.27	0.12	0.72	0.72	0.10	0.71	0.58	0.12
Control Delay	43.6	40.6	0.2	46.0	45.7	0.2	49.8	23.7	0.1	56.0	23.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	40.6	0.2	46.0	45.7	0.2	49.8	23.7	0.1	56.0	23.7	0.2
Queue Length 50th (ft)	120	41	0	59	22	0	94	283	0	71	204	0
Queue Length 95th (ft)	174	73	0	94	45	0	145	346	0	#127	254	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	600	788	1500	471	639	1500	469	2824	1500	321	2533	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.18	0.16	0.41	0.11	0.12	0.65	0.69	0.10	0.69	0.57	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



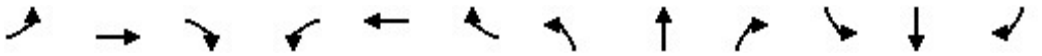
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	376	133	235	185	69	168	295	1880	141	214	1386	174
Future Volume (veh/h)	376	133	235	185	69	168	295	1880	141	214	1386	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	392	139	0	193	72	0	307	1958	0	223	1444	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	478	446		268	203		384	2798		291	2603	
Arrive On Green	0.16	0.13	0.00	0.09	0.06	0.00	0.13	0.46	0.00	0.10	0.43	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	392	139	0	193	72	0	307	1958	0	223	1444	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	10.8	3.1	0.0	5.4	1.7	0.0	8.5	21.3	0.0	6.2	14.8	0.0
Cycle Q Clear(g_c), s	10.8	3.1	0.0	5.4	1.7	0.0	8.5	21.3	0.0	6.2	14.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	478	446		268	203		384	2798		291	2603	
V/C Ratio(X)	0.82	0.31		0.72	0.36		0.80	0.70		0.77	0.55	
Avail Cap(c_a), veh/h	686	899		539	729		536	3220		368	2868	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	33.6	32.6	0.0	36.7	37.5	0.0	35.0	17.9	0.0	36.4	17.9	0.0
Incr Delay (d2), s/veh	5.3	0.4	0.0	3.7	1.1	0.0	5.8	0.6	0.0	7.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	1.3	0.0	2.0	0.7	0.0	3.3	7.0	0.0	2.5	4.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.9	33.0	0.0	40.4	38.6	0.0	40.8	18.5	0.0	43.7	18.1	0.0
LnGrp LOS	D	C		D	D		D	B		D	B	
Approach Vol, veh/h		531	A		265	A		2265	A		1667	A
Approach Delay, s/veh		37.3			39.9			21.5			21.5	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.8	42.6	12.1	15.5	15.5	40.0	18.1	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	8.2	23.3	7.4	5.1	10.5	16.8	12.8	3.7
Green Ext Time (p_c), s	0.2	14.9	0.4	0.7	0.5	11.5	0.8	0.2

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

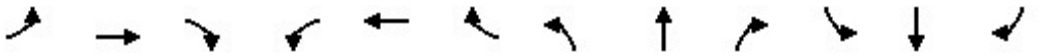
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			219			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



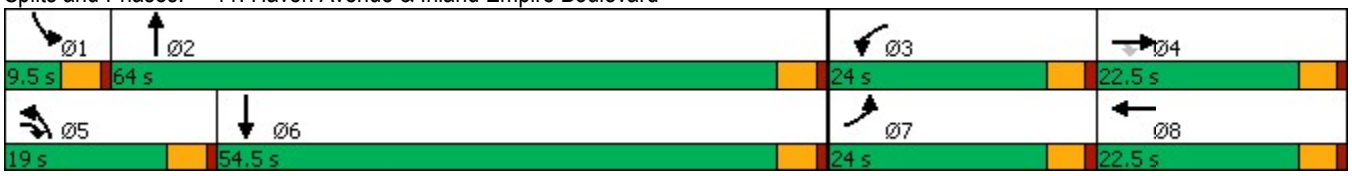
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	278	241	538	638	181	41	414	2094	435	42	2439	151
Future Volume (vph)	278	241	538	638	181	41	414	2094	435	42	2439	151
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	299	259	578	686	195	44	445	2252	468	45	2623	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	299	259	578	686	195	44	445	2252	468	45	2623	162

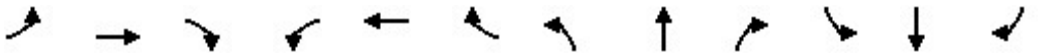
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	241	538	638	181	41	414	2094	435	42	2439	151
Future Volume (vph)	278	241	538	638	181	41	414	2094	435	42	2439	151
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	16.6	14.1	33.1	19.5	17.1	116.2	14.5	61.5	116.2	5.0	50.0	116.2
Actuated g/C Ratio	0.14	0.12	0.28	0.17	0.15	1.00	0.12	0.53	1.00	0.04	0.43	1.00
v/c Ratio	0.73	0.64	1.24	1.04	0.40	0.03	1.23	0.70	0.31	0.36	1.00	0.11
Control Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.7	0.5	63.5	51.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.7	0.5	63.5	51.8	0.1
LOS	E	E	F	F	D	A	F	C	A	E	D	A
Approach Delay		108.6			78.6			40.1			49.1	
Approach LOS		F			E			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 57.3	Intersection LOS: E
Intersection Capacity Utilization 99.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard



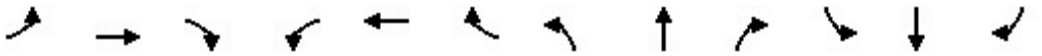


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	299	259	578	686	195	44	445	2252	468	45	2623	162
v/c Ratio	0.73	0.64	1.24	1.04	0.40	0.03	1.23	0.70	0.31	0.36	1.00	0.11
Control Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.7	0.5	63.5	51.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	56.0	158.1	92.3	48.1	0.0	169.8	22.7	0.5	63.5	51.8	0.1
Queue Length 50th (ft)	111	98	~508	~196	71	0	~212	366	0	17	~565	0
Queue Length 95th (ft)	161	143	#725	#291	111	0	#329	440	0	38	#708	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	485	519	466	661	519	1500	361	3214	1500	124	2614	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.50	1.24	1.04	0.38	0.03	1.23	0.70	0.31	0.36	1.00	0.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



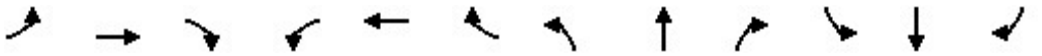
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	241	538	638	181	41	414	2094	435	42	2439	151
Future Volume (veh/h)	278	241	538	638	181	41	414	2094	435	42	2439	151
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	299	259	578	686	195	0	445	2252	0	45	2623	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	353	505	407	644	643		352	3079		94	2540	
Arrive On Green	0.12	0.15	0.15	0.16	0.19	0.00	0.12	0.51	0.00	0.03	0.42	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	299	259	578	686	195	0	445	2252	0	45	2623	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	12.1	8.5	18.0	19.5	6.0	0.0	14.5	34.8	0.0	1.8	50.0	0.0
Cycle Q Clear(g_c), s	12.1	8.5	18.0	19.5	6.0	0.0	14.5	34.8	0.0	1.8	50.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	353	505	407	644	643		352	3079		94	2540	
V/C Ratio(X)	0.85	0.51	1.42	1.06	0.30		1.27	0.73		0.48	1.03	
Avail Cap(c_a), veh/h	473	505	407	644	643		352	3079		121	2540	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.6	47.0	43.8	50.2	41.7	0.0	52.8	23.3	0.0	57.1	35.0	0.0
Incr Delay (d2), s/veh	10.3	0.9	203.5	53.9	0.3	0.0	140.3	0.9	0.0	3.7	27.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	3.6	34.9	9.6	2.5	0.0	12.1	12.3	0.0	0.7	22.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	47.8	247.2	104.1	41.9	0.0	193.0	24.2	0.0	60.8	62.0	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	F	
Approach Vol, veh/h		1136			881	A		2697	A		2668	A
Approach Delay, s/veh		153.0			90.4			52.1			61.9	
Approach LOS		F			F			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.4	65.1	24.0	22.5	19.0	54.5	19.1	27.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	3.8	36.8	21.5	20.0	16.5	52.0	14.1	8.0
Green Ext Time (p_c), s	0.0	18.0	0.0	0.0	0.0	0.0	0.5	0.8

Intersection Summary	
HCM 6th Ctrl Delay	75.7
HCM 6th LOS	E

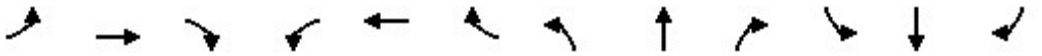
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			340			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



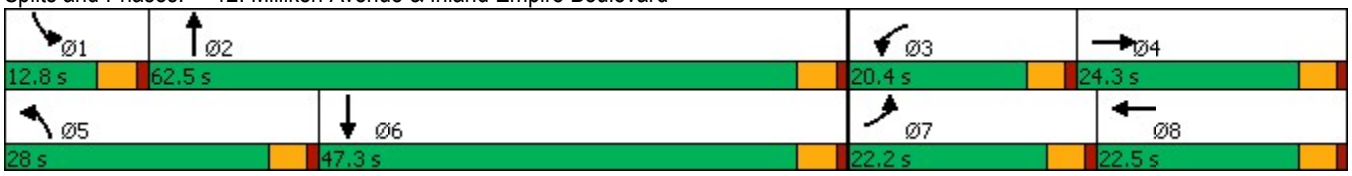
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	305	298	323	212	90	137	391	1845	365	127	1593	131
Future Volume (vph)	305	298	323	212	90	137	391	1845	365	127	1593	131
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	321	314	340	223	95	144	412	1942	384	134	1677	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	321	314	340	223	95	144	412	1942	384	134	1677	138

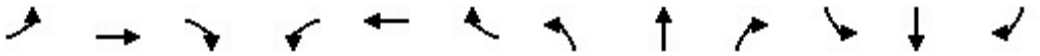
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	305	298	323	212	90	137	391	1845	365	127	1593	131
Future Volume (vph)	305	298	323	212	90	137	391	1845	365	127	1593	131
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	19.2	15.4	107.9	13.3	12.2	107.9	19.9	52.7	107.9	8.2	41.1	107.9
Actuated g/C Ratio	0.18	0.14	1.00	0.12	0.11	1.00	0.18	0.49	1.00	0.08	0.38	1.00
v/c Ratio	0.63	0.66	0.23	0.63	0.25	0.10	0.77	0.65	0.26	0.61	0.73	0.09
Control Delay	50.6	52.0	0.3	55.1	46.7	0.1	53.8	22.3	0.4	64.0	31.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	52.0	0.3	55.1	46.7	0.1	53.8	22.3	0.4	64.0	31.7	0.1
LOS	D	D	A	E	D	A	D	C	A	E	C	A
Approach Delay		33.5			36.3			24.0			31.7	
Approach LOS		C			D			C			C	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 107.9		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.77		
Intersection Signal Delay: 28.9	Intersection LOS: C	
Intersection Capacity Utilization 68.5%	ICU Level of Service C	
Analysis Period (min) 15		

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	321	314	340	223	95	144	412	1942	384	134	1677	138
v/c Ratio	0.63	0.66	0.23	0.63	0.25	0.10	0.77	0.65	0.26	0.61	0.73	0.09
Control Delay	50.6	52.0	0.3	55.1	46.7	0.1	53.8	22.3	0.4	64.0	31.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.6	52.0	0.3	55.1	46.7	0.1	53.8	22.3	0.4	64.0	31.7	0.1
Queue Length 50th (ft)	117	116	0	81	34	0	149	289	0	50	295	0
Queue Length 95th (ft)	#183	168	0	127	61	0	213	364	0	#94	379	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	527	626	1500	433	569	1500	640	3321	1500	226	2474	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.50	0.23	0.52	0.17	0.10	0.64	0.58	0.26	0.59	0.68	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	298	323	212	90	137	391	1845	365	127	1593	131
Future Volume (veh/h)	305	298	323	212	90	137	391	1845	365	127	1593	131
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	321	314	0	223	95	0	412	1942	0	134	1677	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	397	430		295	312		499	3057		192	2415	
Arrive On Green	0.14	0.13	0.00	0.10	0.09	0.00	0.17	0.50	0.00	0.07	0.40	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	321	314	0	223	95	0	412	1942	0	134	1677	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	9.5	7.9	0.0	6.6	2.3	0.0	12.1	20.6	0.0	4.0	20.3	0.0
Cycle Q Clear(g_c), s	9.5	7.9	0.0	6.6	2.3	0.0	12.1	20.6	0.0	4.0	20.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	397	430		295	312		499	3057		192	2415	
V/C Ratio(X)	0.81	0.73		0.76	0.30		0.83	0.64		0.70	0.69	
Avail Cap(c_a), veh/h	582	753		523	685		773	3995		273	2948	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.1	37.1	0.0	38.7	37.5	0.0	35.4	16.1	0.0	40.5	22.3	0.0
Incr Delay (d2), s/veh	5.3	2.4	0.0	3.9	0.5	0.0	4.4	0.2	0.0	4.5	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	3.4	0.0	2.5	1.0	0.0	4.5	6.7	0.0	1.5	7.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	39.6	0.0	42.6	38.0	0.0	39.8	16.4	0.0	45.0	22.8	0.0
LnGrp LOS	D	D		D	D		D	B		D	C	
Approach Vol, veh/h		635	A		318	A		2354	A		1811	A
Approach Delay, s/veh		41.0			41.2			20.5			24.4	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.3	48.9	13.5	15.8	19.7	39.6	16.6	12.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	6.0	22.6	8.6	9.9	14.1	22.3	11.5	4.3
Green Ext Time (p_c), s	0.1	21.3	0.4	1.4	1.1	12.8	0.6	0.4

Intersection Summary	
HCM 6th Ctrl Delay	25.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.982	0.850				
Flt Protected	0.958					
Satd. Flow (prot)	3042	1365	6071	0	0	6071
Flt Permitted	0.958					
Satd. Flow (perm)	3042	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	2	2				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	502	328	2478	0	0	2428
Future Volume (vph)	502	328	2478	0	0	2428
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	523	342	2581	0	0	2529
Shared Lane Traffic (%)		21%				
Lane Group Flow (vph)	595	270	2581	0	0	2529

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	502	328	2478	2428
Future Volume (vph)	502	328	2478	2428
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	16.8	16.8	36.6	36.6
Actuated g/C Ratio	0.27	0.27	0.59	0.59
v/c Ratio	0.73	0.74	0.72	0.71
Control Delay	26.3	33.7	11.2	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.3	33.7	11.2	11.0
LOS	C	C	B	B
Approach Delay	28.6		11.2	11.0
Approach LOS	C		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 62.4	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 70.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	595	270	2581	2529
v/c Ratio	0.73	0.74	0.72	0.71
Control Delay	26.3	33.7	11.2	11.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	26.3	33.7	11.2	11.0
Queue Length 50th (ft)	104	101	195	188
Queue Length 95th (ft)	154	#194	249	241
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	955	429	3562	3562
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.62	0.63	0.72	0.71

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

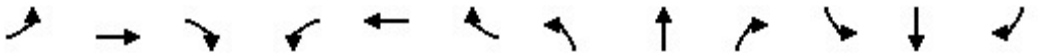
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	502	328	2478	0	0	2428
Future Volume (veh/h)	502	328	2478	0	0	2428
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	573	288	2581	0	0	2529
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	791	373	3639	0	0	3639
Arrive On Green	0.25	0.25	0.60	0.00	0.00	0.60
Sat Flow, veh/h	3188	1502	6592	0	0	6592
Grp Volume(v), veh/h	573	288	2581	0	0	2529
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	9.6	10.4	17.2	0.0	0.0	16.6
Cycle Q Clear(g_c), s	9.6	10.4	17.2	0.0	0.0	16.6
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	791	373	3639	0	0	3639
V/C Ratio(X)	0.72	0.77	0.71	0.00	0.00	0.69
Avail Cap(c_a), veh/h	1068	503	3824	0	0	3824
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	20.0	20.3	8.2	0.0	0.0	8.1
Incr Delay (d2), s/veh	1.6	5.1	0.6	0.0	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	3.8	4.2	0.0	0.0	4.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.6	25.5	8.8	0.0	0.0	8.6
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	861		2581			2529
Approach Delay, s/veh	22.9		8.8			8.6
Approach LOS	C		A			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		39.2			39.2	18.9
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		19.2			18.6	12.4
Green Ext Time (p_c), s		15.5			15.8	2.1

Intersection Summary	
HCM 6th Ctrl Delay	10.7
HCM 6th LOS	B

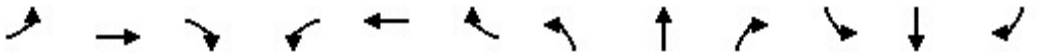
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			136			281			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



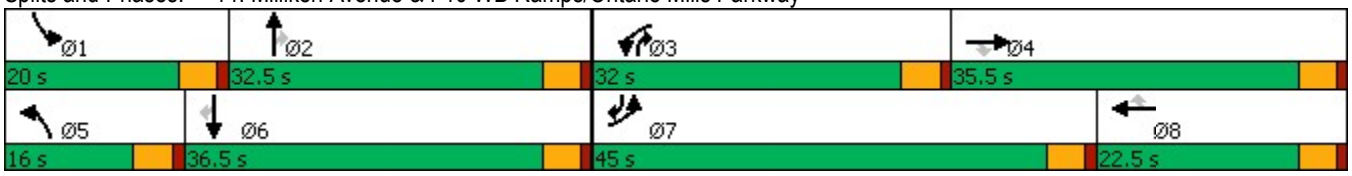
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1010	197	237	253	301	63	240	1040	453	332	1261	479
Future Volume (vph)	1010	197	237	253	301	63	240	1040	453	332	1261	479
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1052	205	247	264	314	66	250	1083	472	346	1314	499
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1052	205	247	264	314	66	250	1083	472	346	1314	499

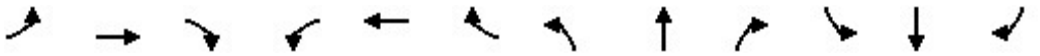
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1010	197	237	253	301	63	240	1040	453	332	1261	479
Future Volume (vph)	1010	197	237	253	301	63	240	1040	453	332	1261	479
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	40.6	39.5	39.5	16.7	15.6	15.6	11.5	27.2	48.4	15.5	31.2	76.3
Actuated g/C Ratio	0.35	0.34	0.34	0.14	0.13	0.13	0.10	0.23	0.41	0.13	0.27	0.65
v/c Ratio	1.05	0.34	0.41	0.64	0.70	0.21	0.88	0.77	0.60	0.90	0.81	0.50
Control Delay	80.1	32.3	15.1	54.5	57.7	1.5	82.7	46.2	13.1	77.7	44.9	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	32.3	15.1	54.5	57.7	1.5	82.7	46.2	13.1	77.7	44.9	11.5
LOS	F	C	B	D	E	A	F	D	B	E	D	B
Approach Delay		62.9			50.6			42.6			42.4	
Approach LOS		E			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.9	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 48.4	Intersection LOS: D
Intersection Capacity Utilization 85.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway



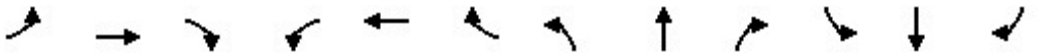


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1052	205	247	264	314	66	250	1083	472	346	1314	499
v/c Ratio	1.05	0.34	0.41	0.64	0.70	0.21	0.88	0.77	0.60	0.90	0.81	0.50
Control Delay	80.1	32.3	15.1	54.5	57.7	1.5	82.7	46.2	13.1	77.7	44.9	11.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	32.3	15.1	54.5	57.7	1.5	82.7	46.2	13.1	77.7	44.9	11.5
Queue Length 50th (ft)	~455	117	55	98	121	0	98	224	104	136	271	159
Queue Length 95th (ft)	#600	197	137	138	171	0	#178	271	199	#229	322	251
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1002	595	603	681	516	346	284	1456	898	384	1664	998
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.34	0.41	0.39	0.61	0.19	0.88	0.74	0.53	0.90	0.79	0.50

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1010	197	237	253	301	63	240	1040	453	332	1261	479
Future Volume (veh/h)	1010	197	237	253	301	63	240	1040	453	332	1261	479
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	1052	205	247	264	314	66	250	1083	472	346	1314	499
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1020	629	533	328	394	176	290	1477	533	390	1688	942
Arrive On Green	0.35	0.36	0.36	0.11	0.12	0.12	0.10	0.24	0.24	0.13	0.28	0.28
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	1052	205	247	264	314	66	250	1083	472	346	1314	499
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	40.5	9.7	14.7	10.2	10.5	4.7	9.8	18.9	28.0	13.5	23.0	21.4
Cycle Q Clear(g_c), s	40.5	9.7	14.7	10.2	10.5	4.7	9.8	18.9	28.0	13.5	23.0	21.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1020	629	533	328	394	176	290	1477	533	390	1688	942
V/C Ratio(X)	1.03	0.33	0.46	0.81	0.80	0.38	0.86	0.73	0.89	0.89	0.78	0.53
Avail Cap(c_a), veh/h	1020	629	533	693	525	234	290	1477	533	390	1688	942
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.5	27.2	28.8	50.0	49.7	47.1	51.2	40.3	35.1	49.1	38.5	12.0
Incr Delay (d2), s/veh	36.5	0.3	0.6	4.7	6.2	1.3	22.5	1.9	16.3	20.9	2.4	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	19.3	4.2	5.4	3.9	4.7	1.8	4.5	7.3	14.7	6.0	8.8	6.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.0	27.5	29.4	54.7	55.9	48.4	73.8	42.2	51.3	70.1	40.9	12.6
LnGrp LOS	F	C	C	D	E	D	E	D	D	E	D	B
Approach Vol, veh/h		1504			644			1805			2159	
Approach Delay, s/veh		60.3			54.6			49.0			39.0	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	32.5	17.5	45.5	16.0	36.5	45.0	18.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	15.5	30.0	12.2	16.7	11.8	25.0	42.5	12.5
Green Ext Time (p_c), s	0.0	0.0	0.8	1.8	0.0	5.3	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	48.8
HCM 6th LOS	D

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.994	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3066	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3066	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	5	10				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

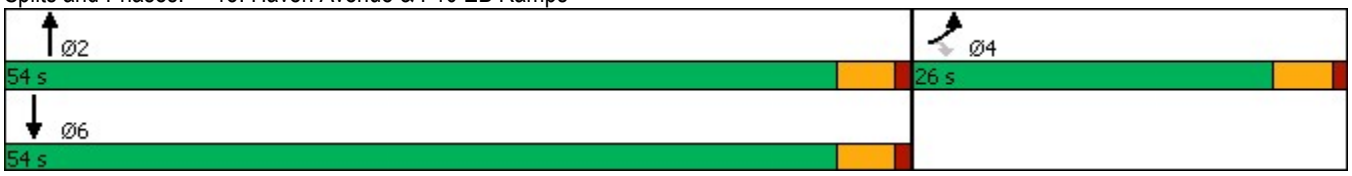
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	649	251	0	2574	2020	0
Future Volume (vph)	649	251	0	2574	2020	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	676	261	0	2681	2104	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	702	235	0	2681	2104	0

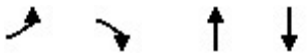
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	649	251	2574	2020
Future Volume (vph)	649	251	2574	2020
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	20.6	20.6	49.5	49.5
Actuated g/C Ratio	0.26	0.26	0.62	0.62
v/c Ratio	0.88	0.65	0.71	0.55
Control Delay	41.5	34.2	11.4	9.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	41.5	34.2	11.4	9.3
LOS	D	C	B	A
Approach Delay	39.7		11.4	9.3
Approach LOS	D		B	A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 79.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 70.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	702	235	2681	2104
v/c Ratio	0.88	0.65	0.71	0.55
Control Delay	41.5	34.2	11.4	9.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	41.5	34.2	11.4	9.3
Queue Length 50th (ft)	169	108	237	159
Queue Length 95th (ft)	#261	192	279	189
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	836	378	3798	3798
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.84	0.62	0.71	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	649	251	0	2574	2020	0
Future Volume (veh/h)	649	251	0	2574	2020	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	676	261	0	2681	2104	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	801	377	0	3823	3823	0
Arrive On Green	0.25	0.25	0.00	0.63	0.63	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	676	261	0	2681	2104	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	14.9	11.7	0.0	21.7	14.6	0.0
Cycle Q Clear(g_c), s	14.9	11.7	0.0	21.7	14.6	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	801	377	0	3823	3823	0
V/C Ratio(X)	0.84	0.69	0.00	0.70	0.55	0.00
Avail Cap(c_a), veh/h	925	436	0	4074	4074	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	26.3	25.1	0.0	9.2	7.9	0.0
Incr Delay (d2), s/veh	6.4	3.9	0.0	0.5	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	4.4	0.0	5.9	3.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.8	29.0	0.0	9.7	8.0	0.0
LnGrp LOS	C	C	A	A	A	A
Approach Vol, veh/h	937			2681	2104	
Approach Delay, s/veh	31.7			9.7	8.0	
Approach LOS	C			A	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		51.0		23.1		51.0
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		23.7		16.9		16.6
Green Ext Time (p_c), s		22.8		1.7		22.4

Intersection Summary	
HCM 6th Ctrl Delay	12.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		8				83
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	513	202	326	1226	1034	734
Future Volume (vph)	513	202	326	1226	1034	734
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	529	208	336	1264	1066	757
Shared Lane Traffic (%)						
Lane Group Flow (vph)	529	208	336	1264	1066	757

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	513	202	326	1226	1034	734
Future Volume (vph)	513	202	326	1226	1034	734
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	15.9	30.4	9.9	31.2	16.7	37.2
Actuated g/C Ratio	0.28	0.54	0.18	0.56	0.30	0.66
v/c Ratio	0.65	0.26	0.66	0.38	0.59	0.74
Control Delay	22.2	7.8	29.8	7.6	18.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	7.8	29.8	7.6	18.7	11.1
LOS	C	A	C	A	B	B
Approach Delay	18.1			12.3	15.5	
Approach LOS	B			B	B	

Intersection Summary			
Cycle Length: 60			
Actuated Cycle Length: 56.2			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 14.7		Intersection LOS: B	
Intersection Capacity Utilization 66.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	529	208	336	1264	1066	757
v/c Ratio	0.65	0.26	0.66	0.38	0.59	0.74
Control Delay	22.2	7.8	29.8	7.6	18.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	7.8	29.8	7.6	18.7	11.1
Queue Length 50th (ft)	83	34	59	67	93	120
Queue Length 95th (ft)	128	66	#100	88	123	245
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	938	831	542	3612	1981	1079
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.25	0.62	0.35	0.54	0.70

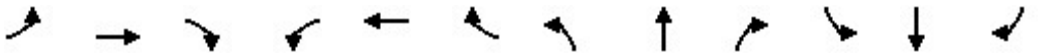
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	513	202	326	1226	1034	734
Future Volume (veh/h)	513	202	326	1226	1034	734
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	529	208	336	1264	1066	757
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	700	592	448	3577	2114	882
Arrive On Green	0.24	0.24	0.15	0.59	0.35	0.35
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	529	208	336	1264	1066	757
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	8.8	5.1	5.8	5.6	7.2	18.1
Cycle Q Clear(g_c), s	8.8	5.1	5.8	5.6	7.2	18.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	700	592	448	3577	2114	882
V/C Ratio(X)	0.76	0.35	0.75	0.35	0.50	0.86
Avail Cap(c_a), veh/h	1004	749	580	3854	2114	882
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	11.1	21.1	5.6	13.5	8.2
Incr Delay (d2), s/veh	2.0	0.4	4.0	0.1	0.2	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	4.9	2.0	1.3	2.2	10.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.4	11.5	25.1	5.7	13.7	16.6
LnGrp LOS	C	B	C	A	B	B
Approach Vol, veh/h	737			1600	1823	
Approach Delay, s/veh	17.9			9.8	14.9	
Approach LOS	B			A	B	

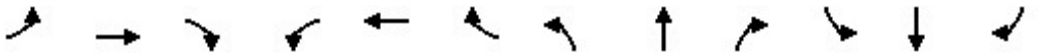
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		35.1		17.1	12.5	22.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		7.6		10.8	7.8	20.1
Green Ext Time (p_c), s		10.5		1.8	0.3	0.0

Intersection Summary	
HCM 6th Ctrl Delay	13.5
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.955				0.850			0.850		0.992	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4601	0	2891	3353	1500	2891	4818	1500	2891	6022	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4601	0	2891	3353	1500	2891	4818	1500	2891	6022	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101				248			288		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	52	579	250	371	550	233	306	1424	496	240	1388	79
Future Volume (vph)	52	579	250	371	550	233	306	1424	496	240	1388	79
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	55	616	266	395	585	248	326	1515	528	255	1477	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	882	0	395	585	248	326	1515	528	255	1561	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	52	579	371	550	233	306	1424	496	240	1388
Future Volume (vph)	52	579	371	550	233	306	1424	496	240	1388
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	22.1	12.5	31.6	31.6	15.0	35.9	99.0	10.5	31.4
Actuated g/C Ratio	0.05	0.22	0.13	0.32	0.32	0.15	0.36	1.00	0.11	0.32
v/c Ratio	0.38	0.80	1.08	0.55	0.38	0.74	0.87	0.35	0.83	0.81
Control Delay	53.8	38.2	113.5	30.7	5.3	51.2	36.1	0.7	67.3	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	38.2	113.5	30.7	5.3	51.2	36.1	0.7	67.3	35.7
LOS	D	D	F	C	A	D	D	A	E	D
Approach Delay		39.1		52.2			30.3			40.1
Approach LOS		D		D			C			D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 99	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.08	
Intersection Signal Delay: 38.6	Intersection LOS: D
Intersection Capacity Utilization 82.4%	ICU Level of Service E
Analysis Period (min) 15	

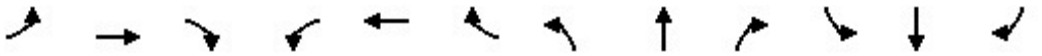
Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	55	882	395	585	248	326	1515	528	255	1561
v/c Ratio	0.38	0.80	1.08	0.55	0.38	0.74	0.87	0.35	0.83	0.81
Control Delay	53.8	38.2	113.5	30.7	5.3	51.2	36.1	0.7	67.3	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	38.2	113.5	30.7	5.3	51.2	36.1	0.7	67.3	35.7
Queue Length 50th (ft)	18	172	~147	164	0	102	327	0	83	270
Queue Length 95th (ft)	38	221	#241	221	55	149	391	0	#151	318
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	145	1150	365	1071	648	482	1746	1500	306	1916
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.77	1.08	0.55	0.38	0.68	0.87	0.35	0.83	0.81

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



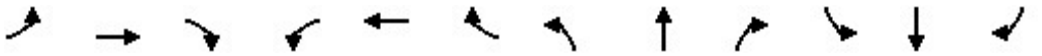
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	52	579	250	371	550	233	306	1424	496	240	1388	79
Future Volume (veh/h)	52	579	250	371	550	233	306	1424	496	240	1388	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	55	616	266	395	585	248	326	1515	0	255	1477	84
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	115	732	309	369	1033	461	390	1764		309	2003	114
Arrive On Green	0.04	0.22	0.22	0.13	0.31	0.31	0.13	0.36	0.00	0.11	0.34	0.34
Sat Flow, veh/h	2910	3335	1409	2910	3367	1502	2910	4837	1502	2910	5945	338
Grp Volume(v), veh/h	55	595	287	395	585	248	326	1515	0	255	1135	426
Grp Sat Flow(s),veh/h/ln	1455	1612	1518	1455	1683	1502	1455	1612	1502	1455	1524	1711
Q Serve(g_s), s	1.8	17.4	17.9	12.5	14.4	13.5	10.8	28.5	0.0	8.5	21.6	21.6
Cycle Q Clear(g_c), s	1.8	17.4	17.9	12.5	14.4	13.5	10.8	28.5	0.0	8.5	21.6	21.6
Prop In Lane	1.00		0.93	1.00		1.00	1.00		1.00	1.00		0.20
Lane Grp Cap(c), veh/h	115	708	333	369	1033	461	390	1764		309	1540	576
V/C Ratio(X)	0.48	0.84	0.86	1.07	0.57	0.54	0.84	0.86		0.83	0.74	0.74
Avail Cap(c_a), veh/h	148	757	356	369	1046	467	488	1764		310	1540	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.3	36.8	37.0	43.0	28.6	28.3	41.6	28.9	0.0	43.1	28.8	28.8
Incr Delay (d2), s/veh	3.1	8.0	17.9	66.4	0.7	1.2	10.0	5.7	0.0	16.5	3.2	8.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	7.5	8.2	7.8	5.8	4.9	4.4	11.6	0.0	3.7	8.1	9.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.4	44.8	54.9	109.4	29.3	29.5	51.6	34.6	0.0	59.6	32.0	37.1
LnGrp LOS	D	D	D	F	C	C	D	C		E	C	D
Approach Vol, veh/h		937			1228			1841	A		1816	
Approach Delay, s/veh		48.2			55.1			37.6			37.1	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.9	40.4	17.0	26.1	17.7	37.7	8.4	34.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	10.5	30.5	14.5	19.9	12.8	23.6	3.8	16.4
Green Ext Time (p_c), s	0.0	4.1	0.0	1.7	0.4	4.6	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	42.8
HCM 6th LOS	D

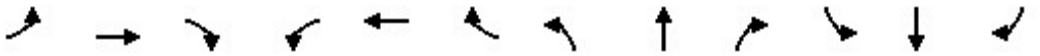
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.993				0.850			0.850		0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1667	6028	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1667	6028	0	1583	4818	1500	1583	1765	1500	1583	2850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				182			201		266	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



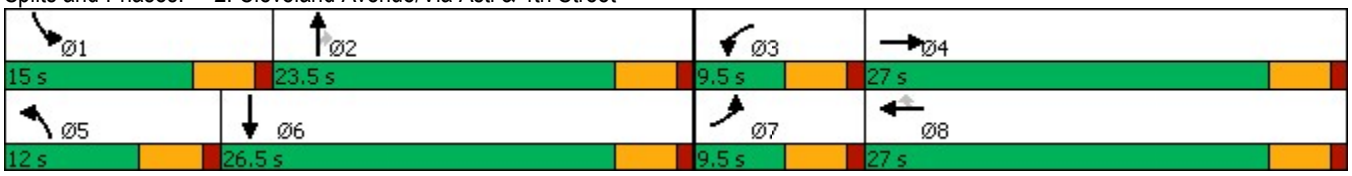
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1337	64	3	1108	177	59	0	4	174	0	1
Future Volume (vph)	0	1337	64	3	1108	177	59	0	4	174	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1378	66	3	1142	182	61	0	4	179	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1444	0	3	1142	182	61	0	4	179	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1337	3	1108	177	59	4	174	0	
Future Volume (vph)	1337	3	1108	177	59	4	174	0	
Turn Type	NA	Prot	NA	Perm	Prot	Perm	Prot	NA	
Protected Phases	4	3	8		5		1	6	7
Permitted Phases				8		2			
Detector Phase	4	3	8	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	12.0	23.5	15.0	26.5	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	16.0%	31.3%	20.0%	35.3%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	21.7	5.0	23.3	23.3	6.9	5.5	10.2	13.4	
Actuated g/C Ratio	0.41	0.10	0.44	0.44	0.13	0.10	0.19	0.25	
v/c Ratio	0.58	0.02	0.54	0.24	0.30	0.01	0.59	0.00	
Control Delay	13.4	24.3	11.6	2.5	26.3	0.0	30.7	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	13.4	24.3	11.6	2.5	26.3	0.0	30.7	0.0	
LOS	B	C	B	A	C	A	C	A	
Approach Delay	13.4		10.4					30.5	
Approach LOS	B		B					C	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 52.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 47.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	1444	3	1142	182	61	4	179	1
v/c Ratio	0.58	0.02	0.54	0.24	0.30	0.01	0.59	0.00
Control Delay	13.4	24.3	11.6	2.5	26.3	0.0	30.7	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	24.3	11.6	2.5	26.3	0.0	30.7	0.0
Queue Length 50th (ft)	89	1	89	0	17	0	50	0
Queue Length 95th (ft)	160	8	119	24	52	0	#141	0
Internal Link Dist (ft)	2546		362					358
Turn Bay Length (ft)		130		145	165	165	50	
Base Capacity (vph)	2607	151	2226	791	227	674	318	1355
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.02	0.51	0.23	0.27	0.01	0.56	0.00

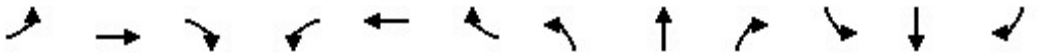
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1337	64	3	1108	177	59	0	4	174	0	1
Future Volume (veh/h)	0	1337	64	3	1108	177	59	0	4	174	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	0	1378	66	3	1142	182	61	0	4	179	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	2263	108	7	2297	713	92	185	157	222	313	279
Arrive On Green	0.00	0.38	0.38	0.00	0.47	0.47	0.06	0.00	0.10	0.14	0.00	0.19
Sat Flow, veh/h	1594	6005	287	1594	4837	1502	1594	1772	1502	1594	1683	1502
Grp Volume(v), veh/h	0	1049	395	3	1142	182	61	0	4	179	0	1
Grp Sat Flow(s),veh/h/ln	1594	1524	1720	1594	1612	1502	1594	1772	1502	1594	1683	1502
Q Serve(g_s), s	0.0	8.9	8.9	0.1	7.8	3.5	1.8	0.0	0.1	5.2	0.0	0.0
Cycle Q Clear(g_c), s	0.0	8.9	8.9	0.1	7.8	3.5	1.8	0.0	0.1	5.2	0.0	0.0
Prop In Lane	1.00		0.17	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	3	1723	648	7	2297	713	92	185	157	222	313	279
V/C Ratio(X)	0.00	0.61	0.61	0.46	0.50	0.26	0.66	0.00	0.03	0.81	0.00	0.00
Avail Cap(c_a), veh/h	166	2145	807	166	2297	713	249	702	595	349	772	689
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.1	12.1	23.8	8.7	7.5	22.1	0.0	19.3	20.0	0.0	15.9
Incr Delay (d2), s/veh	0.0	0.4	0.9	43.3	0.2	0.2	7.8	0.0	0.1	7.3	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	2.9	0.1	2.1	0.9	0.8	0.0	0.0	2.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.4	13.0	67.2	8.8	7.7	29.9	0.0	19.4	27.3	0.0	15.9
LnGrp LOS	A	B	B	E	A	A	C	A	B	C	A	B
Approach Vol, veh/h		1444			1327			65			180	
Approach Delay, s/veh		12.6			8.8			29.2			27.3	
Approach LOS		B			A			C			C	

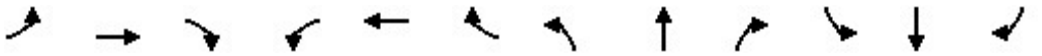
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	9.5	4.7	22.6	7.3	13.4	0.0	27.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	7.2	2.1	2.1	10.9	3.8	2.0	0.0	9.8
Green Ext Time (p_c), s	0.1	0.0	0.0	7.2	0.0	0.0	0.0	6.9

Intersection Summary	
HCM 6th Ctrl Delay	12.2
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.994				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	2891	6065	0	1583	4789	0	1583	1765	1500	0	1682	1500
Flt Permitted	0.950			0.950			0.725				0.731	
Satd. Flow (perm)	2891	6065	0	1583	4789	0	1208	1765	1500	0	1290	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			11				219			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



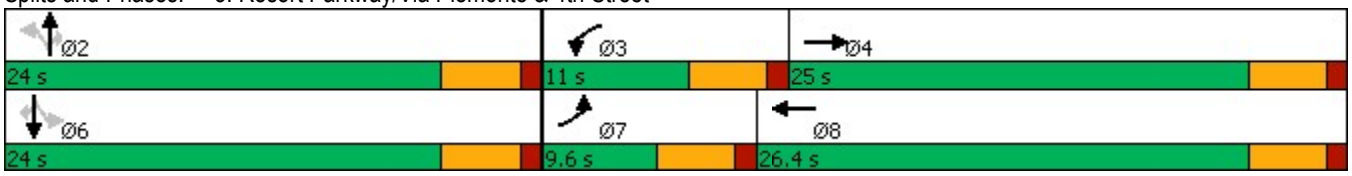
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	1488	8	65	1223	47	32	0	37	47	1	16
Future Volume (vph)	11	1488	8	65	1223	47	32	0	37	47	1	16
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	1534	8	67	1261	48	33	0	38	48	1	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	1542	0	67	1309	0	33	0	38	0	49	16

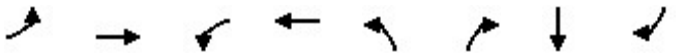
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	11	1488	65	1223	32	37	47	1	16
Future Volume (vph)	11	1488	65	1223	32	37	47	1	16
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.3	19.9	6.4	24.0	7.2	7.2		7.2	7.2
Actuated g/C Ratio	0.13	0.47	0.15	0.57	0.17	0.17		0.17	0.17
v/c Ratio	0.03	0.54	0.28	0.48	0.16	0.09		0.22	0.05
Control Delay	20.1	9.9	22.2	6.7	19.3	0.4		20.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	20.1	9.9	22.2	6.7	19.3	0.4		20.1	0.2
LOS	C	A	C	A	B	A		C	A
Approach Delay		10.0		7.5				15.2	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 42.2	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 50.9%	ICU Level of Service A
Analysis Period (min) 15	

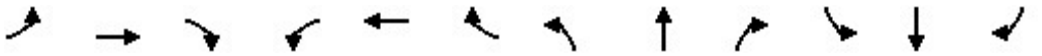
Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	11	1542	67	1309	33	38	49	16
v/c Ratio	0.03	0.54	0.28	0.48	0.16	0.09	0.22	0.05
Control Delay	20.1	9.9	22.2	6.7	19.3	0.4	20.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.1	9.9	22.2	6.7	19.3	0.4	20.1	0.2
Queue Length 50th (ft)	1	87	17	45	8	0	12	0
Queue Length 95th (ft)	7	128	47	137	27	0	35	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	363	3068	253	2975	581	835	620	778
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.50	0.26	0.44	0.06	0.05	0.08	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	1488	8	65	1223	47	32	0	37	47	1	16
Future Volume (veh/h)	11	1488	8	65	1223	47	32	0	37	47	1	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	11	1534	8	67	1261	48	33	0	38	48	1	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	42	2761	14	107	2346	89	327	237	201	370	6	201
Arrive On Green	0.01	0.44	0.44	0.07	0.49	0.49	0.13	0.00	0.13	0.13	0.13	0.13
Sat Flow, veh/h	2910	6305	33	1594	4782	182	1318	1772	1502	1337	43	1502
Grp Volume(v), veh/h	11	1112	430	67	850	459	33	0	38	49	0	16
Grp Sat Flow(s),veh/h/ln	1455	1524	1766	1594	1612	1739	1318	1772	1502	1379	0	1502
Q Serve(g_s), s	0.1	6.8	6.8	1.5	6.8	6.8	0.9	0.0	0.8	1.1	0.0	0.3
Cycle Q Clear(g_c), s	0.1	6.8	6.8	1.5	6.8	6.8	2.0	0.0	0.8	1.2	0.0	0.3
Prop In Lane	1.00		0.02	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	42	2002	773	107	1582	853	327	237	201	375	0	201
V/C Ratio(X)	0.26	0.56	0.56	0.63	0.54	0.54	0.10	0.00	0.19	0.13	0.00	0.08
Avail Cap(c_a), veh/h	397	2508	969	277	1890	1019	839	925	784	909	0	784
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.2	7.8	7.8	17.0	6.6	6.6	15.4	0.0	14.4	14.5	0.0	14.2
Incr Delay (d2), s/veh	3.3	0.2	0.6	5.9	0.3	0.5	0.1	0.0	0.5	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.5	1.8	0.6	1.5	1.6	0.2	0.0	0.3	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	8.0	8.4	22.9	6.9	7.1	15.6	0.0	14.8	14.7	0.0	14.3
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1553			1376			71			65	
Approach Delay, s/veh		8.2			7.7			15.2			14.6	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	7.0	20.9		9.5	5.0	22.8				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		4.0	3.5	8.8		3.2	2.1	8.8				
Green Ext Time (p_c), s		0.1	0.0	7.6		0.2	0.0	7.1				

Intersection Summary	
HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.993					0.865
Flt Protected						
Satd. Flow (prot)	4784	0	0	4818	0	1526
Flt Permitted						
Satd. Flow (perm)	4784	0	0	4818	0	1526
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1498	75	0	1356	0	45
Future Volume (vph)	1498	75	0	1356	0	45
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1577	79	0	1427	0	47
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1656	0	0	1427	0	47

Intersection Summary

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1498	75	0	1356	0	45
Future Vol, veh/h	1498	75	0	1356	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1577	79	0	1427	0	47

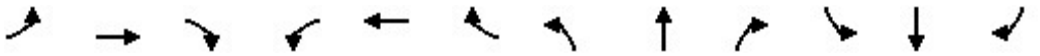
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	828
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	270
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	270
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	270	-	-	-
HCM Lane V/C Ratio	0.175	-	-	-
HCM Control Delay (s)	21.1	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.6	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5943	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	2891	6071	1500	2891	5943	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			252			323			95		32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



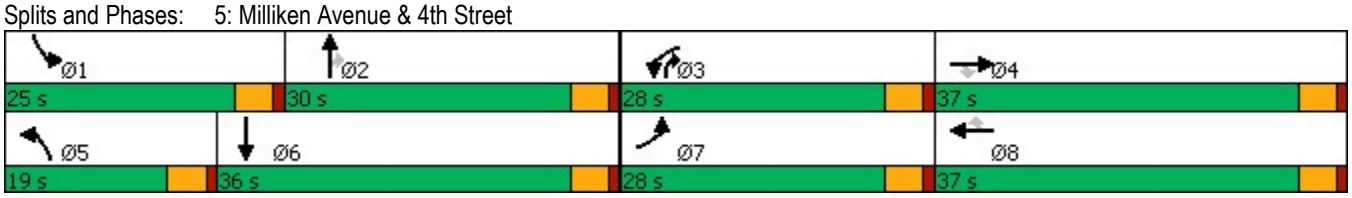
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	280	1213	403	550	959	327	328	1022	386	439	993	158
Future Volume (vph)	280	1213	403	550	959	327	328	1022	386	439	993	158
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	295	1277	424	579	1009	344	345	1076	406	462	1045	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	1277	424	579	1009	344	345	1076	406	462	1211	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	280	1213	403	550	959	327	328	1022	386	439	993
Future Volume (vph)	280	1213	403	550	959	327	328	1022	386	439	993
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	17.4	32.5	32.5	23.5	38.5	38.5	14.5	25.2	53.2	20.5	31.2
Actuated g/C Ratio	0.15	0.27	0.27	0.20	0.32	0.32	0.12	0.21	0.44	0.17	0.26
v/c Ratio	0.70	0.98	0.72	1.02	0.65	0.49	0.99	0.84	0.56	0.94	0.77
Control Delay	57.6	63.4	23.3	90.8	37.9	7.2	97.6	52.3	22.0	76.6	43.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	63.4	23.3	90.8	37.9	7.2	97.6	52.3	22.0	76.6	43.7
LOS	E	E	C	F	D	A	F	D	C	E	D
Approach Delay		54.0			48.3			54.1			52.8
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 52.3	Intersection LOS: D
Intersection Capacity Utilization 88.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

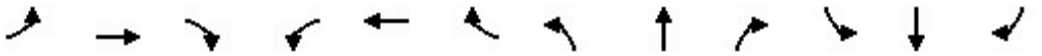


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	295	1277	424	579	1009	344	345	1076	406	462	1211
v/c Ratio	0.70	0.98	0.72	1.02	0.65	0.49	0.99	0.84	0.56	0.94	0.77
Control Delay	57.6	63.4	23.3	90.8	37.9	7.2	97.6	52.3	22.0	76.6	43.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	63.4	23.3	90.8	37.9	7.2	97.6	52.3	22.0	76.6	43.7
Queue Length 50th (ft)	113	360	121	~245	245	11	139	233	174	184	246
Queue Length 95th (ft)	154	#464	249	#359	314	91	#238	277	276	#285	289
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	567	1307	591	567	1551	702	350	1293	719	494	1587
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.98	0.72	1.02	0.65	0.49	0.99	0.83	0.56	0.94	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

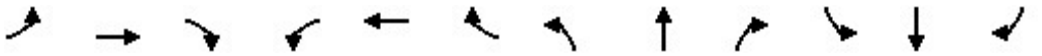
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	1213	403	550	959	327	328	1022	386	439	993	158
Future Volume (veh/h)	280	1213	403	550	959	327	328	1022	386	439	993	158
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	295	1277	424	579	1009	344	345	1076	406	462	1045	166
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	354	1310	407	570	1669	518	352	1295	613	497	1405	221
Arrive On Green	0.12	0.27	0.27	0.20	0.34	0.34	0.12	0.21	0.21	0.17	0.26	0.26
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	2910	6095	1502	2910	5351	841
Grp Volume(v), veh/h	295	1277	424	579	1009	344	345	1076	406	462	891	320
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1455	1524	1502	1455	1524	1621
Q Serve(g_s), s	11.9	31.4	32.5	23.5	20.7	23.4	14.2	20.3	25.5	18.8	21.4	21.8
Cycle Q Clear(g_c), s	11.9	31.4	32.5	23.5	20.7	23.4	14.2	20.3	25.5	18.8	21.4	21.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.52
Lane Grp Cap(c), veh/h	354	1310	407	570	1669	518	352	1295	613	497	1200	425
V/C Ratio(X)	0.83	0.97	1.04	1.02	0.60	0.66	0.98	0.83	0.66	0.93	0.74	0.75
Avail Cap(c_a), veh/h	570	1310	407	570	1669	518	352	1295	613	497	1200	425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	43.3	43.8	48.3	32.5	33.4	52.6	45.2	28.8	49.0	40.5	40.7
Incr Delay (d2), s/veh	5.7	19.0	56.1	41.8	0.6	3.2	42.8	4.7	2.7	24.1	2.5	7.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	14.7	18.3	11.8	8.2	8.9	7.3	8.1	9.8	8.5	8.3	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.2	62.4	99.9	90.0	33.2	36.6	95.4	49.9	31.4	73.1	43.1	48.0
LnGrp LOS	E	E	F	F	C	D	F	D	C	E	D	D
Approach Vol, veh/h		1996			1932			1827			1673	
Approach Delay, s/veh		69.6			50.8			54.4			52.3	
Approach LOS		E			D			D			D	

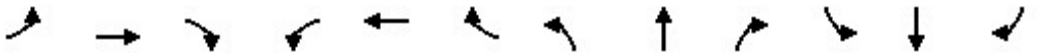
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	30.0	28.0	37.0	19.0	36.0	19.1	45.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	20.8	27.5	25.5	34.5	16.2	23.8	13.9	25.4
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	4.6	0.7	4.4

Intersection Summary	
HCM 6th Ctrl Delay	57.1
HCM 6th LOS	E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.940	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3019	1365
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	4818	1500	2891	4818	1500	1583	3353	1500	1583	3019	1365
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			141			280			355		125	400
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



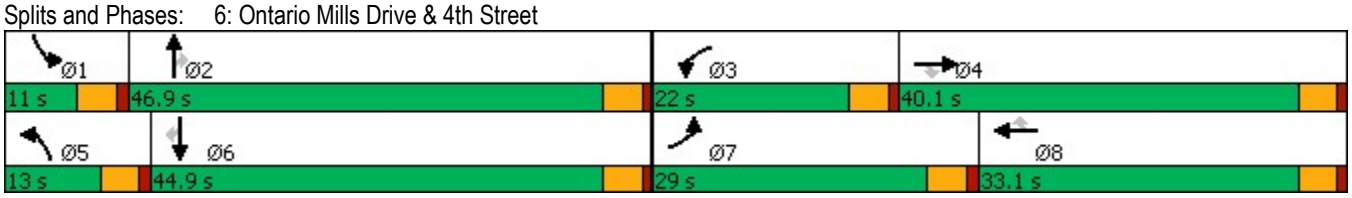
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	779	1366	156	431	1099	529	182	318	496	110	632	906
Future Volume (vph)	779	1366	156	431	1099	529	182	318	496	110	632	906
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	811	1423	163	449	1145	551	190	331	517	115	658	944
Shared Lane Traffic (%)												47%
Lane Group Flow (vph)	811	1423	163	449	1145	551	190	331	517	115	1102	500

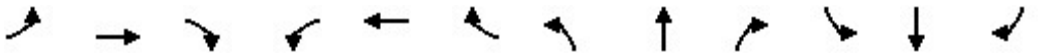
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	779	1366	156	431	1099	529	182	318	496	110	632	906
Future Volume (vph)	779	1366	156	431	1099	529	182	318	496	110	632	906
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	35.6	35.6	17.5	28.6	28.6	8.5	42.4	42.4	6.5	40.4	40.4
Actuated g/C Ratio	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
v/c Ratio	1.37	1.00	0.30	1.07	1.00	0.97	1.70	0.28	0.68	1.35	1.00	0.69
Control Delay	216.2	65.1	8.9	111.4	71.8	53.1	382.5	28.7	14.9	260.6	63.3	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	216.2	65.1	8.9	111.4	71.8	53.1	382.5	28.7	14.9	260.6	63.3	12.7
LOS	F	E	A	F	E	D	F	C	B	F	E	B
Approach Delay		112.4			75.3			86.6			61.8	
Approach LOS		F			E			F			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.70	
Intersection Signal Delay: 85.9	Intersection LOS: F
Intersection Capacity Utilization 103.7%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



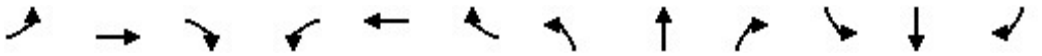


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	811	1423	163	449	1145	551	190	331	517	115	1102	500
v/c Ratio	1.37	1.00	0.30	1.07	1.00	0.97	1.70	0.28	0.68	1.35	1.00	0.69
Control Delay	216.2	65.1	8.9	111.4	71.8	53.1	382.5	28.7	14.9	260.6	63.3	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	216.2	65.1	8.9	111.4	71.8	53.1	382.5	28.7	14.9	260.6	63.3	12.7
Queue Length 50th (ft)	~428	402	12	~197	326	236	~216	96	100	~116	~429	60
Queue Length 95th (ft)	#553	#515	64	#303	#431	#471	#366	134	233	#239	#594	207
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	590	1429	544	421	1148	570	112	1184	759	85	1099	724
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.37	1.00	0.30	1.07	1.00	0.97	1.70	0.28	0.68	1.35	1.00	0.69

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



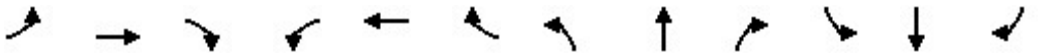
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	779	1366	156	431	1099	529	182	318	496	110	632	906
Future Volume (veh/h)	779	1366	156	431	1099	529	182	318	496	110	632	906
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	811	1423	162	449	1145	551	190	331	517	115	658	944
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	2910	4837	1502	2910	4837	1502	1594	3367	1502	1594	1772	3003
Grp Volume(v), veh/h	811	1423	162	449	1145	551	190	331	517	115	658	944
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1455	1612	1502	1594	1683	1502	1594	1772	1502
Q Serve(g_s), s	24.5	35.2	10.2	17.5	28.3	28.6	8.5	8.5	40.7	6.5	40.4	36.5
Cycle Q Clear(g_c), s	24.5	35.2	10.2	17.5	28.3	28.6	8.5	8.5	40.7	6.5	40.4	36.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
V/C Ratio(X)	1.36	0.99	0.36	1.06	0.99	1.54	1.68	0.28	0.97	1.33	1.10	0.93
Avail Cap(c_a), veh/h	594	1435	445	424	1153	358	113	1190	531	86	597	1011
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	42.1	33.3	51.3	45.6	45.7	55.8	27.8	38.3	56.8	39.8	38.5
Incr Delay (d2), s/veh	174.9	21.7	0.5	59.8	24.8	256.4	342.6	0.1	32.5	209.2	68.3	15.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	23.3	16.7	3.8	9.9	13.9	36.1	14.2	3.4	19.5	7.6	28.6	15.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	222.6	63.7	33.8	111.1	70.4	302.1	398.3	28.0	70.7	265.9	108.1	53.5
LnGrp LOS	F	E	C	F	E	F	F	C	E	F	F	D
Approach Vol, veh/h		2396			2145			1038			1717	
Approach Delay, s/veh		115.5			138.4			117.1			88.6	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	46.9	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	8.5	42.7	19.5	37.2	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	116.1
HCM 6th LOS	F

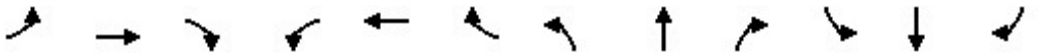
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1700	1800	1800	1700	1800	1800	1700	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.982			0.943				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	2891	4818	1500	1583	4731	0	1583	3162	0	1504	1646	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	2891	4818	1500	1583	4731	0	1583	3162	0	1504	1646	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			132		18			50				317
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



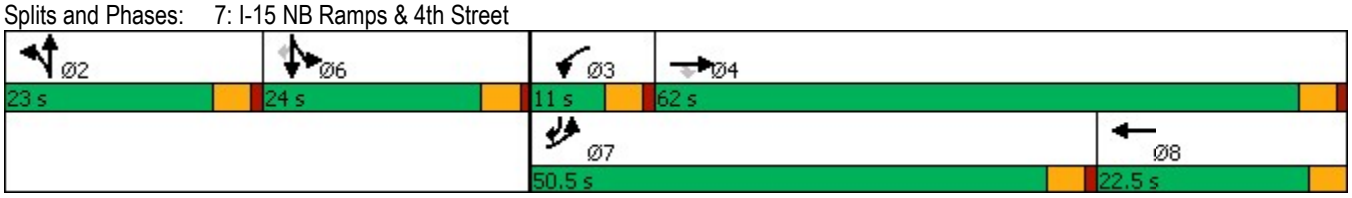
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1145	671	124	32	769	107	126	76	47	175	84	1183
Future Volume (vph)	1145	671	124	32	769	107	126	76	47	175	84	1183
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1218	714	132	34	818	114	134	81	50	186	89	1259
Shared Lane Traffic (%)										27%		
Lane Group Flow (vph)	1218	714	132	34	932	0	134	131	0	136	139	1259

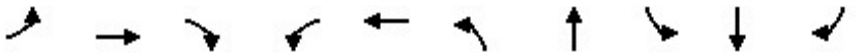
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1145	671	124	32	769	126	76	175	84	1183
Future Volume (vph)	1145	671	124	32	769	126	76	175	84	1183
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	46.2	62.5	62.5	6.3	19.1	14.1	14.1	14.8	14.8	65.5
Actuated g/C Ratio	0.42	0.56	0.56	0.06	0.17	0.13	0.13	0.13	0.13	0.59
v/c Ratio	1.01	0.26	0.15	0.38	1.13	0.67	0.29	0.68	0.64	0.75
Control Delay	63.3	14.8	3.3	65.8	114.6	63.6	29.3	64.3	59.9	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.3	14.8	3.3	65.8	114.6	63.6	29.3	64.3	59.9	15.7
LOS	E	B	A	E	F	E	C	E	E	B
Approach Delay		42.7			112.9		46.6		24.0	
Approach LOS		D			F		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.3	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 51.0	Intersection LOS: D
Intersection Capacity Utilization 86.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1218	714	132	34	932	134	131	136	139	1259
v/c Ratio	1.01	0.26	0.15	0.38	1.13	0.67	0.29	0.68	0.64	0.75
Control Delay	63.3	14.8	3.3	65.8	114.6	63.6	29.3	64.3	59.9	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.3	14.8	3.3	65.8	114.6	63.6	29.3	64.3	59.9	15.7
Queue Length 50th (ft)	~484	103	0	24	~284	93	27	98	101	271
Queue Length 95th (ft)	#685	150	33	61	#414	164	59	174	176	398
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1200	2706	900	92	826	264	569	264	289	1684
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.26	0.15	0.37	1.13	0.51	0.23	0.52	0.48	0.75

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

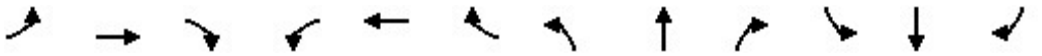
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1145	671	124	32	769	107	126	76	47	175	84	1183
Future Volume (veh/h)	1145	671	124	32	769	107	126	76	47	175	84	1183
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1673	1772	1772	1673	1772	1772	1673	1772	1772
Adj Flow Rate, veh/h	1218	714	132	34	818	114	134	81	50	138	157	1259
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1169	2606	809	46	713	99	167	217	124	271	302	1718
Arrive On Green	0.40	0.54	0.54	0.03	0.17	0.17	0.10	0.10	0.10	0.17	0.17	0.17
Sat Flow, veh/h	2910	4837	1502	1594	4295	595	1594	2063	1180	1594	1772	3003
Grp Volume(v), veh/h	1218	714	132	34	613	319	134	65	66	138	157	1259
Grp Sat Flow(s),veh/h/ln	1455	1612	1502	1594	1612	1665	1594	1683	1560	1594	1772	1502
Q Serve(g_s), s	46.0	9.1	5.1	2.4	19.0	19.0	9.4	4.1	4.5	9.0	9.2	19.5
Cycle Q Clear(g_c), s	46.0	9.1	5.1	2.4	19.0	19.0	9.4	4.1	4.5	9.0	9.2	19.5
Prop In Lane	1.00		1.00	1.00		0.36	1.00		0.76	1.00		1.00
Lane Grp Cap(c), veh/h	1169	2606	809	46	535	276	167	177	164	271	302	1718
V/C Ratio(X)	1.04	0.27	0.16	0.74	1.15	1.15	0.80	0.37	0.40	0.51	0.52	0.73
Avail Cap(c_a), veh/h	1169	2606	809	90	535	276	257	272	252	271	302	1718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	14.3	13.4	55.2	47.8	47.8	50.1	47.7	47.9	43.2	43.3	18.1
Incr Delay (d2), s/veh	37.9	0.1	0.1	20.4	85.8	102.7	9.7	1.3	1.6	1.6	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.9	3.3	1.7	1.2	14.0	15.7	4.2	1.8	1.8	3.7	4.2	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.2	14.4	13.5	75.6	133.6	150.4	59.8	49.0	49.5	44.7	44.8	19.7
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	B
Approach Vol, veh/h		2064			966			265			1554	
Approach Delay, s/veh		48.4			137.1			54.6			24.5	
Approach LOS		D			F			D			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.5	7.8	66.2		24.0	50.5	23.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.5	6.5	57.5		19.5	46.0	* 19				
Max Q Clear Time (g_c+I1), s		11.4	4.4	11.1		21.5	48.0	21.0				
Green Ext Time (p_c), s		0.6	0.0	6.4		0.0	0.0	0.0				

Intersection Summary		
HCM 6th Ctrl Delay	58.8	
HCM 6th LOS	E	

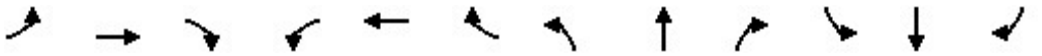
Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3028	0	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50				236			279			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



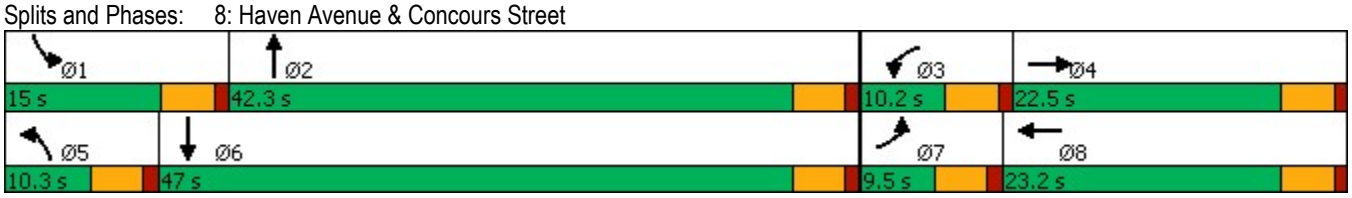
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	12	25	47	195	54	60	45	1886	299	274	1800	31
Future Volume (vph)	12	25	47	195	54	60	45	1886	299	274	1800	31
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	13	27	50	207	57	64	48	2006	318	291	1915	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	77	0	207	57	64	48	2006	318	291	1915	33

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	12	25	195	54	60	45	1886	299	274	1800	31
Future Volume (vph)	12	25	195	54	60	45	1886	299	274	1800	31
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	6.4	5.8	12.5	75.2	5.8	36.9	75.2	10.5	46.0	75.2
Actuated g/C Ratio	0.07	0.09	0.08	0.17	1.00	0.08	0.49	1.00	0.14	0.61	1.00
v/c Ratio	0.07	0.25	0.69	0.10	0.04	0.22	0.67	0.21	0.73	0.52	0.02
Control Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.5	0.3	44.4	10.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.5	0.3	44.4	10.4	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.9		35.7			14.8			14.7	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 75.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 16.2	Intersection LOS: B
Intersection Capacity Utilization 60.7%	ICU Level of Service B
Analysis Period (min) 15	

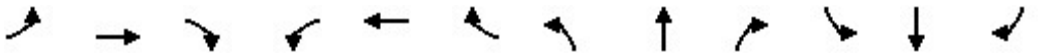
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	13	77	207	57	64	48	2006	318	291	1915	33
v/c Ratio	0.07	0.25	0.69	0.10	0.04	0.22	0.67	0.21	0.73	0.52	0.02
Control Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.5	0.3	44.4	10.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.9	18.4	48.7	28.6	0.1	37.1	16.5	0.3	44.4	10.4	0.0
Queue Length 50th (ft)	3	6	35	11	0	11	207	0	71	167	0
Queue Length 95th (ft)	11	26	#70	31	0	28	261	0	#131	212	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	194	769	301	841	1500	225	3081	1500	407	3711	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.10	0.69	0.07	0.04	0.21	0.65	0.21	0.71	0.52	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



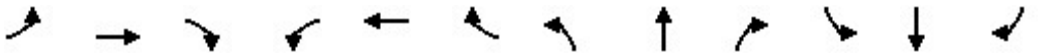
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	25	47	195	54	60	45	1886	299	274	1800	31
Future Volume (veh/h)	12	25	47	195	54	60	45	1886	299	274	1800	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	13	27	50	207	57	0	48	2006	0	291	1915	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	46	112	100	308	432		125	2892		370	3405	
Arrive On Green	0.02	0.07	0.07	0.08	0.13	0.00	0.04	0.47	0.00	0.13	0.56	0.00
Sat Flow, veh/h	2910	1683	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	13	27	50	207	57	0	48	2006	0	291	1915	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	0.3	1.1	2.3	3.6	1.1	0.0	1.1	18.3	0.0	6.9	14.3	0.0
Cycle Q Clear(g_c), s	0.3	1.1	2.3	3.6	1.1	0.0	1.1	18.3	0.0	6.9	14.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	46	112	100	308	432		125	2892		370	3405	
V/C Ratio(X)	0.28	0.24	0.50	0.67	0.13		0.38	0.69		0.79	0.56	
Avail Cap(c_a), veh/h	205	427	381	319	888		238	3250		431	3654	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.5	31.4	31.9	31.8	27.4	0.0	33.0	14.6	0.0	30.0	10.1	0.0
Incr Delay (d2), s/veh	3.2	1.1	3.8	5.2	0.1	0.0	1.9	0.6	0.0	8.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.5	0.9	1.3	0.4	0.0	0.4	5.7	0.0	2.7	4.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.7	32.5	35.8	37.0	27.5	0.0	34.9	15.2	0.0	38.1	10.2	0.0
LnGrp LOS	D	C	D	D	C		C	B		D	B	
Approach Vol, veh/h		90			264	A		2054	A		2206	A
Approach Delay, s/veh		35.1			34.9			15.6			13.9	
Approach LOS		D			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.5	38.1	10.0	9.2	7.6	44.1	5.6	13.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	8.9	20.3	5.6	4.3	3.1	16.3	2.3	3.1
Green Ext Time (p_c), s	0.2	13.4	0.0	0.3	0.0	17.3	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

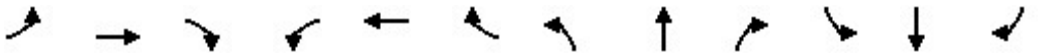
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.995									0.936	
Flt Protected	0.950	0.954					0.950					
Satd. Flow (prot)	1593	1591	0	0	1765	0	1676	4818	0	1765	4509	0
Flt Permitted	0.950	0.954					0.950					
Satd. Flow (perm)	1593	1591	0	0	1765	0	1676	4818	0	1765	4509	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143									187	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



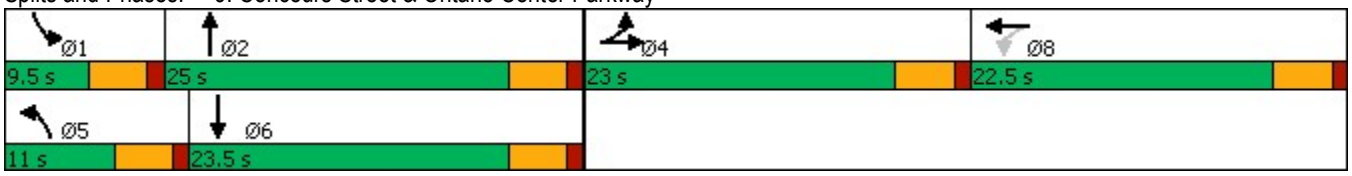
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	159	0	3	0	0	0	35	305	1	0	228	168
Future Volume (vph)	159	0	3	0	0	0	35	305	1	0	228	168
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	177	0	3	0	0	0	39	339	1	0	253	187
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	90	90	0	0	0	0	39	340	0	0	440	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	159	0	35	305	228		
Future Volume (vph)	159	0	35	305	228		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	7.6	7.6	6.3	16.1	14.5		
Actuated g/C Ratio	0.26	0.26	0.21	0.54	0.49		
v/c Ratio	0.22	0.18	0.11	0.13	0.19		
Control Delay	11.0	2.3	12.1	5.1	5.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	11.0	2.3	12.1	5.1	5.0		
LOS	B	A	B	A	A		
Approach Delay		6.7		5.8	5.0		
Approach LOS		A		A	A		

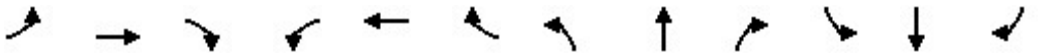
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 29.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.22	
Intersection Signal Delay: 5.6	Intersection LOS: A
Intersection Capacity Utilization 28.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	90	90	39	340	440
v/c Ratio	0.22	0.18	0.11	0.13	0.19
Control Delay	11.0	2.3	12.1	5.1	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	2.3	12.1	5.1	5.0
Queue Length 50th (ft)	8	0	4	9	6
Queue Length 95th (ft)	44	13	25	20	34
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	1027	1076	379	3647	3264
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.08	0.10	0.09	0.13

Intersection Summary



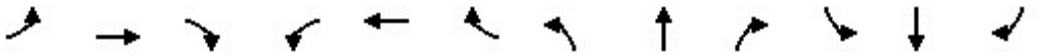
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	159	0	3	0	0	0	35	305	1	0	228	168
Future Volume (veh/h)	159	0	3	0	0	0	35	305	1	0	228	168
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772	1772
Adj Flow Rate, veh/h	180	0	0	0	0	0	39	339	1	0	253	187
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	478	251	0	0	7	0	80	2504	7	7	896	417
Arrive On Green	0.14	0.00	0.00	0.00	0.00	0.00	0.05	0.50	0.50	0.00	0.28	0.28
Sat Flow, veh/h	3375	1772	0	0	1772	0	1688	4979	15	1688	3225	1502
Grp Volume(v), veh/h	180	0	0	0	0	0	39	219	121	0	253	187
Grp Sat Flow(s),veh/h/ln	1688	1772	0	0	1772	0	1688	1612	1769	1688	1612	1502
Q Serve(g_s), s	1.2	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.9	0.0	1.6	2.6
Cycle Q Clear(g_c), s	1.2	0.0	0.0	0.0	0.0	0.0	0.6	0.9	0.9	0.0	1.6	2.6
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	478	251	0	0	7	0	80	1622	890	7	896	417
V/C Ratio(X)	0.38	0.00	0.00	0.00	0.00	0.00	0.49	0.14	0.14	0.00	0.28	0.45
Avail Cap(c_a), veh/h	2465	1294	0	0	1259	0	433	2610	1432	333	2419	1126
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.9	0.0	0.0	0.0	0.0	0.0	11.8	3.4	3.4	0.0	7.2	7.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.1	0.0	0.2	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.3	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.3	0.0	0.0	0.0	0.0	0.0	16.3	3.4	3.4	0.0	7.3	8.3
LnGrp LOS	B	A	A	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		180			0			379			440	
Approach Delay, s/veh		10.3			0.0			4.7			7.7	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	17.2		8.1	5.7	11.5		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	2.9		3.2	2.6	4.6		0.0				
Green Ext Time (p_c), s	0.0	1.9		0.5	0.0	2.4		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		7.1
HCM 6th LOS		A

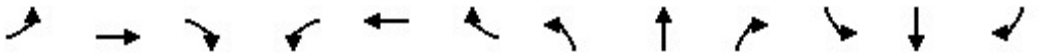
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			308			226			184			234
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



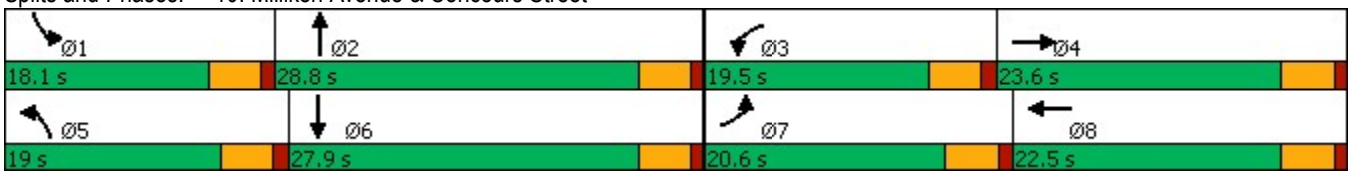
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	346	156	286	272	102	210	332	1216	254	330	1217	280
Future Volume (vph)	346	156	286	272	102	210	332	1216	254	330	1217	280
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	372	168	308	292	110	226	357	1308	273	355	1309	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	372	168	308	292	110	226	357	1308	273	355	1309	301

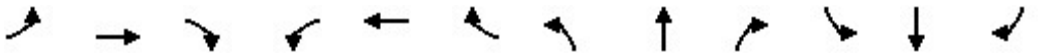
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	346	156	286	272	102	210	332	1216	254	330	1217	280
Future Volume (vph)	346	156	286	272	102	210	332	1216	254	330	1217	280
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	16.5	9.6	76.9	12.6	8.2	76.9	13.4	23.5	76.9	13.0	23.1	76.9
Actuated g/C Ratio	0.21	0.12	1.00	0.16	0.11	1.00	0.17	0.31	1.00	0.17	0.30	1.00
v/c Ratio	0.60	0.40	0.21	0.62	0.31	0.15	0.71	0.70	0.18	0.73	0.72	0.20
Control Delay	33.6	34.9	0.3	36.6	35.2	0.2	39.3	26.6	0.3	41.1	27.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	34.9	0.3	36.6	35.2	0.2	39.3	26.6	0.3	41.1	27.3	0.3
LOS	C	C	A	D	D	A	D	C	A	D	C	A
Approach Delay		21.8			23.3			25.2			25.6	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 76.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 24.6	Intersection LOS: C
Intersection Capacity Utilization 60.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street

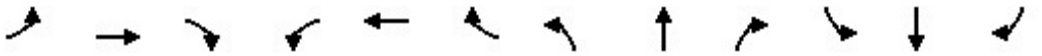




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	372	168	308	292	110	226	357	1308	273	355	1309	301
v/c Ratio	0.60	0.40	0.21	0.62	0.31	0.15	0.71	0.70	0.18	0.73	0.72	0.20
Control Delay	33.6	34.9	0.3	36.6	35.2	0.2	39.3	26.6	0.3	41.1	27.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	34.9	0.3	36.6	35.2	0.2	39.3	26.6	0.3	41.1	27.3	0.3
Queue Length 50th (ft)	88	40	0	70	27	0	86	165	0	86	168	0
Queue Length 95th (ft)	139	72	0	111	52	0	#137	217	0	#150	221	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	646	839	1500	568	791	1500	549	1933	1500	515	1880	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.20	0.21	0.51	0.14	0.15	0.65	0.68	0.18	0.69	0.70	0.20

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



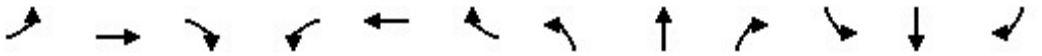
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	346	156	286	272	102	210	332	1216	254	330	1217	280
Future Volume (veh/h)	346	156	286	272	102	210	332	1216	254	330	1217	280
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	372	168	0	292	110	0	357	1308	0	355	1309	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	481	362		396	264		460	1934		455	1923	
Arrive On Green	0.17	0.11	0.00	0.14	0.08	0.00	0.16	0.32	0.00	0.16	0.32	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	372	168	0	292	110	0	357	1308	0	355	1309	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	7.8	3.0	0.0	6.1	2.0	0.0	7.5	11.9	0.0	7.5	11.9	0.0
Cycle Q Clear(g_c), s	7.8	3.0	0.0	6.1	2.0	0.0	7.5	11.9	0.0	7.5	11.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	481	362		396	264		460	1934		455	1923	
V/C Ratio(X)	0.77	0.46		0.74	0.42		0.78	0.68		0.78	0.68	
Avail Cap(c_a), veh/h	736	1010		686	952		663	2326		622	2240	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	25.4	26.7	0.0	26.4	27.9	0.0	25.7	18.9	0.0	25.8	19.0	0.0
Incr Delay (d2), s/veh	2.8	0.9	0.0	2.7	1.0	0.0	3.6	0.6	0.0	4.4	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	1.2	0.0	2.2	0.8	0.0	2.7	3.9	0.0	2.7	3.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	27.6	0.0	29.1	29.0	0.0	29.3	19.5	0.0	30.2	19.7	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		540	A		402	A		1665	A		1664	A
Approach Delay, s/veh		28.0			29.1			21.6			21.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.5	24.7	13.2	11.4	14.6	24.6	15.0	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	9.5	13.9	8.1	5.0	9.5	13.9	9.8	4.0
Green Ext Time (p_c), s	0.5	6.3	0.6	0.8	0.6	5.9	0.7	0.4

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

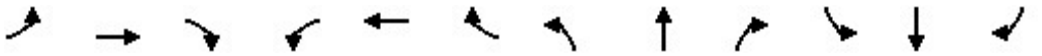
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1500	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	3940	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			415			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



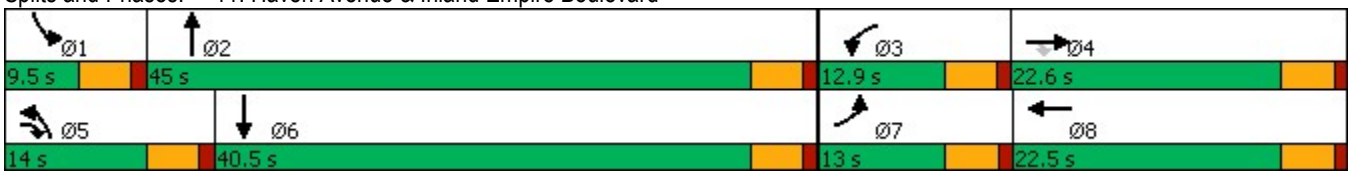
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	224	148	336	189	146	71	252	1927	570	55	1718	199
Future Volume (vph)	224	148	336	189	146	71	252	1927	570	55	1718	199
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	231	153	346	195	151	73	260	1987	588	57	1771	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	153	346	195	151	73	260	1987	588	57	1771	205

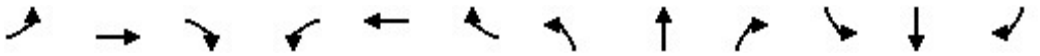
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	148	336	189	146	71	252	1927	570	55	1718	199
Future Volume (vph)	224	148	336	189	146	71	252	1927	570	55	1718	199
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	8.5	9.4	23.4	8.1	9.0	79.9	9.5	43.3	79.9	5.0	34.8	79.9
Actuated g/C Ratio	0.11	0.12	0.29	0.10	0.11	1.00	0.12	0.54	1.00	0.06	0.44	1.00
v/c Ratio	0.75	0.39	0.70	0.49	0.40	0.05	0.76	0.60	0.39	0.31	0.67	0.14
Control Delay	52.3	36.1	28.9	39.0	36.5	0.1	50.5	14.4	0.8	41.9	19.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	36.1	28.9	39.0	36.5	0.1	50.5	14.4	0.8	41.9	19.6	0.2
LOS	D	D	C	D	D	A	D	B	A	D	B	A
Approach Delay		37.8			31.3			14.9			18.2	
Approach LOS		D			C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 79.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 19.9	Intersection LOS: B
Intersection Capacity Utilization 64.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard

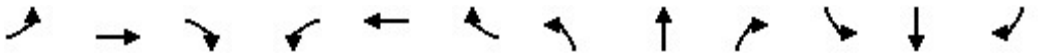




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	231	153	346	195	151	73	260	1987	588	57	1771	205
v/c Ratio	0.75	0.39	0.70	0.49	0.40	0.05	0.76	0.60	0.39	0.31	0.67	0.14
Control Delay	52.3	36.1	28.9	39.0	36.5	0.1	50.5	14.4	0.8	41.9	19.6	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.3	36.1	28.9	39.0	36.5	0.1	50.5	14.4	0.8	41.9	19.6	0.2
Queue Length 50th (ft)	59	38	124	33	37	0	67	206	0	14	197	0
Queue Length 95th (ft)	#119	67	220	57	66	0	#128	262	0	34	250	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	308	761	491	415	757	1500	344	3292	1500	181	2742	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.20	0.70	0.47	0.20	0.05	0.76	0.60	0.39	0.31	0.65	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	148	336	189	146	71	252	1927	570	55	1718	199
Future Volume (veh/h)	224	148	336	189	146	71	252	1927	570	55	1718	199
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1477	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	231	153	346	195	151	0	260	1987	0	57	1771	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	293	724	490	288	629		323	2771		127	2362	
Arrive On Green	0.10	0.22	0.22	0.07	0.19	0.00	0.11	0.45	0.00	0.04	0.39	0.00
Sat Flow, veh/h	2910	3367	1502	3966	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	231	153	346	195	151	0	260	1987	0	57	1771	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1322	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	6.5	3.1	17.0	4.0	3.2	0.0	7.3	22.2	0.0	1.6	21.1	0.0
Cycle Q Clear(g_c), s	6.5	3.1	17.0	4.0	3.2	0.0	7.3	22.2	0.0	1.6	21.1	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	293	724	490	288	629		323	2771		127	2362	
V/C Ratio(X)	0.79	0.21	0.71	0.68	0.24		0.81	0.72		0.45	0.75	
Avail Cap(c_a), veh/h	294	724	490	396	720		328	2933		173	2607	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.0	27.2	24.8	38.1	29.1	0.0	36.5	18.6	0.0	39.3	22.3	0.0
Incr Delay (d2), s/veh	13.2	0.1	4.6	2.8	0.2	0.0	13.5	0.8	0.0	2.5	1.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	1.3	6.4	1.4	1.3	0.0	3.2	7.4	0.0	0.6	7.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.2	27.3	29.5	40.8	29.3	0.0	50.0	19.4	0.0	41.7	23.4	0.0
LnGrp LOS	D	C	C	D	C		D	B		D	C	
Approach Vol, veh/h		730			346	A		2247	A		1828	A
Approach Delay, s/veh		35.6			35.8			22.9			24.0	
Approach LOS		D			D			C			C	

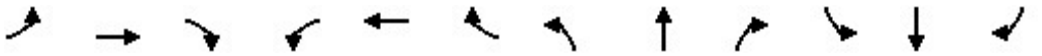
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.2	42.8	10.6	22.6	13.8	37.1	13.0	20.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	3.6	24.2	6.0	19.0	9.3	23.1	8.5	5.2
Green Ext Time (p_c), s	0.0	12.5	0.1	0.0	0.0	9.5	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	25.9
HCM 6th LOS	C

Notes

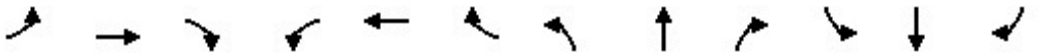
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	3353	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			281			193			485			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



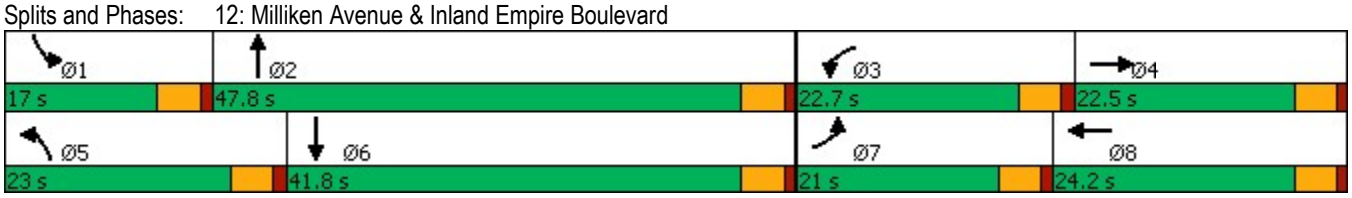
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	190	309	273	360	150	185	349	1365	794	192	1580	123
Future Volume (vph)	190	309	273	360	150	185	349	1365	794	192	1580	123
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	196	319	281	371	155	191	360	1407	819	198	1629	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	319	281	371	155	191	360	1407	819	198	1629	127

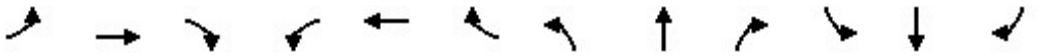
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	309	273	360	150	185	349	1365	794	192	1580	123
Future Volume (vph)	190	309	273	360	150	185	349	1365	794	192	1580	123
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	12.3	14.8	102.5	16.7	19.2	102.5	16.7	41.5	102.5	11.3	36.2	102.5
Actuated g/C Ratio	0.12	0.14	1.00	0.16	0.19	1.00	0.16	0.40	1.00	0.11	0.35	1.00
v/c Ratio	0.56	0.66	0.19	0.79	0.25	0.13	0.77	0.57	0.55	0.62	0.76	0.08
Control Delay	50.1	49.4	0.3	55.1	38.0	0.2	53.6	25.2	1.4	54.1	32.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	49.4	0.3	55.1	38.0	0.2	53.6	25.2	1.4	54.1	32.8	0.1
LOS	D	D	A	E	D	A	D	C	A	D	C	A
Approach Delay		32.2			36.8			21.6			32.9	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 102.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 28.5	Intersection LOS: C
Intersection Capacity Utilization 72.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	196	319	281	371	155	191	360	1407	819	198	1629	127
v/c Ratio	0.56	0.66	0.19	0.79	0.25	0.13	0.77	0.57	0.55	0.62	0.76	0.08
Control Delay	50.1	49.4	0.3	55.1	38.0	0.2	53.6	25.2	1.4	54.1	32.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	49.4	0.3	55.1	38.0	0.2	53.6	25.2	1.4	54.1	32.8	0.1
Queue Length 50th (ft)	67	111	0	126	47	0	122	214	0	67	288	0
Queue Length 95th (ft)	103	158	0	#195	81	0	178	262	0	108	346	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	470	594	1500	518	669	1500	527	2590	1500	356	2231	1500
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.54	0.19	0.72	0.23	0.13	0.68	0.54	0.55	0.56	0.73	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	190	309	273	360	150	185	349	1365	794	192	1580	123
Future Volume (veh/h)	190	309	273	360	150	185	349	1365	794	192	1580	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	196	319	0	371	155	0	360	1407	0	198	1629	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	267	429		447	636		437	2588		265	2228	
Arrive On Green	0.09	0.13	0.00	0.15	0.19	0.00	0.15	0.42	0.00	0.09	0.37	0.00
Sat Flow, veh/h	2910	3367	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	196	319	0	371	155	0	360	1407	0	198	1629	0
Grp Sat Flow(s),veh/h/ln	1455	1683	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	5.8	8.1	0.0	11.0	3.5	0.0	10.6	15.3	0.0	5.9	20.5	0.0
Cycle Q Clear(g_c), s	5.8	8.1	0.0	11.0	3.5	0.0	10.6	15.3	0.0	5.9	20.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	267	429		447	636		437	2588		265	2228	
V/C Ratio(X)	0.73	0.74		0.83	0.24		0.82	0.54		0.75	0.73	
Avail Cap(c_a), veh/h	542	684		598	749		608	2981		411	2568	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.1	37.2	0.0	36.4	30.5	0.0	36.5	19.1	0.0	39.2	24.3	0.0
Incr Delay (d2), s/veh	3.9	2.6	0.0	7.3	0.2	0.0	6.4	0.2	0.0	4.2	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	3.4	0.0	4.3	1.4	0.0	4.1	5.2	0.0	2.2	7.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.0	39.8	0.0	43.6	30.7	0.0	42.9	19.2	0.0	43.4	25.2	0.0
LnGrp LOS	D	D		D	C		D	B		D	C	
Approach Vol, veh/h		515	A		526	A		1767	A		1827	A
Approach Delay, s/veh		41.0			39.8			24.1			27.2	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	42.1	18.1	15.8	17.8	36.9	12.6	21.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	7.9	17.3	13.0	10.1	12.6	22.5	7.8	5.5
Green Ext Time (p_c), s	0.3	12.1	0.6	1.2	0.7	9.9	0.4	0.7

Intersection Summary	
HCM 6th Ctrl Delay	29.0
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.924	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	2916	1365	6071	0	0	6071
Flt Permitted	0.976					
Satd. Flow (perm)	2916	1365	6071	0	0	6071
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	3	3				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

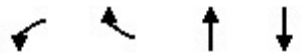
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	246	506	2200	0	0	1462
Future Volume (vph)	246	506	2200	0	0	1462
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	251	516	2245	0	0	1492
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	509	258	2245	0	0	1492

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	246	506	2200	1462
Future Volume (vph)	246	506	2200	1462
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	15.4	15.4	31.6	31.6
Actuated g/C Ratio	0.27	0.27	0.56	0.56
v/c Ratio	0.63	0.68	0.66	0.44
Control Delay	21.4	27.9	10.2	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	27.9	10.2	8.1
LOS	C	C	B	A
Approach Delay	23.6		10.2	8.1
Approach LOS	C		B	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 56.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 75.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	509	258	2245	1492
v/c Ratio	0.63	0.68	0.66	0.44
Control Delay	21.4	27.9	10.2	8.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	21.4	27.9	10.2	8.1
Queue Length 50th (ft)	75	82	139	77
Queue Length 95th (ft)	117	157	202	114
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1019	478	3423	3423
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.50	0.54	0.66	0.44

Intersection Summary

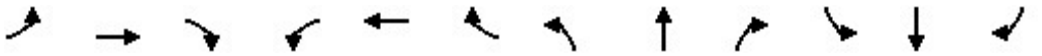
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	246	506	2200	0	0	1462
Future Volume (veh/h)	246	506	2200	0	0	1462
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1673	1772	1772	0	0	1772
Adj Flow Rate, veh/h	251	516	2245	0	0	1492
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	387	729	3510	0	0	3510
Arrive On Green	0.24	0.24	0.58	0.00	0.00	0.58
Sat Flow, veh/h	1594	3003	6592	0	0	6592
Grp Volume(v), veh/h	251	516	2245	0	0	1492
Grp Sat Flow(s),veh/h/ln	1594	1502	1524	0	0	1524
Q Serve(g_s), s	7.0	7.8	12.3	0.0	0.0	6.8
Cycle Q Clear(g_c), s	7.0	7.8	12.3	0.0	0.0	6.8
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	387	729	3510	0	0	3510
V/C Ratio(X)	0.65	0.71	0.64	0.00	0.00	0.43
Avail Cap(c_a), veh/h	627	1181	3872	0	0	3872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	16.9	17.2	7.1	0.0	0.0	5.9
Incr Delay (d2), s/veh	1.8	1.3	0.3	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.5	2.7	0.0	0.0	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.7	18.5	7.4	0.0	0.0	6.0
LnGrp LOS	B	B	A	A	A	A
Approach Vol, veh/h	767		2245			1492
Approach Delay, s/veh	18.5		7.4			6.0
Approach LOS	B		A			A

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	33.1			33.1	16.5
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s	14.3			8.8	9.8
Green Ext Time (p_c), s	14.3			12.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

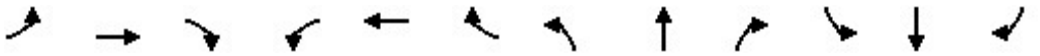
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1800	1800	1600	1800	1800	1600	1800	1800	1600	1800	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	2891	1765	1500	2891	3353	1500	2891	6071	1500	2891	6071	1500
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			136			218			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



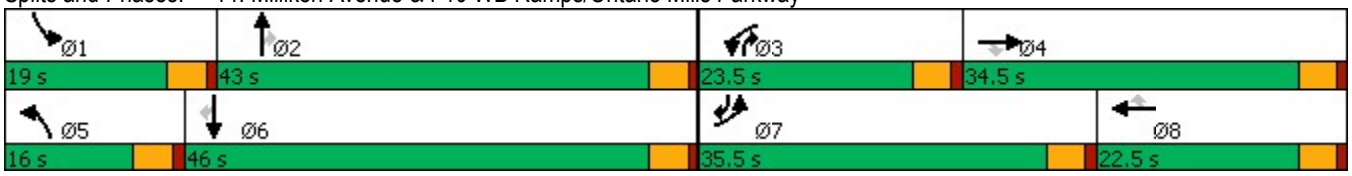
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	852	229	130	277	345	103	210	1373	420	305	1252	798
Future Volume (vph)	852	229	130	277	345	103	210	1373	420	305	1252	798
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	916	246	140	298	371	111	226	1476	452	328	1346	858
Shared Lane Traffic (%)												
Lane Group Flow (vph)	916	246	140	298	371	111	226	1476	452	328	1346	858

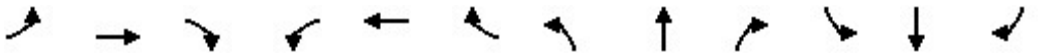
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	852	229	130	277	345	103	210	1373	420	305	1252	798
Future Volume (vph)	852	229	130	277	345	103	210	1373	420	305	1252	798
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	31.1	31.0	31.0	16.7	16.6	16.6	11.3	37.2	58.4	14.5	40.4	75.9
Actuated g/C Ratio	0.26	0.26	0.26	0.14	0.14	0.14	0.10	0.32	0.50	0.12	0.34	0.65
v/c Ratio	1.20	0.53	0.30	0.73	0.78	0.34	0.81	0.77	0.53	0.92	0.64	0.87
Control Delay	140.4	42.8	15.3	59.1	61.2	7.2	75.2	39.5	11.9	82.6	34.3	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	140.4	42.8	15.3	59.1	61.2	7.2	75.2	39.5	11.9	82.6	34.3	27.2
LOS	F	D	B	E	E	A	E	D	B	F	C	C
Approach Delay		108.5			52.7			37.4			38.1	
Approach LOS		F			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.4	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 53.1	Intersection LOS: D
Intersection Capacity Utilization 85.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway



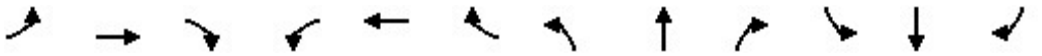


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	916	246	140	298	371	111	226	1476	452	328	1346	858
v/c Ratio	1.20	0.53	0.30	0.73	0.78	0.34	0.81	0.77	0.53	0.92	0.64	0.87
Control Delay	140.4	42.8	15.3	59.1	61.2	7.2	75.2	39.5	11.9	82.6	34.3	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	140.4	42.8	15.3	59.1	61.2	7.2	75.2	39.5	11.9	82.6	34.3	27.2
Queue Length 50th (ft)	~451	166	27	113	146	0	90	297	109	131	253	477
Queue Length 95th (ft)	#578	253	82	161	201	34	#155	342	199	#222	294	#821
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	764	466	466	468	514	345	284	1994	880	357	2149	989
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.20	0.53	0.30	0.64	0.72	0.32	0.80	0.74	0.51	0.92	0.63	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	852	229	130	277	345	103	210	1373	420	305	1252	798
Future Volume (veh/h)	852	229	130	277	345	103	210	1373	420	305	1252	798
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1772	1772	1575	1772	1772	1575	1772	1772	1575	1772	1772
Adj Flow Rate, veh/h	916	246	140	298	371	111	226	1476	452	328	1346	858
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	771	489	414	354	446	199	273	1979	670	361	2163	931
Arrive On Green	0.27	0.28	0.28	0.12	0.13	0.13	0.09	0.32	0.32	0.12	0.35	0.35
Sat Flow, veh/h	2910	1772	1502	2910	3367	1502	2910	6095	1502	2910	6095	1502
Grp Volume(v), veh/h	916	246	140	298	371	111	226	1476	452	328	1346	858
Grp Sat Flow(s),veh/h/ln	1455	1772	1502	1455	1683	1502	1455	1524	1502	1455	1524	1502
Q Serve(g_s), s	31.0	13.7	8.7	11.7	12.6	8.1	8.9	25.2	27.9	13.0	21.4	41.5
Cycle Q Clear(g_c), s	31.0	13.7	8.7	11.7	12.6	8.1	8.9	25.2	27.9	13.0	21.4	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	771	489	414	354	446	199	273	1979	670	361	2163	931
V/C Ratio(X)	1.19	0.50	0.34	0.84	0.83	0.56	0.83	0.75	0.67	0.91	0.62	0.92
Avail Cap(c_a), veh/h	771	489	414	473	518	231	286	2007	677	361	2163	931
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.0	35.6	33.8	50.3	49.5	47.5	52.1	35.2	25.7	50.6	31.2	19.7
Incr Delay (d2), s/veh	97.2	0.8	0.5	10.0	9.8	2.4	17.4	1.5	2.6	26.1	0.6	14.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.4	6.0	3.2	4.8	5.9	3.2	3.9	9.5	10.3	6.0	7.9	22.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	140.1	36.4	34.3	60.3	59.3	50.0	69.5	36.7	28.3	76.7	31.8	33.9
LnGrp LOS	F	D	C	E	E	D	E	D	C	E	C	C
Approach Vol, veh/h		1302			780			2154			2532	
Approach Delay, s/veh		109.2			58.4			38.4			38.3	
Approach LOS		F			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	42.5	18.7	36.8	15.5	46.0	35.5	20.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	15.0	29.9	13.7	15.7	10.9	43.5	33.0	14.6
Green Ext Time (p_c), s	0.0	6.6	0.5	1.6	0.0	0.0	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	54.3
HCM 6th LOS	D

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1800	1800	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3063	1365	0	6071	6071	0
Flt Permitted	0.954					
Satd. Flow (perm)	3063	1365	0	6071	6071	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	5	5				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

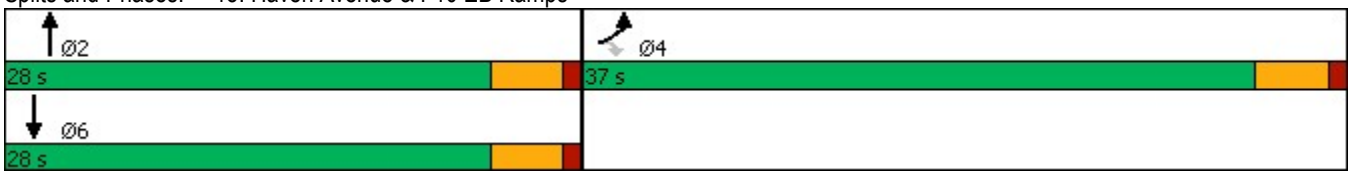
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1148	541	0	1632	1364	0
Future Volume (vph)	1148	541	0	1632	1364	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1184	558	0	1682	1406	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1240	502	0	1682	1406	0

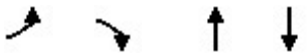
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1148	541	1632	1364
Future Volume (vph)	1148	541	1632	1364
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	29.7	29.7	23.4	23.4
Actuated g/C Ratio	0.48	0.48	0.38	0.38
v/c Ratio	0.85	0.77	0.74	0.62
Control Delay	20.8	22.7	19.6	17.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.8	22.7	19.6	17.6
LOS	C	C	B	B
Approach Delay	21.4		19.6	17.6
Approach LOS	C		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 62.2	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 75.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1240	502	1682	1406
v/c Ratio	0.85	0.77	0.74	0.62
Control Delay	20.8	22.7	19.6	17.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	20.8	22.7	19.6	17.6
Queue Length 50th (ft)	197	159	166	131
Queue Length 95th (ft)	279	#300	208	166
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1612	720	2306	2306
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.77	0.70	0.73	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1148	541	0	1632	1364	0
Future Volume (veh/h)	1148	541	0	1632	1364	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1772	0	1772	1772	0
Adj Flow Rate, veh/h	1184	558	0	1682	1406	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1470	692	0	2320	2320	0
Arrive On Green	0.46	0.46	0.00	0.38	0.38	0.00
Sat Flow, veh/h	3188	1502	0	6592	6592	0
Grp Volume(v), veh/h	1184	558	0	1682	1406	0
Grp Sat Flow(s),veh/h/ln	1594	1502	0	1524	1524	0
Q Serve(g_s), s	18.1	18.1	0.0	13.4	10.6	0.0
Cycle Q Clear(g_c), s	18.1	18.1	0.0	13.4	10.6	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1470	692	0	2320	2320	0
V/C Ratio(X)	0.81	0.81	0.00	0.73	0.61	0.00
Avail Cap(c_a), veh/h	1822	858	0	2520	2520	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.1	13.1	0.0	15.1	14.2	0.0
Incr Delay (d2), s/veh	2.2	4.6	0.0	1.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	5.9	0.0	4.2	3.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.4	17.8	0.0	16.0	14.5	0.0
LnGrp LOS	B	B	A	B	B	A
Approach Vol, veh/h	1742			1682	1406	
Approach Delay, s/veh	16.1			16.0	14.5	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		26.1		30.7		26.1
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		15.4		20.1		12.6
Green Ext Time (p_c), s		6.2		6.1		7.0

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1600	1800	1600	1800	1800	1800
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	2891	1500	2891	6071	6071	1500
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	2891	1500	2891	6071	6071	1500
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		10				127
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	887	222	158	1166	855	829
Future Volume (vph)	887	222	158	1166	855	829
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	914	229	163	1202	881	855
Shared Lane Traffic (%)						
Lane Group Flow (vph)	914	229	163	1202	881	855

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	887	222	158	1166	855	829
Future Volume (vph)	887	222	158	1166	855	829
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	28.3	40.3	7.4	28.5	16.5	49.4
Actuated g/C Ratio	0.43	0.61	0.11	0.43	0.25	0.75
v/c Ratio	0.74	0.25	0.51	0.46	0.58	0.74
Control Delay	20.0	6.7	36.2	14.6	24.1	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	6.7	36.2	14.6	24.1	8.4
LOS	C	A	D	B	C	A
Approach Delay	17.4			17.2	16.3	
Approach LOS	B			B	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 66	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	914	229	163	1202	881	855
v/c Ratio	0.74	0.25	0.51	0.46	0.58	0.74
Control Delay	20.0	6.7	36.2	14.6	24.1	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	6.7	36.2	14.6	24.1	8.4
Queue Length 50th (ft)	157	37	34	102	95	112
Queue Length 95th (ft)	230	72	67	142	134	222
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1549	926	336	2970	1838	1298
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.25	0.49	0.40	0.48	0.66

Intersection Summary

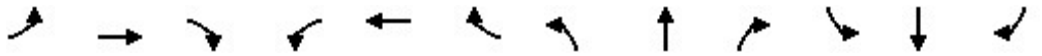
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	887	222	158	1166	855	829
Future Volume (veh/h)	887	222	158	1166	855	829
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1575	1772	1575	1772	1772	1772
Adj Flow Rate, veh/h	914	229	163	1202	881	855
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1113	699	242	2875	1925	1049
Arrive On Green	0.38	0.38	0.08	0.47	0.32	0.32
Sat Flow, veh/h	2910	1502	2910	6343	6343	1502
Grp Volume(v), veh/h	914	229	163	1202	881	855
Grp Sat Flow(s),veh/h/ln	1455	1502	1455	1524	1524	1502
Q Serve(g_s), s	17.5	5.9	3.4	8.0	7.1	19.5
Cycle Q Clear(g_c), s	17.5	5.9	3.4	8.0	7.1	19.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1113	699	242	2875	1925	1049
V/C Ratio(X)	0.82	0.33	0.67	0.42	0.46	0.82
Avail Cap(c_a), veh/h	1626	964	353	3110	1925	1049
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	10.4	27.5	10.7	16.9	5.8
Incr Delay (d2), s/veh	2.3	0.3	3.3	0.1	0.2	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.1	1.2	2.3	2.3	13.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.4	10.7	30.8	10.8	17.1	10.8
LnGrp LOS	B	B	C	B	B	B
Approach Vol, veh/h	1143			1365	1736	
Approach Delay, s/veh	17.7			13.2	14.0	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		33.6		28.1	9.6	24.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		10.0		19.5	5.4	21.5
Green Ext Time (p_c), s		9.1		4.2	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.7
HCM 6th LOS	B

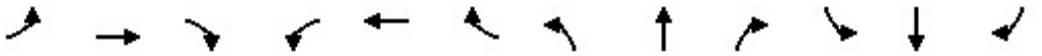
Appendix H

Intersection LOS Analysis Sheets
Horizon Year (2040) Without Project Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.962				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	4892	0	3072	3539	1583	3072	5085	1583	3072	6369	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	4892	0	3072	3539	1583	3072	5085	1583	3072	6369	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67				149			238		9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



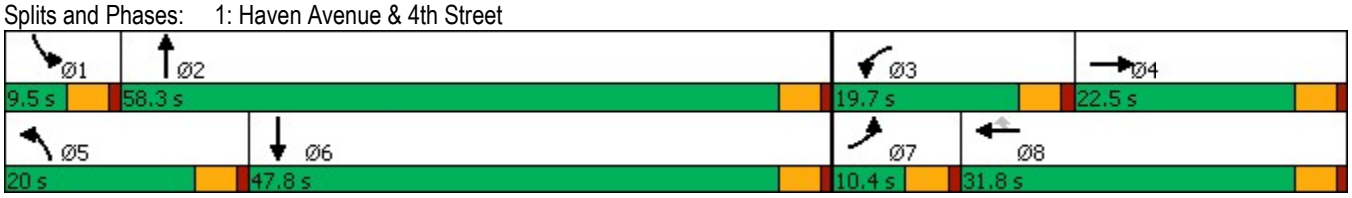
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	130	420	143	342	731	185	293	2155	676	124	1728	77
Future Volume (vph)	130	420	143	342	731	185	293	2155	676	124	1728	77
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	143	462	157	376	803	203	322	2368	743	136	1899	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	619	0	376	803	203	322	2368	743	136	1984	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	130	420	342	731	185	293	2155	676	124	1728
Future Volume (vph)	130	420	342	731	185	293	2155	676	124	1728
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	17.9	15.1	27.1	27.1	14.7	53.8	109.8	5.0	44.0
Actuated g/C Ratio	0.05	0.16	0.14	0.25	0.25	0.13	0.49	1.00	0.05	0.40
v/c Ratio	0.87	0.72	0.89	0.92	0.40	0.78	0.95	0.47	0.98	0.78
Control Delay	95.2	44.3	70.6	56.9	13.1	60.0	36.9	1.0	123.9	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.2	44.3	70.6	56.9	13.1	60.0	36.9	1.0	123.9	31.2
LOS	F	D	E	E	B	E	D	A	F	C
Approach Delay		53.9		54.2			31.3			37.1
Approach LOS		D		D			C			D

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 109.8	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 39.3	Intersection LOS: D
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	143	619	376	803	203	322	2368	743	136	1984
v/c Ratio	0.87	0.72	0.89	0.92	0.40	0.78	0.95	0.47	0.98	0.78
Control Delay	95.2	44.3	70.6	56.9	13.1	60.0	36.9	1.0	123.9	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.2	44.3	70.6	56.9	13.1	60.0	36.9	1.0	123.9	31.2
Queue Length 50th (ft)	52	136	136	291	30	113	566	0	50	351
Queue Length 95th (ft)	#111	180	#220	#406	94	#171	#701	0	#114	400
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	164	857	425	879	505	433	2491	1583	139	2560
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.72	0.88	0.91	0.40	0.74	0.95	0.47	0.98	0.78

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

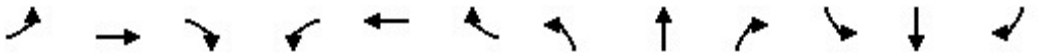
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	420	143	342	731	185	293	2155	676	124	1728	77
Future Volume (veh/h)	130	420	143	342	731	185	293	2155	676	124	1728	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	143	462	157	376	803	203	322	2368	0	136	1899	85
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	167	613	201	426	871	389	380	2507		141	2633	118
Arrive On Green	0.05	0.16	0.16	0.14	0.25	0.25	0.12	0.49	0.00	0.05	0.41	0.41
Sat Flow, veh/h	3092	3804	1247	3092	3554	1585	3092	5106	1585	3092	6360	285
Grp Volume(v), veh/h	143	412	207	376	803	203	322	2368	0	136	1441	543
Grp Sat Flow(s),veh/h/ln	1546	1702	1646	1546	1777	1585	1546	1702	1585	1546	1609	1819
Q Serve(g_s), s	5.0	12.6	13.2	13.1	24.1	12.1	11.2	48.2	0.0	4.8	27.3	27.3
Cycle Q Clear(g_c), s	5.0	12.6	13.2	13.1	24.1	12.1	11.2	48.2	0.0	4.8	27.3	27.3
Prop In Lane	1.00		0.76	1.00		1.00	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	167	549	265	426	871	389	380	2507		141	1997	753
V/C Ratio(X)	0.86	0.75	0.78	0.88	0.92	0.52	0.85	0.94		0.96	0.72	0.72
Avail Cap(c_a), veh/h	167	559	270	429	886	395	437	2507		141	1997	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.4	43.8	44.1	46.4	40.3	35.8	47.1	26.5	0.0	52.2	26.8	26.8
Incr Delay (d2), s/veh	33.5	5.5	13.5	18.9	14.7	1.2	13.0	9.0	0.0	64.5	2.3	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	5.7	6.4	6.1	12.2	4.8	5.0	20.6	0.0	3.1	10.7	12.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.9	49.4	57.6	65.2	55.0	37.0	60.1	35.4	0.0	116.7	29.1	32.7
LnGrp LOS	F	D	E	E	E	D	E	D		F	C	C
Approach Vol, veh/h		762			1382			2690	A		2120	
Approach Delay, s/veh		58.3			55.1			38.4			35.7	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	58.3	19.6	22.2	18.0	49.8	10.4	31.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	6.8	50.2	15.1	15.2	13.2	29.3	7.0	26.1
Green Ext Time (p_c), s	0.0	3.4	0.0	1.1	0.3	10.6	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	43.1
HCM 6th LOS	D

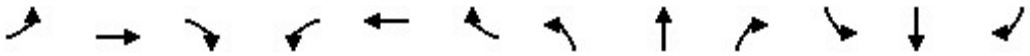
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.994				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	6369	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	6369	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				164			164		421	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	54	693	29	1	956	109	4	1	1	176	0	4
Future Volume (vph)	54	693	29	1	956	109	4	1	1	176	0	4
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	60	770	32	1	1062	121	4	1	1	196	0	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	802	0	1	1062	121	4	1	1	196	4	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	54	693	1	956	109	4	1	1	176	0
Future Volume (vph)	54	693	1	956	109	4	1	1	176	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	15.0	26.7
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	21.4%	38.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	5.1	20.8	5.1	17.3	17.3	5.8	5.7	5.7	10.0	18.3
Actuated g/C Ratio	0.10	0.40	0.10	0.33	0.33	0.11	0.11	0.11	0.19	0.35
v/c Ratio	0.37	0.31	0.01	0.63	0.19	0.02	0.00	0.00	0.61	0.00
Control Delay	31.1	11.3	24.0	17.3	2.4	23.2	23.0	0.0	30.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	11.3	24.0	17.3	2.4	23.2	23.0	0.0	30.8	0.0
LOS	C	B	C	B	A	C	C	A	C	A
Approach Delay		12.7		15.8			19.3			30.1
Approach LOS		B		B			B			C

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 51.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 15.9	Intersection LOS: B
Intersection Capacity Utilization 50.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	60	802	1	1062	121	4	1	1	196	4
v/c Ratio	0.37	0.31	0.01	0.63	0.19	0.02	0.00	0.00	0.61	0.00
Control Delay	31.1	11.3	24.0	17.3	2.4	23.2	23.0	0.0	30.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	11.3	24.0	17.3	2.4	23.2	23.0	0.0	30.8	0.0
Queue Length 50th (ft)	20	43	0	112	0	1	0	0	62	0
Queue Length 95th (ft)	51	83	4	153	18	9	4	0	#138	0
Internal Link Dist (ft)		2546		362			269			358
Turn Bay Length (ft)	130		130		145	165		165	50	
Base Capacity (vph)	164	2678	164	1794	664	223	675	678	345	1547
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.30	0.01	0.59	0.18	0.02	0.00	0.00	0.57	0.00

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

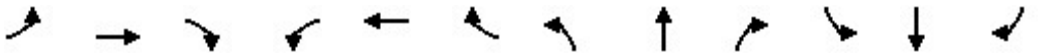
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	693	29	1	956	109	4	1	1	176	0	4
Future Volume (veh/h)	54	693	29	1	956	109	4	1	1	176	0	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	60	770	32	1	1062	121	4	1	1	196	0	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	2357	97	4	1598	496	9	197	167	246	436	389
Arrive On Green	0.06	0.37	0.37	0.00	0.31	0.31	0.01	0.11	0.11	0.15	0.00	0.25
Sat Flow, veh/h	1688	6385	264	1688	5106	1585	1688	1870	1585	1688	1777	1585
Grp Volume(v), veh/h	60	581	221	1	1062	121	4	1	1	196	0	4
Grp Sat Flow(s),veh/h/ln	1688	1609	1823	1688	1702	1585	1688	1870	1585	1688	1777	1585
Q Serve(g_s), s	1.7	4.1	4.1	0.0	8.6	2.7	0.1	0.0	0.0	5.3	0.0	0.1
Cycle Q Clear(g_c), s	1.7	4.1	4.1	0.0	8.6	2.7	0.1	0.0	0.0	5.3	0.0	0.1
Prop In Lane	1.00		0.14	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	97	1782	673	4	1598	496	9	197	167	246	436	389
V/C Ratio(X)	0.62	0.33	0.33	0.28	0.66	0.24	0.44	0.01	0.01	0.80	0.00	0.01
Avail Cap(c_a), veh/h	177	1826	690	177	1933	600	241	728	617	373	829	740
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	10.8	10.8	23.7	14.2	12.1	23.6	19.1	19.1	19.6	0.0	13.6
Incr Delay (d2), s/veh	6.2	0.1	0.3	38.4	0.7	0.3	29.7	0.0	0.0	6.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.2	1.4	0.0	2.9	0.8	0.1	0.0	0.0	2.3	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.1	10.9	11.1	62.1	14.8	12.4	53.3	19.1	19.1	26.5	0.0	13.6
LnGrp LOS	C	B	B	E	B	B	D	B	B	C	A	B
Approach Vol, veh/h		862			1184			6			200	
Approach Delay, s/veh		12.1			14.6			41.9			26.2	
Approach LOS		B			B			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.4	9.5	4.6	22.1	4.8	16.2	7.2	19.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	7.3	2.0	2.0	6.1	2.1	2.1	3.7	10.6
Green Ext Time (p_c), s	0.2	0.0	0.0	4.2	0.0	0.0	0.0	4.3

Intersection Summary	
HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	3072	6401	0	1676	5065	0	1676	1863	1583	0	1781	1583
Flt Permitted	0.950			0.950			0.720				0.739	
Satd. Flow (perm)	3072	6401	0	1676	5065	0	1271	1863	1583	0	1377	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



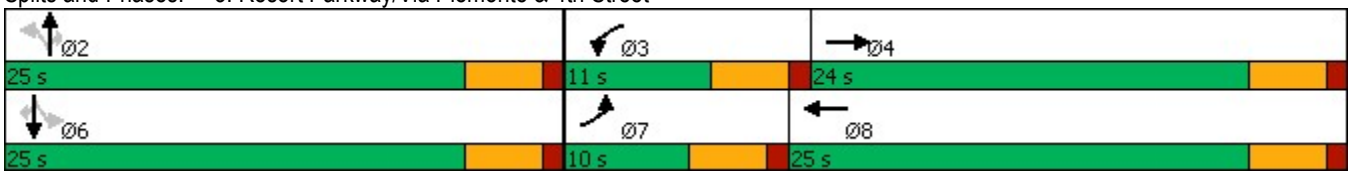
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	716	6	22	983	28	12	4	16	48	4	23
Future Volume (vph)	20	716	6	22	983	28	12	4	16	48	4	23
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	770	6	24	1057	30	13	4	17	52	4	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	776	0	24	1087	0	13	4	17	0	56	25

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	716	22	983	12	4	16	48	4	23
Future Volume (vph)	20	716	22	983	12	4	16	48	4	23
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.8	15.6	6.2	15.8	7.1	7.1	7.1		7.1	7.1
Actuated g/C Ratio	0.17	0.46	0.18	0.47	0.21	0.21	0.21		0.21	0.21
v/c Ratio	0.04	0.26	0.08	0.46	0.05	0.01	0.04		0.19	0.06
Control Delay	16.2	6.4	16.0	7.3	14.2	14.0	0.2		15.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	16.2	6.4	16.0	7.3	14.2	14.0	0.2		15.4	0.3
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		6.7		7.5		7.2			10.7	
Approach LOS		A		A		A			B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 33.7	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 39.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	22	776	24	1087	13	4	17	56	25
v/c Ratio	0.04	0.26	0.08	0.46	0.05	0.01	0.04	0.19	0.06
Control Delay	16.2	6.4	16.0	7.3	14.2	14.0	0.2	15.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	6.4	16.0	7.3	14.2	14.0	0.2	15.4	0.3
Queue Length 50th (ft)	1	17	3	34	2	1	0	8	0
Queue Length 95th (ft)	10	59	22	109	14	7	0	38	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	527	3902	340	3248	814	1193	1053	882	1053
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.20	0.07	0.33	0.02	0.00	0.02	0.06	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	716	6	22	983	28	12	4	16	48	4	23
Future Volume (veh/h)	20	716	6	22	983	28	12	4	16	48	4	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	770	6	24	1057	30	13	4	17	52	4	25
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	2660	21	51	2058	58	379	288	244	410	24	244
Arrive On Green	0.03	0.40	0.40	0.03	0.40	0.40	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	3092	6635	52	1688	5104	145	1308	1870	1585	1275	156	1585
Grp Volume(v), veh/h	22	560	216	24	705	382	13	4	17	56	0	25
Grp Sat Flow(s),veh/h/ln	1546	1609	1861	1688	1702	1844	1308	1870	1585	1431	0	1585
Q Serve(g_s), s	0.2	2.6	2.6	0.5	5.1	5.1	0.3	0.1	0.3	0.9	0.0	0.4
Cycle Q Clear(g_c), s	0.2	2.6	2.6	0.5	5.1	5.1	1.4	0.1	0.3	1.1	0.0	0.4
Prop In Lane	1.00		0.03	1.00		0.08	1.00		1.00	0.93		1.00
Lane Grp Cap(c), veh/h	86	1935	746	51	1373	744	379	288	244	434	0	244
V/C Ratio(X)	0.26	0.29	0.29	0.47	0.51	0.51	0.03	0.01	0.07	0.13	0.00	0.10
Avail Cap(c_a), veh/h	523	2895	1116	337	2147	1163	1003	1179	1000	1109	0	1000
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.5	6.6	6.6	15.5	7.3	7.3	12.7	11.7	11.8	12.1	0.0	11.8
Incr Delay (d2), s/veh	1.6	0.1	0.2	6.8	0.3	0.6	0.0	0.0	0.1	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.5	0.7	0.2	1.2	1.3	0.1	0.0	0.1	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.0	6.7	6.8	22.3	7.6	7.9	12.7	11.7	11.9	12.2	0.0	12.0
LnGrp LOS	B	A	A	C	A	A	B	B	B	B	A	B
Approach Vol, veh/h		798			1111			34			81	
Approach Delay, s/veh		7.0			8.0			12.2			12.1	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.5	17.5		9.5	5.4	17.6				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		3.4	2.5	4.6		3.1	2.2	7.1				
Green Ext Time (p_c), s		0.1	0.0	4.5		0.3	0.0	6.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.994					0.865
Flt Protected						
Satd. Flow (prot)	5055	0	0	5085	0	1611
Flt Permitted						
Satd. Flow (perm)	5055	0	0	5085	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	754	29	0	973	0	4
Future Volume (vph)	754	29	0	973	0	4
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	820	32	0	1058	0	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	852	0	0	1058	0	4

Intersection Summary

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	754	29	0	973	0	4
Future Vol, veh/h	754	29	0	973	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	820	32	0	1058	0	4

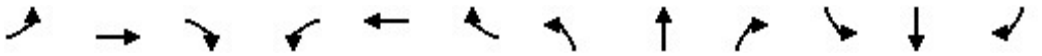
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	426
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	493
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	493
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	493	-	-	-
HCM Lane V/C Ratio	0.009	-	-	-
HCM Control Delay (s)	12.4	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6305	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6305	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			220			278			73		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



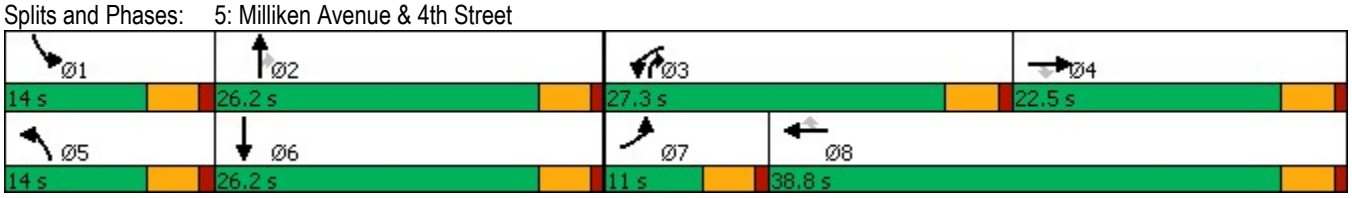
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	205	532	226	645	1649	549	278	1307	204	277	1144	133
Future Volume (vph)	205	532	226	645	1649	549	278	1307	204	277	1144	133
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	220	572	243	694	1773	590	299	1405	219	298	1230	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	220	572	243	694	1773	590	299	1405	219	298	1373	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	205	532	226	645	1649	549	278	1307	204	277	1144
Future Volume (vph)	205	532	226	645	1649	549	278	1307	204	277	1144
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	18.5	18.5	22.3	34.3	34.3	9.5	21.7	48.5	9.5	21.7
Actuated g/C Ratio	0.07	0.21	0.21	0.25	0.38	0.38	0.11	0.24	0.54	0.11	0.24
v/c Ratio	1.00	0.55	0.49	0.91	0.92	0.76	0.92	0.91	0.25	0.92	0.89
Control Delay	103.6	34.5	9.8	50.7	35.3	19.9	75.4	43.2	7.8	74.8	40.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.6	34.5	9.8	50.7	35.3	19.9	75.4	43.2	7.8	74.8	40.9
LOS	F	C	A	D	D	B	E	D	A	E	D
Approach Delay		43.4			35.9			44.2			47.0
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 41.4	Intersection LOS: D
Intersection Capacity Utilization 81.2%	ICU Level of Service D
Analysis Period (min) 15	

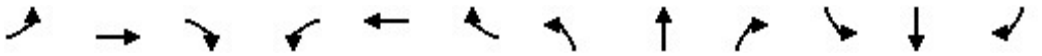
Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	220	572	243	694	1773	590	299	1405	219	298	1373
v/c Ratio	1.00	0.55	0.49	0.91	0.92	0.76	0.92	0.91	0.25	0.92	0.89
Control Delay	103.6	34.5	9.8	50.7	35.3	19.9	75.4	43.2	7.8	74.8	40.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.6	34.5	9.8	50.7	35.3	19.9	75.4	43.2	7.8	74.8	40.9
Queue Length 50th (ft)	65	108	11	196	344	154	88	226	39	88	215
Queue Length 95th (ft)	#139	145	74	#296	#446	297	#165	#293	77	#164	#278
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	221	1044	499	778	1937	775	324	1545	895	324	1542
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.55	0.49	0.89	0.92	0.76	0.92	0.91	0.24	0.92	0.89

Intersection Summary

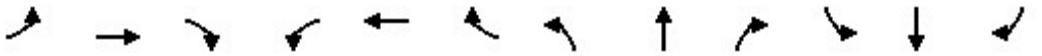
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	532	226	645	1649	549	278	1307	204	277	1144	133
Future Volume (veh/h)	205	532	226	645	1649	549	278	1307	204	277	1144	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	220	572	243	694	1773	590	299	1405	219	298	1230	143
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	224	1066	331	758	1948	605	327	1546	769	327	1416	164
Arrive On Green	0.07	0.21	0.21	0.25	0.38	0.38	0.11	0.24	0.24	0.11	0.24	0.24
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	3092	6434	1585	3092	5891	682
Grp Volume(v), veh/h	220	572	243	694	1773	590	299	1405	219	298	1006	367
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1546	1609	1585	1546	1609	1748
Q Serve(g_s), s	6.4	9.0	12.9	19.6	29.6	33.0	8.6	19.1	7.4	8.6	18.0	18.1
Cycle Q Clear(g_c), s	6.4	9.0	12.9	19.6	29.6	33.0	8.6	19.1	7.4	8.6	18.0	18.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	224	1066	331	758	1948	605	327	1546	769	327	1160	420
V/C Ratio(X)	0.98	0.54	0.73	0.92	0.91	0.98	0.92	0.91	0.28	0.91	0.87	0.87
Avail Cap(c_a), veh/h	224	1066	331	784	1948	605	327	1553	771	327	1165	422
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.7	31.7	33.2	33.0	26.3	27.4	39.8	33.2	13.8	39.8	32.8	32.8
Incr Delay (d2), s/veh	55.5	0.5	8.2	15.1	6.9	30.4	29.2	8.2	0.2	28.6	7.2	17.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	3.7	5.6	8.7	12.6	16.9	4.5	8.1	2.6	4.5	7.6	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.2	32.2	41.5	48.2	33.2	57.8	69.0	41.4	14.0	68.4	39.9	50.7
LnGrp LOS	F	C	D	D	C	E	E	D	B	E	D	D
Approach Vol, veh/h		1035			3057			1923			1671	
Approach Delay, s/veh		48.2			41.4			42.6			47.4	
Approach LOS		D			D			D			D	

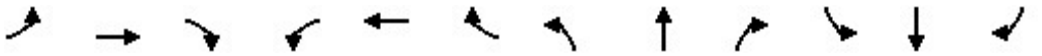
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	26.1	26.5	23.3	14.0	26.1	11.0	38.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	10.6	21.1	21.6	14.9	10.6	20.1	8.4	35.0
Green Ext Time (p_c), s	0.0	0.5	0.4	1.4	0.0	1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	43.9
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.901	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3055	1441
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3055	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		208	208
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



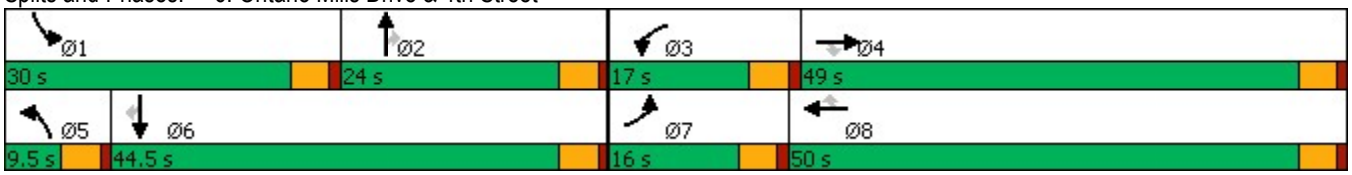
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	401	469	83	154	1811	184	101	99	109	205	312	1212
Future Volume (vph)	401	469	83	154	1811	184	101	99	109	205	312	1212
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	461	539	95	177	2082	211	116	114	125	236	359	1393
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	461	539	95	177	2082	211	116	114	125	236	1056	696

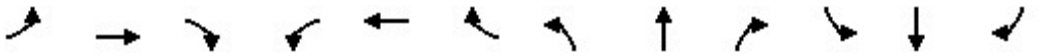
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	469	83	154	1811	184	101	99	109	205	312	1212
Future Volume (vph)	401	469	83	154	1811	184	101	99	109	205	312	1212
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.5	45.7	45.7	11.3	45.5	45.5	5.0	23.8	23.8	21.2	40.0	40.0
Actuated g/C Ratio	0.10	0.38	0.38	0.09	0.38	0.38	0.04	0.20	0.20	0.18	0.33	0.33
v/c Ratio	1.57	0.28	0.14	0.61	1.08	0.31	1.68	0.16	0.30	0.80	1.09dr	1.12
Control Delay	307.4	26.5	1.8	61.4	81.9	10.8	396.0	42.2	8.0	66.7	43.4	102.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	307.4	26.5	1.8	61.4	81.9	10.8	396.0	42.2	8.0	66.7	43.4	102.6
LOS	F	C	A	E	F	B	F	D	A	E	D	F
Approach Delay		142.6			74.4			145.8			66.9	
Approach LOS		F			E			F			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.68	
Intersection Signal Delay: 88.8	Intersection LOS: F
Intersection Capacity Utilization 102.2%	ICU Level of Service G
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 6: Ontario Mills Drive & 4th Street





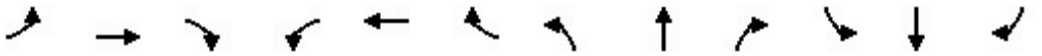
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	461	539	95	177	2082	211	116	114	125	236	1056	696
v/c Ratio	1.57	0.28	0.14	0.61	1.08	0.31	1.68	0.16	0.30	0.80	1.09dr	1.12
Control Delay	307.4	26.5	1.8	61.4	81.9	10.8	396.0	42.2	8.0	66.7	43.4	102.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	307.4	26.5	1.8	61.4	81.9	10.8	396.0	42.2	8.0	66.7	43.4	102.6
Queue Length 50th (ft)	~260	106	0	68	~660	38	~131	38	0	175	358	~560
Queue Length 95th (ft)	#350	131	11	102	#711	88	#242	66	42	248	#448	#770
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	294	1935	686	320	1928	684	69	701	423	356	1157	619
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.57	0.28	0.14	0.55	1.08	0.31	1.68	0.16	0.30	0.66	0.91	1.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.



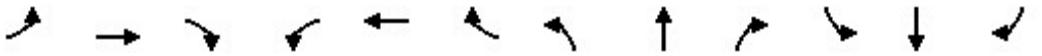
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	401	469	83	154	1811	184	101	99	109	205	312	1212
Future Volume (veh/h)	401	469	83	154	1811	184	101	99	109	205	312	1212
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	461	539	95	177	2082	211	116	114	125	236	359	1393
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	296	2047	635	229	1936	601	70	775	346	265	623	1057
Arrive On Green	0.10	0.40	0.40	0.07	0.38	0.38	0.04	0.22	0.22	0.16	0.33	0.33
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	1688	3554	1585	1688	1870	3170
Grp Volume(v), veh/h	461	539	95	177	2082	211	116	114	125	236	359	1393
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1688	1777	1585	1688	1870	1585
Q Serve(g_s), s	11.5	8.5	4.6	6.7	45.5	11.4	5.0	3.1	8.0	16.4	19.0	40.0
Cycle Q Clear(g_c), s	11.5	8.5	4.6	6.7	45.5	11.4	5.0	3.1	8.0	16.4	19.0	40.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	296	2047	635	229	1936	601	70	775	346	265	623	1057
V/C Ratio(X)	1.56	0.26	0.15	0.77	1.08	0.35	1.65	0.15	0.36	0.89	0.58	1.32
Avail Cap(c_a), veh/h	296	2047	635	322	1936	601	70	775	346	359	623	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.2	24.1	22.9	54.5	37.2	26.7	57.5	37.9	39.8	49.6	33.0	40.0
Incr Delay (d2), s/veh	266.1	0.1	0.1	7.3	44.1	0.3	347.1	0.1	0.6	18.7	1.3	150.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.4	3.4	1.7	2.9	26.4	4.4	8.9	1.4	3.2	8.3	8.8	37.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	320.3	24.2	23.0	61.8	81.4	27.0	404.6	38.0	40.5	68.3	34.3	190.0
LnGrp LOS	F	C	C	E	F	C	F	D	D	E	C	F
Approach Vol, veh/h		1095			2470			355			1988	
Approach Delay, s/veh		148.8			75.3			158.7			147.4	
Approach LOS		F			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	23.3	30.7	13.4	52.6	9.5	44.5	16.0	50.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	18.4	10.0	8.7	10.5	7.0	42.0	13.5	47.5
Green Ext Time (p_c), s	0.4	0.7	0.2	4.4	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	118.2
HCM 6th LOS	F

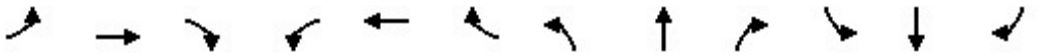
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.982			0.892				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (prot)	3072	5085	1583	1676	4994	0	1676	3157	0	1593	1709	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (perm)	3072	5085	1583	1676	4994	0	1676	3157	0	1593	1709	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		24			84				353
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



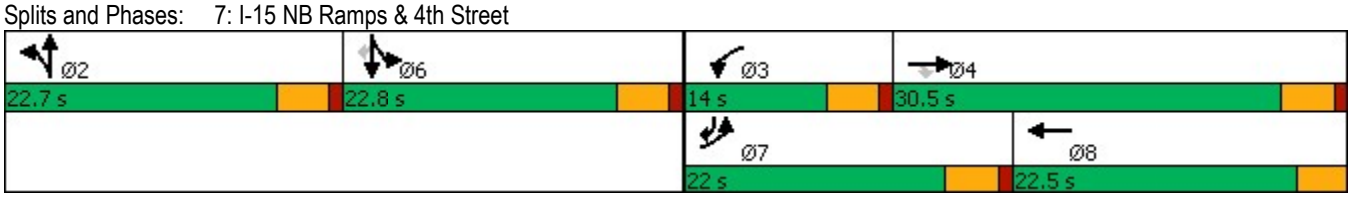
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	273	457	108	63	656	87	154	31	80	519	92	1346
Future Volume (vph)	273	457	108	63	656	87	154	31	80	519	92	1346
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	287	481	114	66	691	92	162	33	84	546	97	1417
Shared Lane Traffic (%)										42%		
Lane Group Flow (vph)	287	481	114	66	783	0	162	117	0	317	326	1417

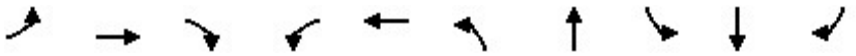
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	273	457	108	63	656	154	31	519	92	1346
Future Volume (vph)	273	457	108	63	656	154	31	519	92	1346
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	22.0	30.5	30.5	14.0	22.5	22.7	22.7	22.8	22.8	22.0
Total Split (%)	24.4%	33.9%	33.9%	15.6%	25.0%	25.2%	25.2%	25.3%	25.3%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	17.6	28.5	28.5	8.0	17.7	13.1	13.1	18.4	18.4	40.5
Actuated g/C Ratio	0.21	0.34	0.34	0.10	0.21	0.16	0.16	0.22	0.22	0.48
v/c Ratio	0.45	0.28	0.18	0.41	0.73	0.62	0.21	0.91	0.87	0.97
Control Delay	32.6	22.4	4.7	44.9	34.7	43.9	12.5	65.3	58.1	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	22.4	4.7	44.9	34.7	43.9	12.5	65.3	58.1	36.1
LOS	C	C	A	D	C	D	B	E	E	D
Approach Delay		23.4			35.5		30.7		44.1	
Approach LOS		C			D		C		D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 83.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 36.9	Intersection LOS: D
Intersection Capacity Utilization 84.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	287	481	114	66	783	162	117	317	326	1417
v/c Ratio	0.45	0.28	0.18	0.41	0.73	0.62	0.21	0.91	0.87	0.97
Control Delay	32.6	22.4	4.7	44.9	34.7	43.9	12.5	65.3	58.1	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	22.4	4.7	44.9	34.7	43.9	12.5	65.3	58.1	36.1
Queue Length 50th (ft)	70	71	0	34	137	82	7	175	178	334
Queue Length 95th (ft)	114	107	32	77	193	144	30	#365	#364	#572
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	643	1727	621	190	1154	365	753	349	374	1456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.28	0.18	0.35	0.68	0.44	0.16	0.91	0.87	0.97

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

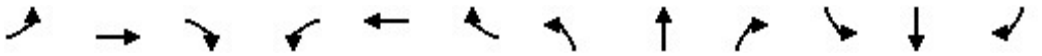
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	273	457	108	63	656	87	154	31	80	519	92	1346
Future Volume (veh/h)	273	457	108	63	656	87	154	31	80	519	92	1346
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1772
Adj Flow Rate, veh/h	287	481	114	66	691	92	162	33	84	615	0	1417
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	395	1475	458	88	974	128	224	235	210	896	0	1180
Arrive On Green	0.13	0.29	0.29	0.05	0.21	0.21	0.13	0.13	0.13	0.27	0.00	0.27
Sat Flow, veh/h	3092	5106	1585	1688	4564	602	1688	1777	1585	3375	0	3003
Grp Volume(v), veh/h	287	481	114	66	514	269	162	33	84	615	0	1417
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1688	1702	1762	1688	1777	1585	1688	0	1502
Q Serve(g_s), s	6.2	5.1	3.8	2.7	9.6	9.8	6.4	1.1	3.3	11.3	0.0	18.3
Cycle Q Clear(g_c), s	6.2	5.1	3.8	2.7	9.6	9.8	6.4	1.1	3.3	11.3	0.0	18.3
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	395	1475	458	88	726	376	224	235	210	896	0	1180
V/C Ratio(X)	0.73	0.33	0.25	0.75	0.71	0.72	0.72	0.14	0.40	0.69	0.00	1.20
Avail Cap(c_a), veh/h	785	1926	598	233	938	486	446	469	418	896	0	1180
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.9	19.2	18.8	32.2	25.1	25.2	28.7	26.4	27.4	22.7	0.0	20.9
Incr Delay (d2), s/veh	2.6	0.1	0.3	12.1	1.7	3.5	4.4	0.3	1.2	2.2	0.0	98.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	1.9	1.4	1.3	3.9	4.2	2.7	0.5	1.3	4.5	0.0	24.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.5	19.4	19.1	44.3	26.8	28.7	33.1	26.7	28.6	24.9	0.0	119.4
LnGrp LOS	C	B	B	D	C	C	C	C	C	C	A	F
Approach Vol, veh/h		882			849			279			2032	
Approach Delay, s/veh		23.3			28.8			31.0			90.8	
Approach LOS		C			C			C			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.6	8.1	24.4		22.8	13.3	19.2				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	17.5	* 19				
Max Q Clear Time (g_c+I1), s		8.4	4.7	7.1		20.3	8.2	11.8				
Green Ext Time (p_c), s		0.8	0.0	3.5		0.0	0.7	2.9				

Intersection Summary		
HCM 6th Ctrl Delay	58.9	
HCM 6th LOS	E	

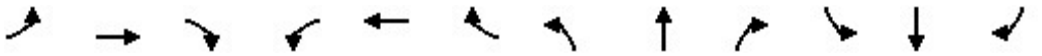
Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3196	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3196	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		127				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



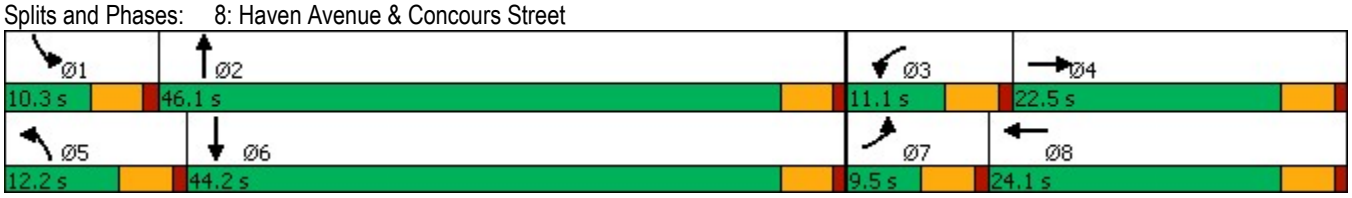
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	29	63	114	229	83	25	99	2530	191	139	1926	61
Future Volume (vph)	29	63	114	229	83	25	99	2530	191	139	1926	61
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	32	70	127	254	92	28	110	2811	212	154	2140	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	197	0	254	92	28	110	2811	212	154	2140	68

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	29	63	229	83	25	99	2530	191	139	1926	61
Future Volume (vph)	29	63	229	83	25	99	2530	191	139	1926	61
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.4	6.6	14.8	79.5	7.3	41.6	79.5	5.8	42.3	79.5
Actuated g/C Ratio	0.06	0.09	0.08	0.19	1.00	0.09	0.52	1.00	0.07	0.53	1.00
v/c Ratio	0.17	0.48	0.73	0.14	0.02	0.39	0.84	0.13	0.69	0.63	0.04
Control Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.2	0.2	53.8	15.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.2	0.2	53.8	15.0	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.4		40.9			18.6			17.1	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 79.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 66.7%	ICU Level of Service C
Analysis Period (min) 15	

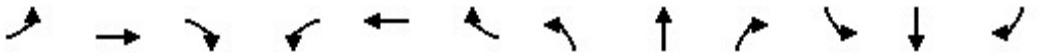
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	32	197	254	92	28	110	2811	212	154	2140	68
v/c Ratio	0.17	0.48	0.73	0.14	0.02	0.39	0.84	0.13	0.69	0.63	0.04
Control Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.2	0.2	53.8	15.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.2	0.2	53.8	15.0	0.0
Queue Length 50th (ft)	7	17	44	18	0	26	319	0	39	217	0
Queue Length 95th (ft)	22	47	#82	43	0	53	406	0	#85	279	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	193	822	349	873	1583	297	3356	1583	224	3411	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.24	0.73	0.11	0.02	0.37	0.84	0.13	0.69	0.63	0.04

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



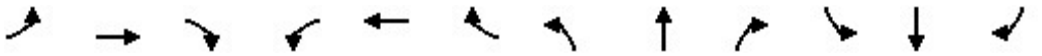
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	63	114	229	83	25	99	2530	191	139	1926	61
Future Volume (veh/h)	29	63	114	229	83	25	99	2530	191	139	1926	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	32	70	127	254	92	0	110	2811	0	154	2140	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	98	197	176	347	574		176	3294		220	3387	
Arrive On Green	0.03	0.11	0.11	0.08	0.16	0.00	0.06	0.51	0.00	0.07	0.53	0.00
Sat Flow, veh/h	3092	1777	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	32	70	127	254	92	0	110	2811	0	154	2140	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	0.8	2.9	6.2	4.7	1.8	0.0	2.8	30.5	0.0	3.9	19.0	0.0
Cycle Q Clear(g_c), s	0.8	2.9	6.2	4.7	1.8	0.0	2.8	30.5	0.0	3.9	19.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	98	197	176	347	574		176	3294		220	3387	
V/C Ratio(X)	0.33	0.35	0.72	0.73	0.16		0.63	0.85		0.70	0.63	
Avail Cap(c_a), veh/h	192	397	354	347	865		296	3326		223	3387	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.1	33.1	34.6	36.1	29.1	0.0	37.1	17.0	0.0	36.5	13.5	0.0
Incr Delay (d2), s/veh	1.9	1.1	5.5	7.7	0.1	0.0	3.6	2.3	0.0	9.2	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.3	2.6	1.8	0.8	0.0	1.1	10.5	0.0	1.7	6.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.0	34.2	40.0	43.8	29.2	0.0	40.8	19.3	0.0	45.7	13.9	0.0
LnGrp LOS	D	C	D	D	C		D	B		D	B	
Approach Vol, veh/h		229			346	A		2921	A		2294	A
Approach Delay, s/veh		38.2			39.9			20.1			16.0	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	45.7	11.1	13.4	9.1	46.9	7.1	17.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	5.9	32.5	6.7	8.2	4.8	21.0	2.8	3.8
Green Ext Time (p_c), s	0.0	8.7	0.0	0.7	0.1	14.8	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	20.4
HCM 6th LOS	C

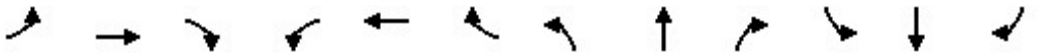
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.850			0.977			0.994			0.989	
Flt Protected	0.950				0.968		0.950			0.950		
Satd. Flow (prot)	1593	1504	0	0	1762	0	1676	5055	0	1676	5029	0
Flt Permitted	0.950						0.950			0.950		
Satd. Flow (perm)	1593	1504	0	0	1820	0	1676	5055	0	1676	5029	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		563			1			7			16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



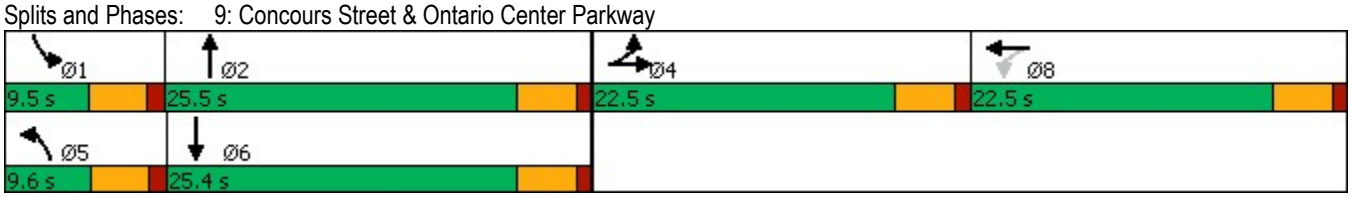
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	2	0	4	4	1	1	54	693	29	1	956	79
Future Volume (vph)	2	0	4	4	1	1	54	693	29	1	956	79
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	2	0	4	4	1	1	60	770	32	1	1062	88
Shared Lane Traffic (%)	10%											
Lane Group Flow (vph)	2	4	0	0	6	0	60	802	0	1	1150	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	2	0	4	1	54	693	1	956
Future Volume (vph)	2	0	4	1	54	693	1	956
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.8	5.8		6.0	5.3	36.5	5.2	31.1
Actuated g/C Ratio	0.14	0.14		0.14	0.13	0.88	0.12	0.75
v/c Ratio	0.01	0.01		0.02	0.28	0.18	0.00	0.31
Control Delay	20.0	0.0		18.8	23.9	3.9	21.0	5.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	0.0		18.8	23.9	3.9	21.0	5.6
LOS	B	A		B	C	A	C	A
Approach Delay		6.7		18.8		5.3		5.6
Approach LOS		A		B		A		A

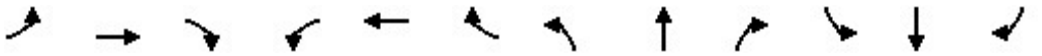
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 41.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.31	
Intersection Signal Delay: 5.5	Intersection LOS: A
Intersection Capacity Utilization 39.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	2	4	6	60	802	1	1150
v/c Ratio	0.01	0.01	0.02	0.28	0.18	0.00	0.31
Control Delay	20.0	0.0	18.8	23.9	3.9	21.0	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	0.0	18.8	23.9	3.9	21.0	5.6
Queue Length 50th (ft)	1	0	1	15	0	0	30
Queue Length 95th (ft)	6	0	10	50	98	4	147
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	720	988	823	214	4423	210	3752
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.00	0.01	0.28	0.18	0.00	0.31

Intersection Summary



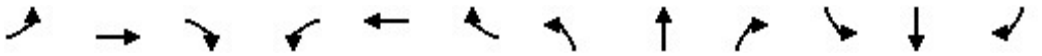
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	4	1	1	54	693	29	1	956	79
Future Volume (veh/h)	2	0	4	4	1	1	54	693	29	1	956	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	2	0	4	4	1	1	60	770	32	1	1062	88
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	14	0	13	9	2	2	107	2352	97	5	1951	161
Arrive On Green	0.01	0.00	0.01	0.01	0.01	0.01	0.06	0.47	0.47	0.00	0.41	0.41
Sat Flow, veh/h	1688	0	1585	1173	293	293	1688	5029	208	1688	4805	398
Grp Volume(v), veh/h	2	0	4	6	0	0	60	521	281	1	752	398
Grp Sat Flow(s),veh/h/ln	1688	0	1585	1759	0	0	1688	1702	1833	1688	1702	1799
Q Serve(g_s), s	0.0	0.0	0.1	0.1	0.0	0.0	1.2	3.4	3.4	0.0	5.9	5.9
Cycle Q Clear(g_c), s	0.0	0.0	0.1	0.1	0.0	0.0	1.2	3.4	3.4	0.0	5.9	5.9
Prop In Lane	1.00		1.00	0.67		0.17	1.00		0.11	1.00		0.22
Lane Grp Cap(c), veh/h	14	0	13	14	0	0	107	1592	857	5	1382	730
V/C Ratio(X)	0.15	0.00	0.31	0.42	0.00	0.00	0.56	0.33	0.33	0.21	0.54	0.55
Avail Cap(c_a), veh/h	869	0	816	905	0	0	246	2044	1101	241	2034	1075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	0.0	17.2	17.3	0.0	0.0	15.9	5.8	5.9	17.4	7.9	7.9
Incr Delay (d2), s/veh	4.8	0.0	13.2	18.6	0.0	0.0	4.6	0.1	0.2	20.0	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.1	0.0	0.0	0.5	0.7	0.8	0.0	1.5	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	0.0	30.4	35.8	0.0	0.0	20.5	6.0	6.1	37.4	8.3	8.6
LnGrp LOS	C	A	C	D	A	A	C	A	A	D	A	A
Approach Vol, veh/h		6			6			862			1151	
Approach Delay, s/veh		27.6			35.8			7.0			8.4	
Approach LOS		C			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.5	20.9		4.8	6.7	18.7		4.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	5.4		2.1	3.2	7.9		2.1				
Green Ext Time (p_c), s	0.0	4.7		0.0	0.0	6.3		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		7.9
HCM 6th LOS		A

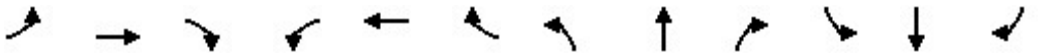
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			342
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



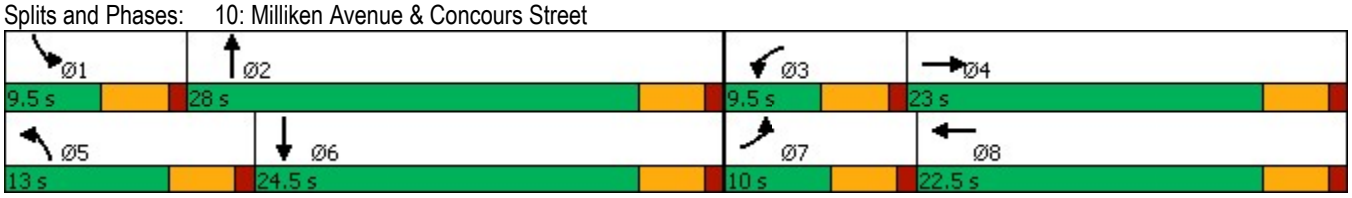
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	98	34	71	68	109	55	217	1314	83	103	1259	329
Future Volume (vph)	98	34	71	68	109	55	217	1314	83	103	1259	329
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	114	40	83	79	127	64	252	1528	97	120	1464	383
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	40	83	79	127	64	252	1528	97	120	1464	383

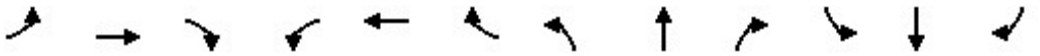
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	34	71	68	109	55	217	1314	83	103	1259	329
Future Volume (vph)	98	34	71	68	109	55	217	1314	83	103	1259	329
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	9.4	54.7	7.6	7.6	54.7	8.4	28.1	54.7	5.3	20.4	54.7
Actuated g/C Ratio	0.11	0.17	1.00	0.14	0.14	1.00	0.15	0.51	1.00	0.10	0.37	1.00
v/c Ratio	0.35	0.07	0.05	0.19	0.26	0.04	0.53	0.46	0.06	0.41	0.61	0.24
Control Delay	29.2	22.4	0.1	25.4	24.8	0.1	28.4	13.4	0.1	30.9	17.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	22.4	0.1	25.4	24.8	0.1	28.4	13.4	0.1	30.9	17.1	0.4
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		17.9			19.1			14.7			14.7	
Approach LOS		B			B			B			B	

Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 54.7		
Natural Cycle: 65		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.61		
Intersection Signal Delay: 15.1	Intersection LOS: B	
Intersection Capacity Utilization 46.2%	ICU Level of Service A	
Analysis Period (min) 15		

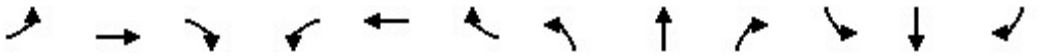
Splits and Phases: 10: Milliken Avenue & Concours Street





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	114	40	83	79	127	64	252	1528	97	120	1464	383
v/c Ratio	0.35	0.07	0.05	0.19	0.26	0.04	0.53	0.46	0.06	0.41	0.61	0.24
Control Delay	29.2	22.4	0.1	25.4	24.8	0.1	28.4	13.4	0.1	30.9	17.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	22.4	0.1	25.4	24.8	0.1	28.4	13.4	0.1	30.9	17.1	0.4
Queue Length 50th (ft)	20	6	0	10	22	0	44	121	0	21	128	0
Queue Length 95th (ft)	41	17	0	31	41	0	74	153	0	42	161	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	325	1262	1583	425	1228	1583	503	3291	1583	296	2470	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.03	0.05	0.19	0.10	0.04	0.50	0.46	0.06	0.41	0.59	0.24

Intersection Summary



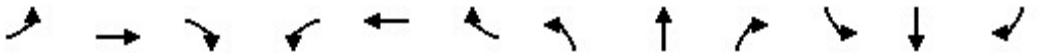
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	98	34	71	68	109	55	217	1314	83	103	1259	329
Future Volume (veh/h)	98	34	71	68	109	55	217	1314	83	103	1259	329
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	114	40	0	79	127	0	252	1528	0	120	1464	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	386		205	341		367	2494		249	2250	
Arrive On Green	0.08	0.11	0.00	0.07	0.10	0.00	0.12	0.39	0.00	0.08	0.35	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	114	40	0	79	127	0	252	1528	0	120	1464	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	1.8	0.5	0.0	1.2	1.7	0.0	3.9	9.6	0.0	1.9	9.7	0.0
Cycle Q Clear(g_c), s	1.8	0.5	0.0	1.2	1.7	0.0	3.9	9.6	0.0	1.9	9.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	244	386		205	341		367	2494		249	2250	
V/C Ratio(X)	0.47	0.10		0.39	0.37		0.69	0.61		0.48	0.65	
Avail Cap(c_a), veh/h	337	1303		306	1268		521	2996		306	2550	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.2	20.3	0.0	22.6	21.4	0.0	21.3	12.4	0.0	22.2	13.8	0.0
Incr Delay (d2), s/veh	1.4	0.1	0.0	1.2	0.7	0.0	2.3	0.3	0.0	1.4	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.2	0.0	0.4	0.7	0.0	1.4	2.9	0.0	0.7	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	20.4	0.0	23.8	22.1	0.0	23.6	12.7	0.0	23.6	14.3	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		154	A		206	A		1780	A		1584	A
Approach Delay, s/veh		22.8			22.7			14.2			15.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	24.1	7.8	10.0	10.5	22.1	8.5	9.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	3.9	11.6	3.2	2.5	5.9	11.7	3.8	3.7
Green Ext Time (p_c), s	0.0	7.9	0.0	0.1	0.2	5.8	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

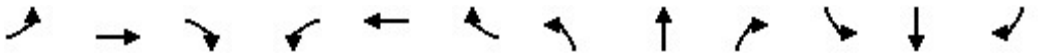
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			437			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



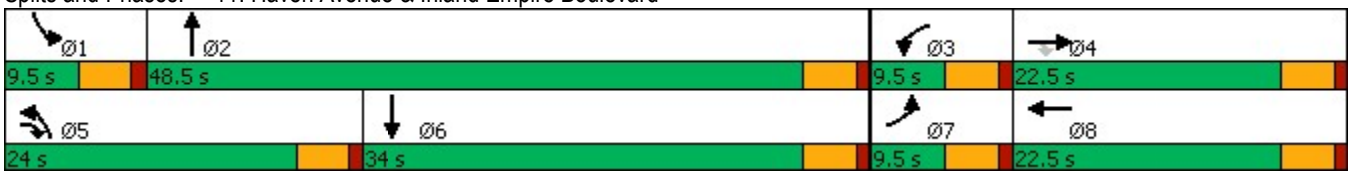
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	90	137	335	165	144	29	644	2912	906	73	1895	128
Future Volume (vph)	90	137	335	165	144	29	644	2912	906	73	1895	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	97	147	360	177	155	31	692	3131	974	78	2038	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	147	360	177	155	31	692	3131	974	78	2038	138

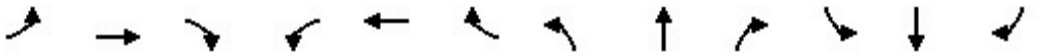
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	137	335	165	144	29	644	2912	906	73	1895	128
Future Volume (vph)	90	137	335	165	144	29	644	2912	906	73	1895	128
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	8.9	32.9	5.0	10.8	80.9	19.5	46.0	80.9	5.0	29.5	80.9
Actuated g/C Ratio	0.06	0.11	0.41	0.06	0.13	1.00	0.24	0.57	1.00	0.06	0.36	1.00
v/c Ratio	0.51	0.38	0.52	0.68	0.33	0.02	0.93	0.86	0.62	0.41	0.87	0.09
Control Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.1	1.8	44.0	29.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.1	1.8	44.0	29.5	0.1
LOS	D	D	B	D	C	A	D	B	A	D	C	A
Approach Delay		26.7			40.4			20.4			28.2	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 80.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 71.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard

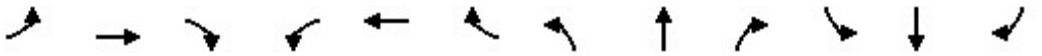




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	97	147	360	177	155	31	692	3131	974	78	2038	138
v/c Ratio	0.51	0.38	0.52	0.68	0.33	0.02	0.93	0.86	0.62	0.41	0.87	0.09
Control Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.1	1.8	44.0	29.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.1	1.8	44.0	29.5	0.1
Queue Length 50th (ft)	25	36	105	31	38	0	177	382	0	20	273	0
Queue Length 95th (ft)	50	64	183	#63	67	0	#294	476	0	42	#340	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	189	787	686	259	787	1583	741	3642	1583	189	2338	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.19	0.52	0.68	0.20	0.02	0.93	0.86	0.62	0.41	0.87	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	137	335	165	144	29	644	2912	906	73	1895	128
Future Volume (veh/h)	90	137	335	165	144	29	644	2912	906	73	1895	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	97	147	360	177	155	0	692	3131	0	78	2038	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	697	656	236	715		673	3212		148	2119	
Arrive On Green	0.05	0.20	0.20	0.06	0.20	0.00	0.22	0.50	0.00	0.05	0.33	0.00
Sat Flow, veh/h	3092	3554	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	97	147	360	177	155	0	692	3131	0	78	2038	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	2.8	3.1	15.4	3.7	3.3	0.0	19.5	42.5	0.0	2.2	27.9	0.0
Cycle Q Clear(g_c), s	2.8	3.1	15.4	3.7	3.3	0.0	19.5	42.5	0.0	2.2	27.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	157	697	656	236	715		673	3212		148	2119	
V/C Ratio(X)	0.62	0.21	0.55	0.75	0.22		1.03	0.97		0.53	0.96	
Avail Cap(c_a), veh/h	173	714	664	236	715		673	3212		173	2119	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.7	30.2	19.9	41.7	29.9	0.0	35.0	21.9	0.0	41.7	29.5	0.0
Incr Delay (d2), s/veh	5.6	0.1	0.9	12.5	0.2	0.0	42.1	10.7	0.0	2.9	11.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.3	5.6	1.5	1.4	0.0	11.1	17.0	0.0	0.9	12.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	30.3	20.8	54.2	30.0	0.0	77.1	32.6	0.0	44.6	41.4	0.0
LnGrp LOS	D	C	C	D	C		F	C		D	D	
Approach Vol, veh/h		604			332	A		3823	A		2116	A
Approach Delay, s/veh		27.4			42.9			40.7			41.5	
Approach LOS		C			D			D			D	

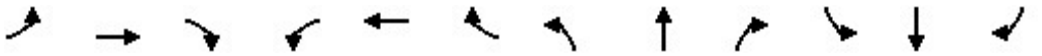
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	49.2	9.5	22.1	24.0	34.0	9.1	22.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.2	44.5	5.7	17.4	21.5	29.9	4.8	5.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	39.9
HCM 6th LOS	D

Notes

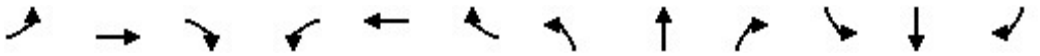
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



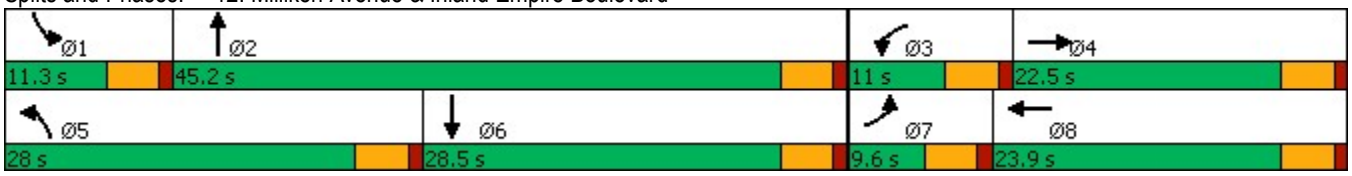
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	89	47	73	138	109	35	568	1470	154	82	1154	182
Future Volume (vph)	89	47	73	138	109	35	568	1470	154	82	1154	182
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	103	55	85	160	127	41	660	1709	179	95	1342	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	55	85	160	127	41	660	1709	179	95	1342	212

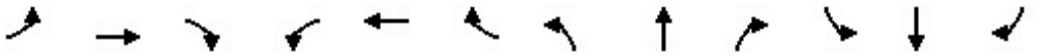
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	47	73	138	109	35	568	1470	154	82	1154	182
Future Volume (vph)	89	47	73	138	109	35	568	1470	154	82	1154	182
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.2	7.0	72.7	8.7	8.3	72.7	20.3	39.5	72.7	6.7	23.1	72.7
Actuated g/C Ratio	0.07	0.10	1.00	0.12	0.11	1.00	0.28	0.54	1.00	0.09	0.32	1.00
v/c Ratio	0.47	0.16	0.05	0.43	0.32	0.03	0.77	0.49	0.11	0.34	0.66	0.13
Control Delay	43.1	33.9	0.1	37.8	34.3	0.0	31.7	12.3	0.1	37.6	24.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	33.9	0.1	37.8	34.3	0.0	31.7	12.3	0.1	37.6	24.3	0.2
LOS	D	C	A	D	C	A	C	B	A	D	C	A
Approach Delay		26.0			31.7			16.5			22.0	
Approach LOS		C			C			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 19.9	Intersection LOS: B
Intersection Capacity Utilization 57.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	103	55	85	160	127	41	660	1709	179	95	1342	212
v/c Ratio	0.47	0.16	0.05	0.43	0.32	0.03	0.77	0.49	0.11	0.34	0.66	0.13
Control Delay	43.1	33.9	0.1	37.8	34.3	0.0	31.7	12.3	0.1	37.6	24.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	33.9	0.1	37.8	34.3	0.0	31.7	12.3	0.1	37.6	24.3	0.2
Queue Length 50th (ft)	25	13	0	39	30	0	148	151	0	22	161	0
Queue Length 95th (ft)	48	29	0	#73	54	0	202	180	0	44	200	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	220	899	1583	368	969	1583	1019	3682	1583	294	2171	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.06	0.05	0.43	0.13	0.03	0.65	0.46	0.11	0.32	0.62	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	47	73	138	109	35	568	1470	154	82	1154	182
Future Volume (veh/h)	89	47	73	138	109	35	568	1470	154	82	1154	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	103	55	0	160	127	0	660	1709	0	95	1342	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	201	272		239	316		801	3256		195	1996	
Arrive On Green	0.06	0.08	0.00	0.08	0.09	0.00	0.26	0.51	0.00	0.06	0.31	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	103	55	0	160	127	0	660	1709	0	95	1342	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	2.1	0.9	0.0	3.3	2.2	0.0	13.1	11.6	0.0	1.9	11.8	0.0
Cycle Q Clear(g_c), s	2.1	0.9	0.0	3.3	2.2	0.0	13.1	11.6	0.0	1.9	11.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	201	272		239	316		801	3256		195	1996	
V/C Ratio(X)	0.51	0.20		0.67	0.40		0.82	0.52		0.49	0.67	
Avail Cap(c_a), veh/h	243	984		309	1061		1118	4029		323	2376	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.4	28.2	0.0	29.2	28.0	0.0	22.7	10.8	0.0	29.4	19.5	0.0
Incr Delay (d2), s/veh	2.0	0.4	0.0	3.6	0.8	0.0	3.6	0.1	0.0	1.9	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.4	0.0	1.3	0.9	0.0	4.8	3.5	0.0	0.7	4.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.4	28.5	0.0	32.8	28.8	0.0	26.3	10.9	0.0	31.3	20.1	0.0
LnGrp LOS	C	C		C	C		C	B		C	C	
Approach Vol, veh/h		158	A		287	A		2369	A		1437	A
Approach Delay, s/veh		30.4			31.0			15.2			20.9	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	37.4	9.5	9.5	21.3	24.7	8.7	10.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	3.9	13.6	5.3	2.9	15.1	13.8	4.1	4.2
Green Ext Time (p_c), s	0.1	15.6	0.1	0.2	1.8	6.4	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.943	0.850				
Flt Protected	0.970					
Satd. Flow (prot)	3132	1441	6408	0	0	6408
Flt Permitted	0.970					
Satd. Flow (perm)	3132	1441	6408	0	0	6408
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

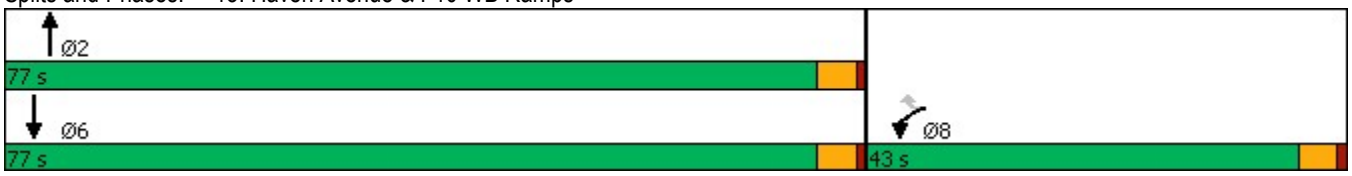
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	695	951	3646	0	0	2153
Future Volume (vph)	695	951	3646	0	0	2153
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	764	1045	4007	0	0	2366
Shared Lane Traffic (%)		45%				
Lane Group Flow (vph)	1234	575	4007	0	0	2366

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	695	951	3646	2153
Future Volume (vph)	695	951	3646	2153
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	38.5	38.5	72.5	72.5
Actuated g/C Ratio	0.32	0.32	0.60	0.60
v/c Ratio	1.23	1.24	1.04	0.61
Control Delay	148.0	163.0	48.8	15.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	148.0	163.0	48.8	15.8
LOS	F	F	D	B
Approach Delay	152.8		48.8	15.8
Approach LOS	F		D	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 62.2	Intersection LOS: E
Intersection Capacity Utilization 103.1%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	1234	575	4007	2366
v/c Ratio	1.23	1.24	1.04	0.61
Control Delay	148.0	163.0	48.8	15.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	148.0	163.0	48.8	15.8
Queue Length 50th (ft)	~607	~608	~970	314
Queue Length 95th (ft)	#742	#851	#1022	348
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1004	462	3871	3871
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.23	1.24	1.04	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

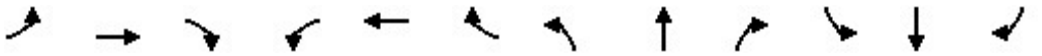
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	695	951	3646	0	0	2153
Future Volume (veh/h)	695	951	3646	0	0	2153
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1772	1870	1870	0	0	1870
Adj Flow Rate, veh/h	603	1217	4007	0	0	2366
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	541	1017	3887	0	0	3887
Arrive On Green	0.32	0.32	0.60	0.00	0.00	0.60
Sat Flow, veh/h	1688	3170	6958	0	0	6958
Grp Volume(v), veh/h	603	1217	4007	0	0	2366
Grp Sat Flow(s),veh/h/ln	1688	1585	1609	0	0	1609
Q Serve(g_s), s	38.5	38.5	72.5	0.0	0.0	27.6
Cycle Q Clear(g_c), s	38.5	38.5	72.5	0.0	0.0	27.6
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	541	1017	3887	0	0	3887
V/C Ratio(X)	1.11	1.20	1.03	0.00	0.00	0.61
Avail Cap(c_a), veh/h	541	1017	3887	0	0	3887
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	40.8	40.8	23.8	0.0	0.0	14.9
Incr Delay (d2), s/veh	73.8	98.2	23.1	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.8	28.6	31.5	0.0	0.0	9.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	114.5	138.9	46.9	0.0	0.0	15.1
LnGrp LOS	F	F	F	A	A	B
Approach Vol, veh/h	1820		4007			2366
Approach Delay, s/veh	130.8		46.9			15.1
Approach LOS	F		D			B

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	77.0			77.0	43.0
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s	74.5			29.6	40.5
Green Ext Time (p_c), s	0.0			30.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	56.4
HCM 6th LOS	E

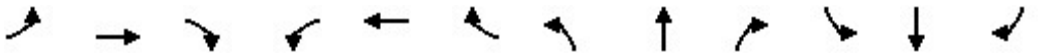
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			220			182			473			130
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



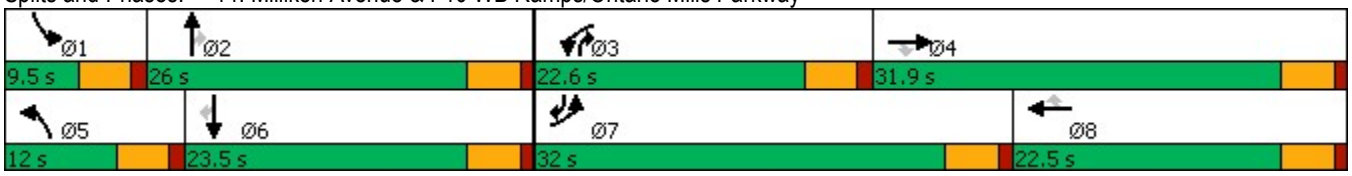
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	822	125	332	227	259	48	216	1251	421	117	765	354
Future Volume (vph)	822	125	332	227	259	48	216	1251	421	117	765	354
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	924	140	373	255	291	54	243	1406	473	131	860	398
Shared Lane Traffic (%)												
Lane Group Flow (vph)	924	140	373	255	291	54	243	1406	473	131	860	398

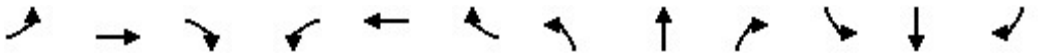
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	822	125	332	227	259	48	216	1251	421	117	765	354
Future Volume (vph)	822	125	332	227	259	48	216	1251	421	117	765	354
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	27.5	27.0	27.0	12.9	12.4	12.4	7.5	21.5	39.0	5.0	19.0	51.1
Actuated g/C Ratio	0.33	0.32	0.32	0.15	0.15	0.15	0.09	0.25	0.46	0.06	0.22	0.60
v/c Ratio	0.92	0.24	0.57	0.54	0.56	0.14	0.89	0.86	0.48	0.72	0.60	0.39
Control Delay	44.2	23.4	13.9	37.3	37.7	0.8	73.3	37.1	3.1	63.2	31.6	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	23.4	13.9	37.3	37.7	0.8	73.3	37.1	3.1	63.2	31.6	7.3
LOS	D	C	B	D	D	A	E	D	A	E	C	A
Approach Delay		34.3			34.2			33.7			27.6	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 84.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 32.4	Intersection LOS: C
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

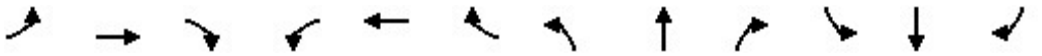




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	924	140	373	255	291	54	243	1406	473	131	860	398
v/c Ratio	0.92	0.24	0.57	0.54	0.56	0.14	0.89	0.86	0.48	0.72	0.60	0.39
Control Delay	44.2	23.4	13.9	37.3	37.7	0.8	73.3	37.1	3.1	63.2	31.6	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	23.4	13.9	37.3	37.7	0.8	73.3	37.1	3.1	63.2	31.6	7.3
Queue Length 50th (ft)	239	54	61	64	76	0	66	205	0	36	118	61
Queue Length 95th (ft)	#384	106	156	100	114	0	#141	#284	45	#83	160	130
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1001	606	664	659	755	480	273	1633	1053	182	1443	1008
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.23	0.56	0.39	0.39	0.11	0.89	0.86	0.45	0.72	0.60	0.39

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	822	125	332	227	259	48	216	1251	421	117	765	354
Future Volume (veh/h)	822	125	332	227	259	48	216	1251	421	117	765	354
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	924	140	373	255	291	54	243	1406	473	131	860	398
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1006	625	529	346	428	191	289	1723	602	193	1523	891
Arrive On Green	0.33	0.33	0.33	0.11	0.12	0.12	0.09	0.27	0.27	0.06	0.24	0.24
Sat Flow, veh/h	3092	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	924	140	373	255	291	54	243	1406	473	131	860	398
Grp Sat Flow(s),veh/h/ln	1546	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	23.1	4.3	16.5	6.4	6.3	2.5	6.2	16.4	21.2	3.3	9.5	11.8
Cycle Q Clear(g_c), s	23.1	4.3	16.5	6.4	6.3	2.5	6.2	16.4	21.2	3.3	9.5	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1006	625	529	346	428	191	289	1723	602	193	1523	891
V/C Ratio(X)	0.92	0.22	0.70	0.74	0.68	0.28	0.84	0.82	0.79	0.68	0.56	0.45
Avail Cap(c_a), veh/h	1059	638	541	697	797	355	289	1723	602	193	1523	891
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.1	19.3	23.3	34.5	33.8	32.1	35.8	27.5	22.0	36.9	27.0	10.3
Incr Delay (d2), s/veh	12.2	0.2	4.0	3.1	1.9	0.8	19.5	3.2	6.8	9.3	0.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.7	1.8	6.4	2.5	2.8	1.0	3.1	6.4	8.5	1.5	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.2	19.4	27.3	37.6	35.7	32.9	55.3	30.7	28.8	46.2	27.5	10.6
LnGrp LOS	D	B	C	D	D	C	E	C	C	D	C	B
Approach Vol, veh/h		1437			600			2122			1389	
Approach Delay, s/veh		33.6			36.3			33.1			24.4	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	26.0	13.5	31.3	12.0	23.5	30.6	14.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	5.3	23.2	8.4	18.5	8.2	13.8	25.1	8.3
Green Ext Time (p_c), s	0.0	0.0	0.6	1.5	0.0	3.2	1.0	1.4

Intersection Summary	
HCM 6th Ctrl Delay	31.4
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3243	1441	0	6408	6408	0
Flt Permitted	0.954					
Satd. Flow (perm)	3243	1441	0	6408	6408	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

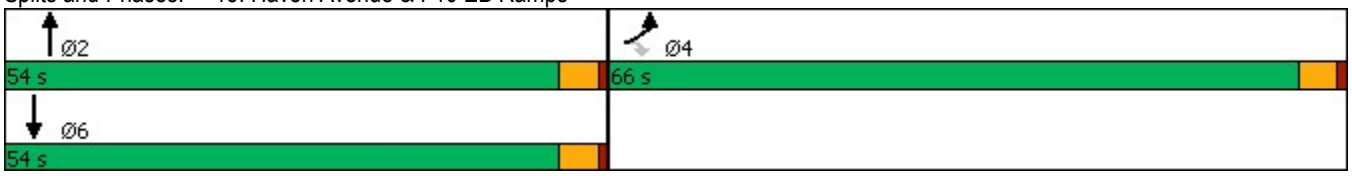
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1734	816	0	2373	2137	0
Future Volume (vph)	1734	816	0	2373	2137	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1948	917	0	2666	2401	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	2040	825	0	2666	2401	0

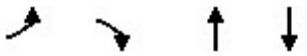
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1734	816	2373	2137
Future Volume (vph)	1734	816	2373	2137
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	61.5	61.5	49.5	49.5
Actuated g/C Ratio	0.51	0.51	0.41	0.41
v/c Ratio	1.23	1.12	1.01	0.91
Control Delay	136.3	99.7	54.9	39.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	136.3	99.7	54.9	39.3
LOS	F	F	D	D
Approach Delay	125.8		54.9	39.3
Approach LOS	F		D	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 75.8	Intersection LOS: E
Intersection Capacity Utilization 103.1%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	2040	825	2666	2401
v/c Ratio	1.23	1.12	1.01	0.91
Control Delay	136.3	99.7	54.9	39.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	136.3	99.7	54.9	39.3
Queue Length 50th (ft)	~1004	~807	~603	500
Queue Length 95th (ft)	#1119	#1054	#686	543
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1662	738	2643	2643
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.23	1.12	1.01	0.91

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1734	816	0	2373	2137	0
Future Volume (veh/h)	1734	816	0	2373	2137	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1772	1870	0	1870	1870	0
Adj Flow Rate, veh/h	1948	917	0	2666	2401	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1730	812	0	2654	2654	0
Arrive On Green	0.51	0.51	0.00	0.41	0.41	0.00
Sat Flow, veh/h	3375	1585	0	6958	6958	0
Grp Volume(v), veh/h	1948	917	0	2666	2401	0
Grp Sat Flow(s),veh/h/ln	1688	1585	0	1609	1609	0
Q Serve(g_s), s	61.5	61.5	0.0	49.5	42.0	0.0
Cycle Q Clear(g_c), s	61.5	61.5	0.0	49.5	42.0	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1730	812	0	2654	2654	0
V/C Ratio(X)	1.13	1.13	0.00	1.00	0.90	0.00
Avail Cap(c_a), veh/h	1730	812	0	2654	2654	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	29.3	0.0	35.3	33.0	0.0
Incr Delay (d2), s/veh	64.9	73.3	0.0	18.6	4.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	39.3	38.8	0.0	22.3	16.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	94.2	102.6	0.0	53.8	37.9	0.0
LnGrp LOS	F	F	A	F	D	A
Approach Vol, veh/h	2865			2666	2401	
Approach Delay, s/veh	96.9			53.8	37.9	
Approach LOS	F			D	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		54.0		66.0		54.0
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		51.5		63.5		44.0
Green Ext Time (p_c), s		0.0		0.0		5.2

Intersection Summary		
HCM 6th Ctrl Delay	64.6	
HCM 6th LOS	E	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1700	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3072	1583	3072	6408	6408	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3072	1583	3072	6408	6408	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						305
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	916	822	223	978	1018	383
Future Volume (vph)	916	822	223	978	1018	383
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1053	945	256	1124	1170	440
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1053	945	256	1124	1170	440

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	916	822	223	978	1018	383
Future Volume (vph)	916	822	223	978	1018	383
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	28.0	28.0	52.0	24.0	38.0
Total Split (%)	42.2%	31.1%	31.1%	57.8%	26.7%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	32.1	56.7	20.0	43.9	19.4	56.0
Actuated g/C Ratio	0.38	0.67	0.24	0.52	0.23	0.66
v/c Ratio	0.91	0.90	0.36	0.34	0.80	0.38
Control Delay	38.5	24.9	28.7	12.5	36.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	24.9	28.7	12.5	36.9	3.2
LOS	D	C	C	B	D	A
Approach Delay	32.1			15.5	27.7	
Approach LOS	C			B	C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 85.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 73.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1053	945	256	1124	1170	440
v/c Ratio	0.91	0.90	0.36	0.34	0.80	0.38
Control Delay	38.5	24.9	28.7	12.5	36.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	24.9	28.7	12.5	36.9	3.2
Queue Length 50th (ft)	289	368	60	100	186	27
Queue Length 95th (ft)	#393	#601	90	118	218	59
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1218	1122	855	3605	1480	1171
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.84	0.30	0.31	0.79	0.38

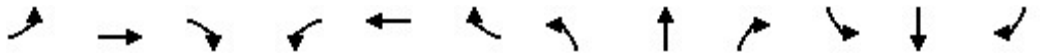
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	916	822	223	978	1018	383
Future Volume (veh/h)	916	822	223	978	1018	383
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1870	1673	1870	1870	1870
Adj Flow Rate, veh/h	1053	945	256	1124	1170	440
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1405	905	360	2725	1582	1110
Arrive On Green	0.45	0.45	0.12	0.42	0.25	0.25
Sat Flow, veh/h	3092	1585	3092	6696	6696	1585
Grp Volume(v), veh/h	1053	945	256	1124	1170	440
Grp Sat Flow(s),veh/h/ln	1546	1585	1546	1609	1609	1585
Q Serve(g_s), s	20.8	33.5	5.9	9.0	12.4	8.5
Cycle Q Clear(g_c), s	20.8	33.5	5.9	9.0	12.4	8.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1405	905	360	2725	1582	1110
V/C Ratio(X)	0.75	1.04	0.71	0.41	0.74	0.40
Avail Cap(c_a), veh/h	1405	905	986	4146	1702	1140
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.6	15.8	31.4	14.8	25.6	4.6
Incr Delay (d2), s/veh	2.3	42.1	2.6	0.1	1.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	10.6	2.3	3.0	4.7	7.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.9	57.9	34.0	14.9	27.2	4.8
LnGrp LOS	B	F	C	B	C	A
Approach Vol, veh/h	1998			1380	1610	
Approach Delay, s/veh	37.4			18.5	21.1	
Approach LOS	D			B	C	

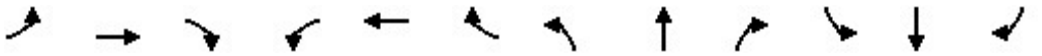
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		35.7		38.0	13.1	22.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	23.5	19.5
Max Q Clear Time (g_c+I1), s		11.0		35.5	7.9	14.4
Green Ext Time (p_c), s		10.2		0.0	0.8	3.8

Intersection Summary		
HCM 6th Ctrl Delay		26.9
HCM 6th LOS		C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.964				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	4902	0	3072	3539	1583	3072	5085	1583	3072	6216	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	4902	0	3072	3539	1583	3072	5085	1583	3072	6216	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65				136			177		65	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	510	961	303	200	823	143	353	2139	263	204	2057	519
Future Volume (vph)	510	961	303	200	823	143	353	2139	263	204	2057	519
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	554	1045	329	217	895	155	384	2325	286	222	2236	564
Shared Lane Traffic (%)												
Lane Group Flow (vph)	554	1374	0	217	895	155	384	2325	286	222	2800	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	510	961	200	823	143	353	2139	263	204	2057
Future Volume (vph)	510	961	200	823	143	353	2139	263	204	2057
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.5	32.5	9.5	24.5	24.5	9.5	52.5	120.0	7.5	50.5
Actuated g/C Ratio	0.15	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	1.24	1.00	0.89	1.24	0.36	1.58	1.05	0.18	1.16	1.06
Control Delay	167.3	65.9	90.6	159.9	11.7	316.0	65.7	0.3	162.5	67.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.3	65.9	90.6	159.9	11.7	316.0	65.7	0.3	162.5	67.8
LOS	F	E	F	F	B	F	E	A	F	E
Approach Delay		95.0		129.9			91.5			74.7
Approach LOS		F		F			F			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.58	
Intersection Signal Delay: 92.0	Intersection LOS: F
Intersection Capacity Utilization 103.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	554	1374	217	895	155	384	2325	286	222	2800
v/c Ratio	1.24	1.00	0.89	1.24	0.36	1.58	1.05	0.18	1.16	1.06
Control Delay	167.3	65.9	90.6	159.9	11.7	316.0	65.7	0.3	162.5	67.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.3	65.9	90.6	159.9	11.7	316.0	65.7	0.3	162.5	67.8
Queue Length 50th (ft)	~274	375	87	~452	12	~218	~716	0	~104	~682
Queue Length 95th (ft)	#386	#488	#160	#583	70	#318	#809	0	#186	#753
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	448	1375	243	722	431	243	2224	1583	192	2653
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.24	1.00	0.89	1.24	0.36	1.58	1.05	0.18	1.16	1.06

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

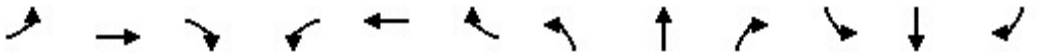
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	510	961	303	200	823	143	353	2139	263	204	2057	519
Future Volume (veh/h)	510	961	303	200	823	143	353	2139	263	204	2057	519
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	554	1045	329	217	895	155	384	2325	0	222	2236	564
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	451	1042	328	245	726	324	245	2234		193	2183	538
Arrive On Green	0.15	0.27	0.27	0.08	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	3092	3846	1210	3092	3554	1585	3092	5106	1585	3092	5186	1279
Grp Volume(v), veh/h	554	925	449	217	895	155	384	2325	0	222	2077	723
Grp Sat Flow(s),veh/h/ln	1546	1702	1652	1546	1777	1585	1546	1702	1585	1546	1609	1640
Q Serve(g_s), s	17.5	32.5	32.5	8.3	24.5	10.4	9.5	52.5	0.0	7.5	50.5	50.5
Cycle Q Clear(g_c), s	17.5	32.5	32.5	8.3	24.5	10.4	9.5	52.5	0.0	7.5	50.5	50.5
Prop In Lane	1.00		0.73	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	451	922	448	245	726	324	245	2234		193	2031	690
V/C Ratio(X)	1.23	1.00	1.00	0.89	1.23	0.48	1.57	1.04		1.15	1.02	1.05
Avail Cap(c_a), veh/h	451	922	448	245	726	324	245	2234		193	2031	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.2	43.8	43.8	54.7	47.8	42.1	55.3	33.8	0.0	56.3	34.8	34.8
Incr Delay (d2), s/veh	121.1	30.4	43.4	29.8	116.9	1.1	274.8	30.7	0.0	110.5	26.0	47.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.3	17.4	18.5	4.3	22.6	4.2	13.0	27.3	0.0	5.9	24.1	28.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	172.4	74.2	87.2	84.5	164.6	43.2	330.1	64.4	0.0	166.8	60.7	82.1
LnGrp LOS	F	F	F	F	F	D	F	F		F	F	F
Approach Vol, veh/h		1928			1267			2709	A		3022	
Approach Delay, s/veh		105.4			136.1			102.1			73.6	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	14.0	37.0	14.0	55.0	22.0	29.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	9.5	54.5	10.3	34.5	11.5	52.5	19.5	26.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	98.0
HCM 6th LOS	F

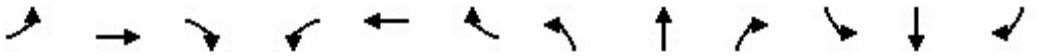
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt						0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	6408	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	6408	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				163			132		227	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	6	2522	7	1	1521	193	20	0	13	151	0	17
Future Volume (vph)	6	2522	7	1	1521	193	20	0	13	151	0	17
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	6	2655	7	1	1601	203	21	0	14	159	0	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	2662	0	1	1601	203	21	0	14	159	18	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	6	2522	1	1521	193	20	13	151	0
Future Volume (vph)	6	2522	1	1521	193	20	13	151	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.0	38.0	5.0	38.0	38.0	6.3	5.5	9.8	17.7
Actuated g/C Ratio	0.07	0.55	0.07	0.55	0.55	0.09	0.08	0.14	0.26
v/c Ratio	0.05	0.75	0.01	0.57	0.21	0.14	0.06	0.66	0.02
Control Delay	32.5	13.9	32.0	11.4	3.2	31.9	0.5	44.3	0.1
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	13.9	32.0	11.6	3.2	31.9	0.5	44.3	0.1
LOS	C	B	C	B	A	C	A	D	A
Approach Delay		13.9		10.7					39.8
Approach LOS		B		B					D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 60.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	6	2662	1	1601	203	21	14	159	18
v/c Ratio	0.05	0.75	0.01	0.57	0.21	0.14	0.06	0.66	0.02
Control Delay	32.5	13.9	32.0	11.4	3.2	31.9	0.5	44.3	0.1
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	13.9	32.0	11.6	3.2	31.9	0.5	44.3	0.1
Queue Length 50th (ft)	2	210	0	136	7	8	0	62	0
Queue Length 95th (ft)	14	351	5	239	41	30	0	#163	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	122	3550	122	2816	949	179	539	242	1113
Starvation Cap Reductn	0	0	0	397	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.75	0.01	0.66	0.21	0.12	0.03	0.66	0.02

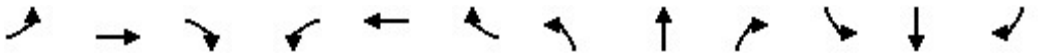
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	2522	7	1	1521	193	20	0	13	151	0	17
Future Volume (veh/h)	6	2522	7	1	1521	193	20	0	13	151	0	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	6	2655	7	1	1601	203	21	0	14	159	0	18
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	13	3600	9	3	2721	845	41	139	118	196	296	264
Arrive On Green	0.01	0.54	0.54	0.00	0.53	0.53	0.02	0.00	0.07	0.12	0.00	0.17
Sat Flow, veh/h	1688	6675	18	1688	5106	1585	1688	1870	1585	1688	1777	1585
Grp Volume(v), veh/h	6	1919	743	1	1601	203	21	0	14	159	0	18
Grp Sat Flow(s),veh/h/ln	1688	1609	1867	1688	1702	1585	1688	1870	1585	1688	1777	1585
Q Serve(g_s), s	0.2	20.4	20.4	0.0	14.3	4.6	0.8	0.0	0.6	6.2	0.0	0.6
Cycle Q Clear(g_c), s	0.2	20.4	20.4	0.0	14.3	4.6	0.8	0.0	0.6	6.2	0.0	0.6
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	13	2603	1007	3	2721	845	41	139	118	196	296	264
V/C Ratio(X)	0.45	0.74	0.74	0.40	0.59	0.24	0.52	0.00	0.12	0.81	0.00	0.07
Avail Cap(c_a), veh/h	126	2726	1055	126	2885	896	184	535	454	249	577	515
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.1	11.8	11.8	33.5	10.7	8.4	32.3	0.0	29.0	28.9	0.0	23.6
Incr Delay (d2), s/veh	22.0	1.0	2.6	79.0	0.3	0.1	9.7	0.0	0.4	14.4	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	6.3	7.8	0.1	4.6	1.4	0.4	0.0	0.2	3.2	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.2	12.8	14.5	112.4	10.9	8.5	42.1	0.0	29.4	43.3	0.0	23.7
LnGrp LOS	E	B	B	F	B	A	D	A	C	D	A	C
Approach Vol, veh/h		2668			1805			35			177	
Approach Delay, s/veh		13.4			10.7			37.0			41.3	
Approach LOS		B			B			D			D	

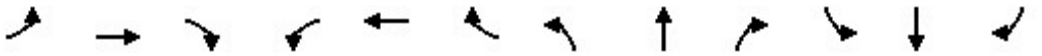
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	9.5	4.6	40.7	6.1	15.7	5.0	40.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	8.2	2.6	2.0	22.4	2.8	2.6	2.2	16.3
Green Ext Time (p_c), s	0.1	0.0	0.0	13.8	0.0	0.0	0.0	13.3

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	3072	6401	0	1676	5060	0	1676	1863	1583	0	1775	1583
Flt Permitted	0.950			0.950			0.715				0.730	
Satd. Flow (perm)	3072	6401	0	1676	5060	0	1262	1863	1583	0	1360	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10				152			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



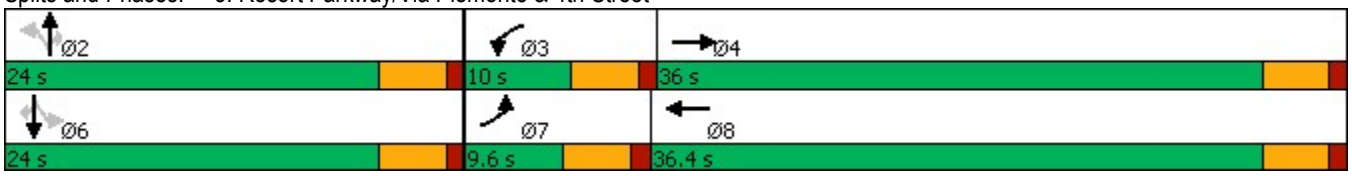
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	41	2545	12	7	1521	54	16	0	28	60	1	28
Future Volume (vph)	41	2545	12	7	1521	54	16	0	28	60	1	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	2679	13	7	1601	57	17	0	29	63	1	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	2692	0	7	1658	0	17	0	29	0	64	29

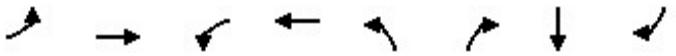
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	41	2545	7	1521	16	28	60	1	28
Future Volume (vph)	41	2545	7	1521	16	28	60	1	28
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	33.8	5.6	32.2	7.9	7.9		7.9	7.9
Actuated g/C Ratio	0.10	0.64	0.11	0.61	0.15	0.15		0.15	0.15
v/c Ratio	0.14	0.65	0.04	0.53	0.09	0.08		0.31	0.09
Control Delay	25.7	7.8	25.3	7.8	22.0	0.4		25.6	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	25.7	7.8	25.3	7.8	22.0	0.4		25.6	0.6
LOS	C	A	C	A	C	A		C	A
Approach Delay		8.0		7.9				17.8	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 52.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 8.2	Intersection LOS: A
Intersection Capacity Utilization 56.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	43	2692	7	1658	17	29	64	29
v/c Ratio	0.14	0.65	0.04	0.53	0.09	0.08	0.31	0.09
Control Delay	25.7	7.8	25.3	7.8	22.0	0.4	25.6	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	7.8	25.3	7.8	22.0	0.4	25.6	0.6
Queue Length 50th (ft)	5	102	2	67	4	0	16	0
Queue Length 95th (ft)	21	277	13	190	20	0	52	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	302	4116	177	3119	474	690	511	654
Starvation Cap Reductn	0	20	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.66	0.04	0.53	0.04	0.04	0.13	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	2545	12	7	1521	54	16	0	28	60	1	28
Future Volume (veh/h)	41	2545	12	7	1521	54	16	0	28	60	1	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	2679	13	7	1601	57	17	0	29	63	1	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	140	4060	20	16	2904	103	226	193	163	287	3	163
Arrive On Green	0.05	0.61	0.61	0.01	0.57	0.57	0.10	0.00	0.10	0.10	0.10	0.10
Sat Flow, veh/h	3092	6658	32	1688	5062	180	1307	1870	1585	1356	33	1585
Grp Volume(v), veh/h	43	1941	751	7	1077	581	17	0	29	64	0	29
Grp Sat Flow(s),veh/h/ln	1546	1609	1865	1688	1702	1838	1307	1870	1585	1390	0	1585
Q Serve(g_s), s	0.7	12.8	12.8	0.2	9.6	9.6	0.6	0.0	0.8	2.1	0.0	0.8
Cycle Q Clear(g_c), s	0.7	12.8	12.8	0.2	9.6	9.6	2.7	0.0	0.8	2.1	0.0	0.8
Prop In Lane	1.00		0.02	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	140	2943	1137	16	1953	1054	226	193	163	290	0	163
V/C Ratio(X)	0.31	0.66	0.66	0.45	0.55	0.55	0.08	0.00	0.18	0.22	0.00	0.18
Avail Cap(c_a), veh/h	325	3130	1209	191	2236	1207	617	751	636	704	0	636
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	6.2	6.2	23.9	6.5	6.5	21.7	0.0	19.9	20.5	0.0	19.9
Incr Delay (d2), s/veh	1.2	0.5	1.2	18.7	0.2	0.5	0.1	0.0	0.5	0.4	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.7	3.4	0.2	2.3	2.6	0.2	0.0	0.3	0.6	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.7	6.7	7.4	42.6	6.7	6.9	21.9	0.0	20.4	20.9	0.0	20.4
LnGrp LOS	C	A	A	D	A	A	C	A	C	C	A	C
Approach Vol, veh/h		2735			1665			46			93	
Approach Delay, s/veh		7.1			6.9			21.0			20.7	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	5.0	34.1		9.5	6.7	32.4				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		4.7	2.2	14.8		4.1	2.7	11.6				
Green Ext Time (p_c), s		0.1	0.0	14.8		0.3	0.0	12.1				

Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	5060	0	0	5085	0	1611
Flt Permitted						
Satd. Flow (perm)	5060	0	0	5085	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	2555	89	0	1544	0	38
Future Volume (vph)	2555	89	0	1544	0	38
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	2661	93	0	1608	0	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2754	0	0	1608	0	40

Intersection Summary

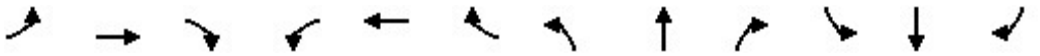
Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2555	89	0	1544	0	38
Future Vol, veh/h	2555	89	0	1544	0	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2661	93	0	1608	0	40

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1377
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	115
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	115
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

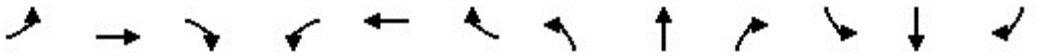
Approach	EB	WB	NB
HCM Control Delay, s	0	0	51.9
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	115	-	-	-
HCM Lane V/C Ratio	0.344	-	-	-
HCM Control Delay (s)	51.9	-	-	-
HCM Lane LOS	F	-	-	-
HCM 95th %tile Q(veh)	1.4	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6280	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6280	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			187			280			55		32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



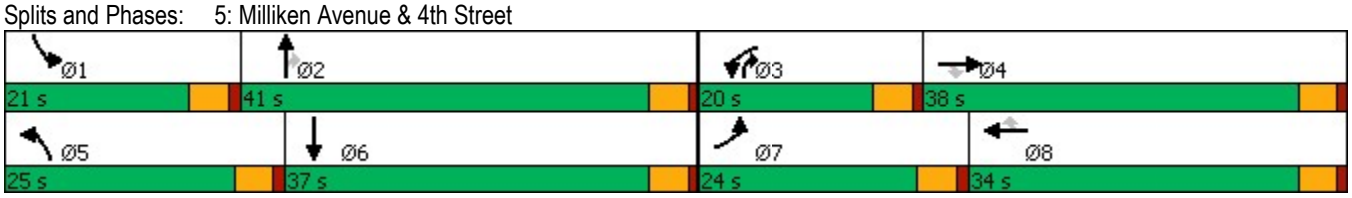
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	610	1501	288	516	1184	385	426	2083	511	605	1288	201
Future Volume (vph)	610	1501	288	516	1184	385	426	2083	511	605	1288	201
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	635	1564	300	538	1233	401	444	2170	532	630	1342	209
Shared Lane Traffic (%)												
Lane Group Flow (vph)	635	1564	300	538	1233	401	444	2170	532	630	1551	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	610	1501	288	516	1184	385	426	2083	511	605	1288
Future Volume (vph)	610	1501	288	516	1184	385	426	2083	511	605	1288
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.5	33.5	33.5	15.5	29.5	29.5	19.9	36.5	56.5	16.5	33.1
Actuated g/C Ratio	0.16	0.28	0.28	0.13	0.25	0.25	0.17	0.30	0.47	0.14	0.28
v/c Ratio	1.27	1.10	0.52	1.36	0.99	0.67	0.87	1.11	0.69	1.49	0.88
Control Delay	178.8	97.7	17.0	217.0	67.6	18.3	67.5	98.0	27.6	270.5	47.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	178.8	97.7	17.0	217.0	67.6	18.3	67.5	98.0	27.6	270.5	47.9
LOS	F	F	B	F	E	B	E	F	C	F	D
Approach Delay		108.6			95.5			81.8			112.2
Approach LOS		F			F			F			F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.49	
Intersection Signal Delay: 98.1	Intersection LOS: F
Intersection Capacity Utilization 109.9%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

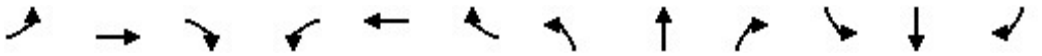


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	635	1564	300	538	1233	401	444	2170	532	630	1551
v/c Ratio	1.27	1.10	0.52	1.36	0.99	0.67	0.87	1.11	0.69	1.49	0.88
Control Delay	178.8	97.7	17.0	217.0	67.6	18.3	67.5	98.0	27.6	270.5	47.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	178.8	97.7	17.0	217.0	67.6	18.3	67.5	98.0	27.6	270.5	47.9
Queue Length 50th (ft)	~320	~504	68	~281	349	80	173	~560	284	~347	331
Queue Length 95th (ft)	#437	#601	158	#393	#453	196	#256	#635	418	#464	380
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	499	1419	576	396	1250	600	524	1949	774	422	1756
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.27	1.10	0.52	1.36	0.99	0.67	0.85	1.11	0.69	1.49	0.88

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

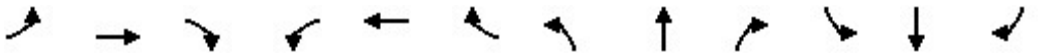
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	610	1501	288	516	1184	385	426	2083	511	605	1288	201
Future Volume (veh/h)	610	1501	288	516	1184	385	426	2083	511	605	1288	201
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	635	1564	300	538	1233	401	444	2170	532	630	1342	209
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	502	1425	442	399	1255	390	495	1957	687	425	1594	247
Arrive On Green	0.16	0.28	0.28	0.13	0.25	0.25	0.16	0.30	0.30	0.14	0.28	0.28
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	3092	6434	1585	3092	5659	879
Grp Volume(v), veh/h	635	1564	300	538	1233	401	444	2170	532	630	1144	407
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1546	1609	1585	1546	1609	1712
Q Serve(g_s), s	19.5	33.5	20.2	15.5	28.8	29.5	16.9	36.5	34.4	16.5	26.8	26.9
Cycle Q Clear(g_c), s	19.5	33.5	20.2	15.5	28.8	29.5	16.9	36.5	34.4	16.5	26.8	26.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.51
Lane Grp Cap(c), veh/h	502	1425	442	399	1255	390	495	1957	687	425	1359	482
V/C Ratio(X)	1.26	1.10	0.68	1.35	0.98	1.03	0.90	1.11	0.77	1.48	0.84	0.84
Avail Cap(c_a), veh/h	502	1425	442	399	1255	390	528	1957	687	425	1359	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.3	43.3	38.5	52.3	45.0	45.2	49.4	41.8	29.0	51.8	40.6	40.6
Incr Delay (d2), s/veh	133.9	55.1	4.1	172.1	21.2	53.3	17.3	57.0	5.5	229.2	4.9	12.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.8	21.2	8.3	15.5	14.5	17.3	7.7	22.0	13.9	19.9	11.1	13.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	184.2	98.3	42.6	224.3	66.1	98.5	66.8	98.8	34.5	280.9	45.5	53.6
LnGrp LOS	F	F	D	F	E	F	E	F	C	F	D	D
Approach Vol, veh/h		2499			2172			3146			2181	
Approach Delay, s/veh		113.4			111.3			83.4			115.0	
Approach LOS		F			F			F			F	

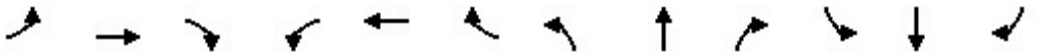
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	41.0	20.0	38.0	23.7	38.3	24.0	34.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	38.5	17.5	35.5	18.9	28.9	21.5	31.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.3	2.8	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	103.9
HCM 6th LOS	F



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.927	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3143	1441
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3143	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			146			150			259		186	447
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



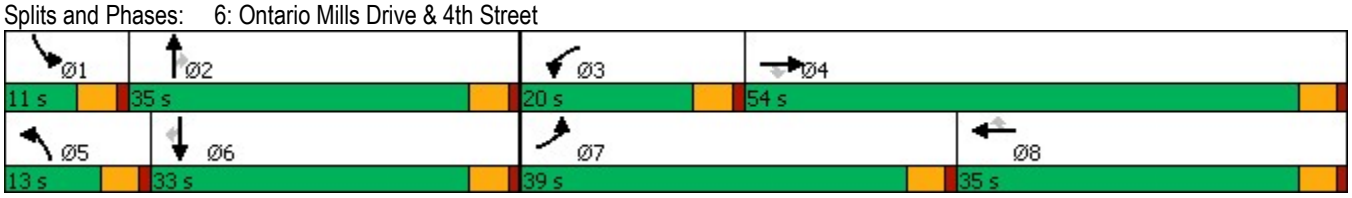
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1339	1699	168	316	1352	456	198	434	492	109	437	823
Future Volume (vph)	1339	1699	168	316	1352	456	198	434	492	109	437	823
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1455	1847	183	343	1470	496	215	472	535	118	475	895
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	1455	1847	183	343	1470	496	215	472	535	118	923	447

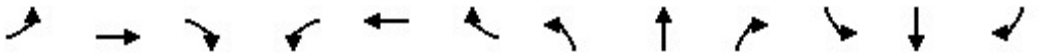
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1339	1699	168	316	1352	456	198	434	492	109	437	823
Future Volume (vph)	1339	1699	168	316	1352	456	198	434	492	109	437	823
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.5	49.7	49.7	15.3	30.5	30.5	8.5	30.5	30.5	6.5	28.5	28.5
Actuated g/C Ratio	0.29	0.41	0.41	0.13	0.25	0.25	0.07	0.25	0.25	0.05	0.24	0.24
v/c Ratio	1.65	0.88	0.25	0.88	1.14	0.96	1.82	0.53	0.90	1.31	1.04	0.65
Control Delay	326.6	38.3	6.8	74.8	112.9	63.3	432.7	41.0	41.7	243.2	76.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	326.6	38.3	6.8	74.8	112.9	63.3	432.7	41.0	41.7	243.2	76.7	8.6
LOS	F	D	A	E	F	E	F	D	D	F	E	A
Approach Delay		157.0			96.5			110.2			69.5	
Approach LOS		F			F			F			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.82	
Intersection Signal Delay: 118.6	Intersection LOS: F
Intersection Capacity Utilization 116.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



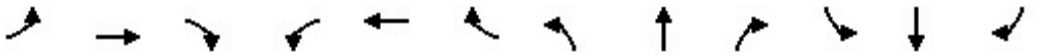


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1455	1847	183	343	1470	496	215	472	535	118	923	447
v/c Ratio	1.65	0.88	0.25	0.88	1.14	0.96	1.82	0.53	0.90	1.31	1.04	0.65
Control Delay	326.6	38.3	6.8	74.8	112.9	63.3	432.7	41.0	41.7	243.2	76.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	326.6	38.3	6.8	74.8	112.9	63.3	432.7	41.0	41.7	243.2	76.7	8.6
Queue Length 50th (ft)	~841	476	17	136	~486	283	~251	166	226	~117	~359	0
Queue Length 95th (ft)	#978	546	63	#216	#583	#506	#407	221	#439	#240	#498	102
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	883	2105	740	396	1292	514	118	899	595	90	888	683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.65	0.88	0.25	0.87	1.14	0.96	1.82	0.53	0.90	1.31	1.04	0.65

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



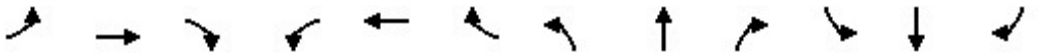
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1339	1699	168	316	1352	456	198	434	492	109	437	823
Future Volume (veh/h)	1339	1699	168	316	1352	456	198	434	492	109	437	823
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	1455	1847	183	343	1470	496	215	472	535	118	475	895
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	889	2121	659	390	1298	403	120	903	403	91	444	753
Arrive On Green	0.29	0.42	0.42	0.13	0.25	0.25	0.07	0.25	0.25	0.05	0.24	0.24
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	1688	3554	1585	1688	1870	3170
Grp Volume(v), veh/h	1455	1847	183	343	1470	496	215	472	535	118	475	895
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1688	1777	1585	1688	1870	1585
Q Serve(g_s), s	34.5	39.8	9.2	13.1	30.5	30.5	8.5	13.7	30.5	6.5	28.5	28.5
Cycle Q Clear(g_c), s	34.5	39.8	9.2	13.1	30.5	30.5	8.5	13.7	30.5	6.5	28.5	28.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	889	2121	659	390	1298	403	120	903	403	91	444	753
V/C Ratio(X)	1.64	0.87	0.28	0.88	1.13	1.23	1.80	0.52	1.33	1.29	1.07	1.19
Avail Cap(c_a), veh/h	889	2121	659	399	1298	403	120	903	403	91	444	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	32.1	23.2	51.5	44.8	44.7	55.7	38.5	44.7	56.8	45.7	45.7
Incr Delay (d2), s/veh	291.7	4.2	0.2	19.3	69.8	124.0	390.6	0.5	163.9	190.8	62.4	98.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	49.0	16.8	3.5	6.1	21.1	25.7	16.6	6.0	30.2	7.6	20.8	21.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	334.4	36.4	23.4	70.8	114.6	168.7	446.3	39.0	208.6	247.6	108.2	143.7
LnGrp LOS	F	D	C	E	F	F	F	D	F	F	F	F
Approach Vol, veh/h		3485			2309			1222			1488	
Approach Delay, s/veh		160.1			119.7			184.9			140.6	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	19.6	54.4	13.0	33.0	39.0	35.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.5	32.5	15.1	41.8	10.5	30.5	36.5	32.5
Green Ext Time (p_c), s	0.0	0.0	0.1	6.5	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	149.3
HCM 6th LOS	F

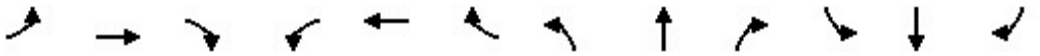
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.972			0.936				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	3072	5085	1583	1676	4943	0	1676	3313	0	1593	1738	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	3072	5085	1583	1676	4943	0	1676	3313	0	1593	1738	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109		41			85				191
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



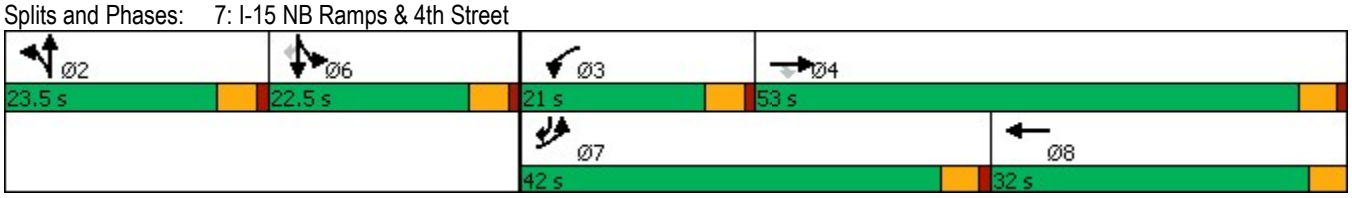
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1164	988	135	111	1045	239	166	108	82	201	95	876
Future Volume (vph)	1164	988	135	111	1045	239	166	108	82	201	95	876
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1213	1029	141	116	1089	249	173	113	85	209	99	913
Shared Lane Traffic (%)										27%		
Lane Group Flow (vph)	1213	1029	141	116	1338	0	173	198	0	153	155	913

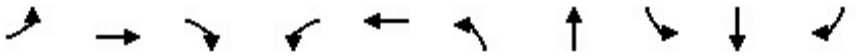
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1164	988	135	111	1045	166	108	201	95	876
Future Volume (vph)	1164	988	135	111	1045	166	108	201	95	876
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	37.6	52.5	52.5	12.7	28.6	15.8	15.8	14.9	14.9	57.1
Actuated g/C Ratio	0.33	0.46	0.46	0.11	0.25	0.14	0.14	0.13	0.13	0.50
v/c Ratio	1.20	0.44	0.18	0.62	1.05	0.75	0.37	0.74	0.68	0.64
Control Delay	133.3	23.0	7.2	63.7	81.1	67.7	27.2	69.0	63.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	133.3	23.0	7.2	63.7	81.1	67.7	27.2	69.0	63.4	18.8
LOS	F	C	A	E	F	E	C	E	E	B
Approach Delay		78.2			79.7		46.1		30.8	
Approach LOS		E			E		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 65.7	Intersection LOS: E
Intersection Capacity Utilization 95.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1213	1029	141	116	1338	173	198	153	155	913
v/c Ratio	1.20	0.44	0.18	0.62	1.05	0.75	0.37	0.74	0.68	0.64
Control Delay	133.3	23.0	7.2	63.7	81.1	67.7	27.2	69.0	63.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	133.3	23.0	7.2	63.7	81.1	67.7	27.2	69.0	63.4	18.8
Queue Length 50th (ft)	~579	193	13	84	~403	125	40	116	116	221
Queue Length 95th (ft)	#742	257	56	147	#523	206	77	196	195	306
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1014	2342	787	243	1270	280	625	252	275	1417
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.20	0.44	0.18	0.48	1.05	0.62	0.32	0.61	0.56	0.64

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1164	988	135	111	1045	239	166	108	82	201	95	876
Future Volume (veh/h)	1164	988	135	111	1045	239	166	108	82	201	95	876
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1772
Adj Flow Rate, veh/h	1212	1029	141	116	1089	249	173	112	85	154	176	912
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	996	2466	765	142	1017	232	209	247	173	261	289	1432
Arrive On Green	0.32	0.48	0.48	0.08	0.24	0.24	0.12	0.12	0.12	0.15	0.15	0.15
Sat Flow, veh/h	3092	5106	1585	1688	4154	949	1688	1996	1399	1688	1870	3003
Grp Volume(v), veh/h	1212	1029	141	116	892	446	173	99	98	154	176	912
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1688	1702	1699	1688	1777	1618	1688	1870	1502
Q Serve(g_s), s	37.5	15.2	5.9	7.9	28.5	28.5	11.7	6.0	6.6	9.9	10.2	18.0
Cycle Q Clear(g_c), s	37.5	15.2	5.9	7.9	28.5	28.5	11.7	6.0	6.6	9.9	10.2	18.0
Prop In Lane	1.00		1.00	1.00		0.56	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	996	2466	765	142	833	416	209	220	201	261	289	1432
V/C Ratio(X)	1.22	0.42	0.18	0.82	1.07	1.07	0.83	0.45	0.49	0.59	0.61	0.64
Avail Cap(c_a), veh/h	996	2466	765	239	833	416	275	290	264	261	289	1432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	19.5	17.1	52.5	44.0	44.0	49.8	47.3	47.6	45.8	45.9	22.9
Incr Delay (d2), s/veh	106.9	0.1	0.1	11.0	51.9	64.5	14.5	1.4	1.8	3.5	3.7	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.8	6.0	2.2	3.8	17.9	19.3	5.7	2.7	2.8	4.4	5.0	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	146.4	19.6	17.2	63.4	95.9	108.5	64.2	48.7	49.4	49.3	49.6	23.8
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	C
Approach Vol, veh/h		2382			1454			370			1242	
Approach Delay, s/veh		84.0			97.2			56.2			30.6	
Approach LOS		F			F			E			C	

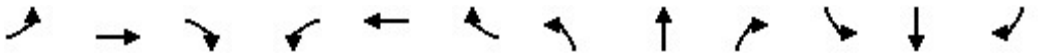
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.9	14.3	60.7		22.5	42.0	33.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		13.7	9.9	17.2		20.0	39.5	30.5				
Green Ext Time (p_c), s		0.8	0.1	9.4		0.0	0.0	0.0				

Intersection Summary		
HCM 6th Ctrl Delay		73.5
HCM 6th LOS		E

Notes

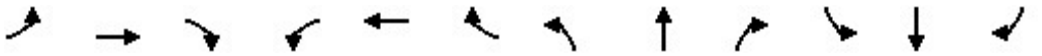
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3210	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3210	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		92				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



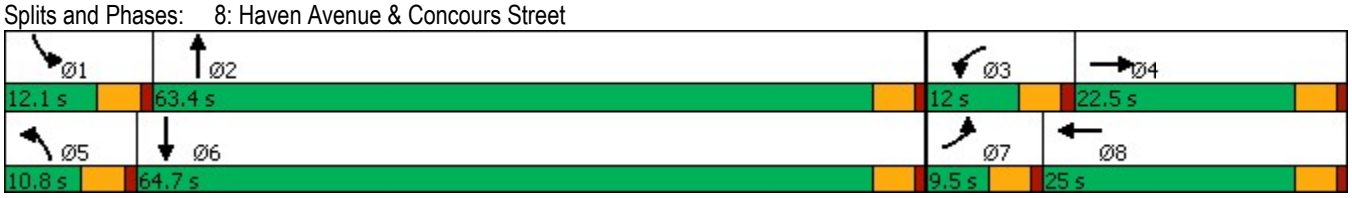
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	36	55	90	249	133	135	67	3292	256	178	2670	39
Future Volume (vph)	36	55	90	249	133	135	67	3292	256	178	2670	39
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	37	56	92	254	136	138	68	3359	261	182	2724	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	148	0	254	136	138	68	3359	261	182	2724	40

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	36	55	249	133	135	67	3292	256	178	2670	39
Future Volume (vph)	36	55	249	133	135	67	3292	256	178	2670	39
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.4	7.5	13.8	99.4	6.2	58.9	99.4	7.6	62.4	99.4
Actuated g/C Ratio	0.05	0.07	0.08	0.14	1.00	0.06	0.59	1.00	0.08	0.63	1.00
v/c Ratio	0.24	0.46	0.80	0.28	0.09	0.36	0.88	0.16	0.78	0.68	0.03
Control Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.4	0.2	68.3	13.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.4	0.2	68.3	13.8	0.0
LOS	D	C	E	D	A	D	C	A	E	B	A
Approach Delay		28.6		42.1			20.4			17.0	
Approach LOS		C		D			C			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99.4	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 20.8	Intersection LOS: C
Intersection Capacity Utilization 78.4%	ICU Level of Service D
Analysis Period (min) 15	

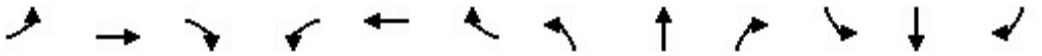
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	37	148	254	136	138	68	3359	261	182	2724	40
v/c Ratio	0.24	0.46	0.80	0.28	0.09	0.36	0.88	0.16	0.78	0.68	0.03
Control Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.4	0.2	68.3	13.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.4	0.2	68.3	13.8	0.0
Queue Length 50th (ft)	11	17	57	43	0	21	489	0	59	315	0
Queue Length 95th (ft)	28	48	#103	73	0	44	591	0	#118	386	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	154	656	316	729	1583	194	3796	1583	234	4022	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.23	0.80	0.19	0.09	0.35	0.88	0.16	0.78	0.68	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



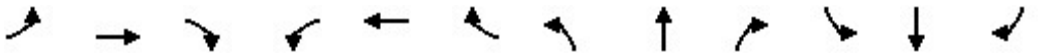
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	55	90	249	133	135	67	3292	256	178	2670	39
Future Volume (veh/h)	36	55	90	249	133	135	67	3292	256	178	2670	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	37	56	92	254	136	0	68	3359	0	182	2724	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	145	129	317	443		131	3778		235	3994	
Arrive On Green	0.03	0.08	0.08	0.08	0.12	0.00	0.04	0.59	0.00	0.08	0.62	0.00
Sat Flow, veh/h	3092	1777	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	37	56	92	254	136	0	68	3359	0	182	2724	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	1.2	3.0	5.7	5.9	3.5	0.0	2.2	45.1	0.0	5.8	27.8	0.0
Cycle Q Clear(g_c), s	1.2	3.0	5.7	5.9	3.5	0.0	2.2	45.1	0.0	5.8	27.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	99	145	129	317	443		131	3778		235	3994	
V/C Ratio(X)	0.37	0.39	0.71	0.80	0.31		0.52	0.89		0.77	0.68	
Avail Cap(c_a), veh/h	155	320	285	317	729		195	3790		235	3994	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	47.4	43.5	44.8	45.5	39.8	0.0	46.9	17.8	0.0	45.3	12.5	0.0
Incr Delay (d2), s/veh	2.3	1.7	7.0	13.6	0.4	0.0	3.1	3.0	0.0	14.8	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.4	2.5	2.5	1.5	0.0	0.9	15.8	0.0	2.7	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.7	45.2	51.7	59.1	40.2	0.0	50.0	20.8	0.0	60.2	12.9	0.0
LnGrp LOS	D	D	D	E	D		D	C		E	B	
Approach Vol, veh/h		185			390	A		3427	A		2906	A
Approach Delay, s/veh		49.4			52.5			21.4			15.9	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	63.2	12.0	12.7	8.7	66.6	7.7	17.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	7.8	47.1	7.9	7.7	4.2	29.8	3.2	5.5
Green Ext Time (p_c), s	0.0	11.6	0.0	0.5	0.0	26.6	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	21.6
HCM 6th LOS	C

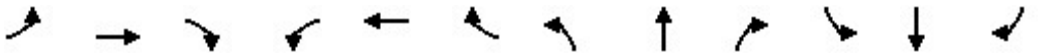
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.936			0.946						0.998	
Flt Protected	0.950	0.972			0.971		0.950			0.950		
Satd. Flow (prot)	1593	1610	0	0	1711	0	1676	5085	0	1676	5075	0
Flt Permitted	0.950	0.972					0.950			0.950		
Satd. Flow (perm)	1593	1610	0	0	1762	0	1676	5085	0	1676	5075	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



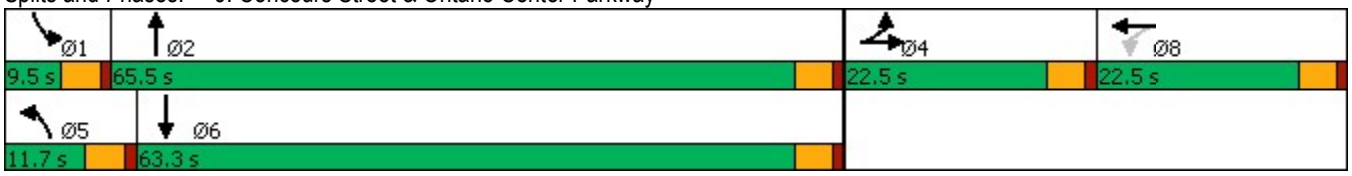
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	66	0	17	20	0	13	6	2522	7	1	1521	20
Future Volume (vph)	66	0	17	20	0	13	6	2522	7	1	1521	20
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	69	0	18	21	0	14	6	2655	7	1	1601	21
Shared Lane Traffic (%)	35%											
Lane Group Flow (vph)	45	42	0	0	35	0	6	2662	0	1	1622	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	66	0	20	0	6	2522	1	1521
Future Volume (vph)	66	0	20	0	6	2522	1	1521
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	8.0	8.0		5.5	5.9	69.0	5.0	68.6
Actuated g/C Ratio	0.09	0.09		0.06	0.07	0.76	0.06	0.76
v/c Ratio	0.32	0.18		0.18	0.05	0.69	0.01	0.42
Control Delay	45.9	1.8		2.0	43.0	9.8	44.0	6.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	45.9	1.8		2.0	43.0	9.8	44.0	6.6
LOS	D	A		A	D	A	D	A
Approach Delay		24.6		2.0		9.9		6.6
Approach LOS		C		A		A		A

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 90.3	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 65.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	45	42	35	6	2662	1	1622
v/c Ratio	0.32	0.18	0.18	0.05	0.69	0.01	0.42
Control Delay	45.9	1.8	2.0	43.0	9.8	44.0	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.9	1.8	2.0	43.0	9.8	44.0	6.6
Queue Length 50th (ft)	25	0	0	3	297	1	126
Queue Length 95th (ft)	65	0	0	17	556	6	254
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	319	398	429	134	3884	93	3858
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.11	0.08	0.04	0.69	0.01	0.42

Intersection Summary

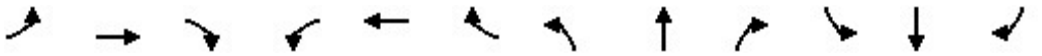
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	0	17	20	0	13	6	2522	7	1	1521	20
Future Volume (veh/h)	66	0	17	20	0	13	6	2522	7	1	1521	20
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	44	36	18	21	0	14	6	2655	7	1	1601	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	93	65	32	34	0	23	13	3609	10	2	3531	46
Arrive On Green	0.06	0.06	0.06	0.03	0.00	0.03	0.01	0.69	0.69	0.00	0.68	0.68
Sat Flow, veh/h	1688	1176	588	1018	0	679	1688	5258	14	1688	5194	68
Grp Volume(v), veh/h	44	0	54	35	0	0	6	1718	944	1	1049	573
Grp Sat Flow(s),veh/h/ln	1688	0	1764	1697	0	0	1688	1702	1868	1688	1702	1858
Q Serve(g_s), s	2.0	0.0	2.4	1.6	0.0	0.0	0.3	25.8	25.8	0.0	11.5	11.5
Cycle Q Clear(g_c), s	2.0	0.0	2.4	1.6	0.0	0.0	0.3	25.8	25.8	0.0	11.5	11.5
Prop In Lane	1.00		0.33	0.60		0.40	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	93	0	97	57	0	0	13	2336	1282	2	2314	1263
V/C Ratio(X)	0.47	0.00	0.55	0.61	0.00	0.00	0.46	0.74	0.74	0.43	0.45	0.45
Avail Cap(c_a), veh/h	377	0	394	379	0	0	151	2578	1415	105	2485	1356
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.9	0.0	37.1	38.4	0.0	0.0	39.8	8.0	8.0	40.2	6.0	6.0
Incr Delay (d2), s/veh	3.7	0.0	4.9	10.1	0.0	0.0	22.7	1.0	1.8	93.3	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	1.1	0.8	0.0	0.0	0.2	7.5	8.5	0.1	3.3	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.6	0.0	42.0	48.5	0.0	0.0	62.5	9.0	9.9	133.5	6.1	6.2
LnGrp LOS	D	A	D	D	A	A	E	A	A	F	A	A
Approach Vol, veh/h		98			35			2668			1623	
Approach Delay, s/veh		41.4			48.5			9.4			6.2	
Approach LOS		D			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	59.8		8.9	5.1	59.3		7.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.0	27.8		4.4	2.3	13.5		3.6				
Green Ext Time (p_c), s	0.0	27.5		0.3	0.0	17.3		0.1				

Intersection Summary		
HCM 6th Ctrl Delay	9.3	
HCM 6th LOS	A	

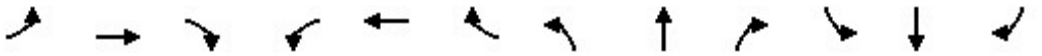
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			209			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



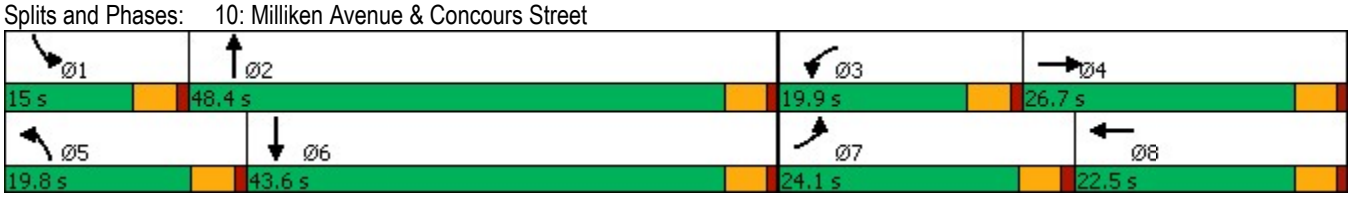
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	475	186	201	242	96	168	261	2329	182	258	1735	181
Future Volume (vph)	475	186	201	242	96	168	261	2329	182	258	1735	181
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	495	194	209	252	100	175	272	2426	190	269	1807	189
Shared Lane Traffic (%)												
Lane Group Flow (vph)	495	194	209	252	100	175	272	2426	190	269	1807	189

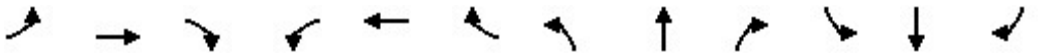
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	475	186	201	242	96	168	261	2329	182	258	1735	181
Future Volume (vph)	475	186	201	242	96	168	261	2329	182	258	1735	181
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	19.1	14.3	99.7	13.0	8.2	99.7	13.4	43.9	99.7	10.5	41.0	99.7
Actuated g/C Ratio	0.19	0.14	1.00	0.13	0.08	1.00	0.13	0.44	1.00	0.11	0.41	1.00
v/c Ratio	0.84	0.38	0.13	0.63	0.34	0.11	0.66	0.86	0.12	0.83	0.69	0.12
Control Delay	53.5	41.7	0.2	48.5	46.6	0.1	49.3	29.4	0.2	66.5	26.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	41.7	0.2	48.5	46.6	0.1	49.3	29.4	0.2	66.5	26.3	0.2
LOS	D	D	A	D	D	A	D	C	A	E	C	A
Approach Delay		38.5			32.1			29.3			28.9	
Approach LOS		D			C			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 30.7	Intersection LOS: C
Intersection Capacity Utilization 76.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street

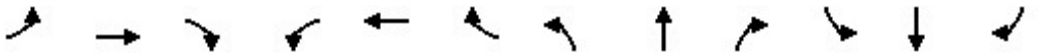




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	495	194	209	252	100	175	272	2426	190	269	1807	189
v/c Ratio	0.84	0.38	0.13	0.63	0.34	0.11	0.66	0.86	0.12	0.83	0.69	0.12
Control Delay	53.5	41.7	0.2	48.5	46.6	0.1	49.3	29.4	0.2	66.5	26.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	41.7	0.2	48.5	46.6	0.1	49.3	29.4	0.2	66.5	26.3	0.2
Queue Length 50th (ft)	157	60	0	79	32	0	85	397	0	88	273	0
Queue Length 95th (ft)	#244	96	0	120	58	0	129	467	0	#160	335	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	603	788	1583	474	639	1583	471	2822	1583	323	2637	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.25	0.13	0.53	0.16	0.11	0.58	0.86	0.12	0.83	0.69	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



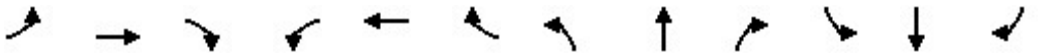
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	475	186	201	242	96	168	261	2329	182	258	1735	181
Future Volume (veh/h)	475	186	201	242	96	168	261	2329	182	258	1735	181
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	495	194	0	252	100	0	272	2426	0	269	1807	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	569	470		326	192		346	2965		331	2935	
Arrive On Green	0.18	0.13	0.00	0.11	0.05	0.00	0.11	0.46	0.00	0.11	0.46	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	495	194	0	252	100	0	272	2426	0	269	1807	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	14.4	4.6	0.0	7.4	2.5	0.0	7.9	30.3	0.0	7.9	19.7	0.0
Cycle Q Clear(g_c), s	14.4	4.6	0.0	7.4	2.5	0.0	7.9	30.3	0.0	7.9	19.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	569	470		326	192		346	2965		331	2935	
V/C Ratio(X)	0.87	0.41		0.77	0.52		0.79	0.82		0.81	0.62	
Avail Cap(c_a), veh/h	653	851		513	690		510	3045		350	2935	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.8	36.9	0.0	40.4	42.7	0.0	40.1	21.6	0.0	40.5	19.1	0.0
Incr Delay (d2), s/veh	11.1	0.6	0.0	3.9	2.2	0.0	4.9	1.8	0.0	12.9	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	2.0	0.0	2.9	1.2	0.0	3.2	11.1	0.0	3.6	7.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	37.5	0.0	44.3	44.9	0.0	45.0	23.5	0.0	53.4	19.5	0.0
LnGrp LOS	D	D		D	D		D	C		D	B	
Approach Vol, veh/h		689	A		352	A		2698	A		2076	A
Approach Delay, s/veh		44.9			44.5			25.6			23.9	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.4	47.2	14.3	16.8	14.9	46.8	21.6	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	9.9	32.3	9.4	6.6	9.9	21.7	16.4	4.5
Green Ext Time (p_c), s	0.1	10.5	0.4	1.0	0.4	12.2	0.6	0.4

Intersection Summary	
HCM 6th Ctrl Delay	28.4
HCM 6th LOS	C

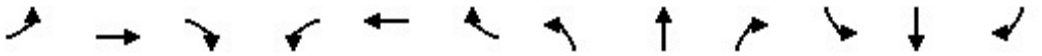
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			242			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



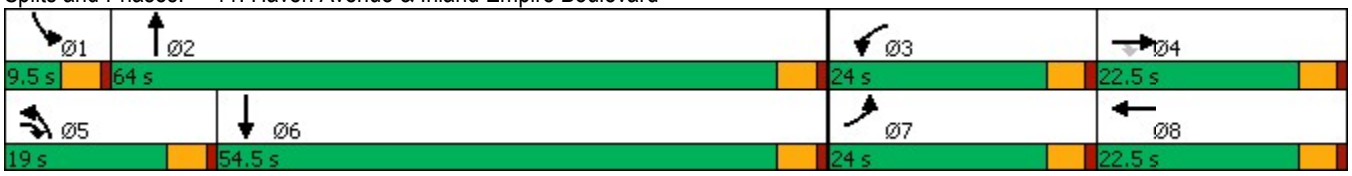
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	278	306	676	893	220	57	492	2653	609	58	3102	151
Future Volume (vph)	278	306	676	893	220	57	492	2653	609	58	3102	151
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	299	329	727	960	237	61	529	2853	655	62	3335	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	299	329	727	960	237	61	529	2853	655	62	3335	162

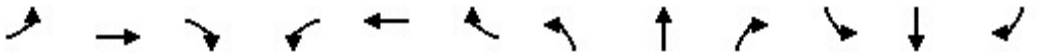
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	306	676	893	220	57	492	2653	609	58	3102	151
Future Volume (vph)	278	306	676	893	220	57	492	2653	609	58	3102	151
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	16.3	15.6	34.6	19.5	18.9	117.7	14.5	61.5	117.7	5.0	50.0	117.7
Actuated g/C Ratio	0.14	0.13	0.29	0.17	0.16	1.00	0.12	0.52	1.00	0.04	0.42	1.00
v/c Ratio	0.71	0.70	1.44	1.38	0.42	0.04	1.40	0.85	0.41	0.48	1.22	0.10
Control Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.2	0.8	68.1	136.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.2	0.8	68.1	136.0	0.1
LOS	E	E	F	F	D	A	F	C	A	E	F	A
Approach Delay		155.5			174.7			50.6			128.6	
Approach LOS		F			F			D			F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.7	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.44	
Intersection Signal Delay: 107.0	Intersection LOS: F
Intersection Capacity Utilization 118.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	299	329	727	960	237	61	529	2853	655	62	3335	162
v/c Ratio	0.71	0.70	1.44	1.38	0.42	0.04	1.40	0.85	0.41	0.48	1.22	0.10
Control Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.2	0.8	68.1	136.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.2	0.8	68.1	136.0	0.1
Queue Length 50th (ft)	113	127	~723	~345	86	0	~278	547	0	24	~913	0
Queue Length 95th (ft)	160	177	#961	#442	131	0	#395	621	0	48	#1000	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	509	541	504	696	567	1583	378	3348	1583	130	2724	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.61	1.44	1.38	0.42	0.04	1.40	0.85	0.41	0.48	1.22	0.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

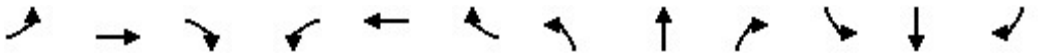
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	306	676	893	220	57	492	2653	609	58	3102	151
Future Volume (veh/h)	278	306	676	893	220	57	492	2653	609	58	3102	151
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	299	329	727	960	237	0	529	2853	0	62	3335	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	358	533	429	687	699		374	3224		113	2681	
Arrive On Green	0.12	0.15	0.15	0.16	0.20	0.00	0.12	0.50	0.00	0.04	0.42	0.00
Sat Flow, veh/h	3092	3554	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	299	329	727	960	237	0	529	2853	0	62	3335	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	11.4	10.4	18.0	19.5	6.9	0.0	14.5	47.7	0.0	2.4	50.0	0.0
Cycle Q Clear(g_c), s	11.4	10.4	18.0	19.5	6.9	0.0	14.5	47.7	0.0	2.4	50.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	358	533	429	687	699		374	3224		113	2681	
V/C Ratio(X)	0.83	0.62	1.69	1.40	0.34		1.42	0.88		0.55	1.24	
Avail Cap(c_a), veh/h	502	533	429	687	699		374	3224		129	2681	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.9	47.8	43.7	50.3	41.5	0.0	52.8	26.8	0.0	56.9	35.0	0.0
Incr Delay (d2), s/veh	8.3	2.1	322.0	187.3	0.3	0.0	202.3	3.3	0.0	4.2	113.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.8	51.0	18.8	3.1	0.0	16.1	18.4	0.0	1.0	40.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.2	49.9	365.8	237.5	41.8	0.0	255.1	30.1	0.0	61.0	148.1	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	F	
Approach Vol, veh/h		1355			1197	A		3382	A		3397	A
Approach Delay, s/veh		221.7			198.7			65.3			146.5	
Approach LOS		F			F			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	64.6	24.0	22.5	19.0	54.5	18.4	28.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	4.4	49.7	21.5	20.0	16.5	52.0	13.4	8.9
Green Ext Time (p_c), s	0.0	9.4	0.0	0.0	0.0	0.0	0.5	0.9

Intersection Summary	
HCM 6th Ctrl Delay	134.7
HCM 6th LOS	F

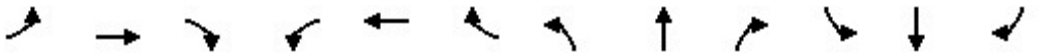
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			397			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



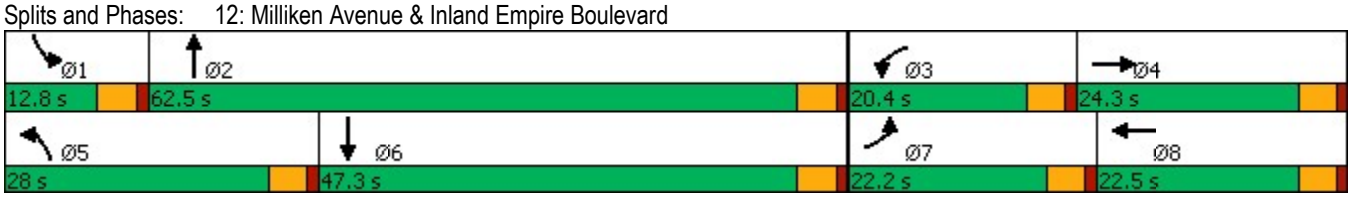
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	412	402	452	297	109	137	548	2226	511	135	1967	166
Future Volume (vph)	412	402	452	297	109	137	548	2226	511	135	1967	166
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	434	423	476	313	115	144	577	2343	538	142	2071	175
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	423	476	313	115	144	577	2343	538	142	2071	175

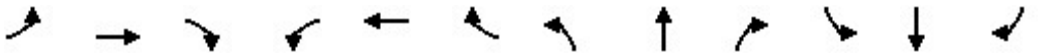
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	412	402	452	297	109	137	548	2226	511	135	1967	166
Future Volume (vph)	412	402	452	297	109	137	548	2226	511	135	1967	166
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	17.7	18.0	117.4	15.1	15.4	117.4	23.4	58.1	117.4	8.2	42.9	117.4
Actuated g/C Ratio	0.15	0.15	1.00	0.13	0.13	1.00	0.20	0.49	1.00	0.07	0.37	1.00
v/c Ratio	0.94	0.78	0.30	0.79	0.25	0.09	0.94	0.74	0.34	0.67	0.89	0.11
Control Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	25.7	0.6	69.6	40.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	25.7	0.6	69.6	40.9	0.1
LOS	E	E	A	E	D	A	E	C	A	E	D	A
Approach Delay		44.4			45.2			29.5			39.7	
Approach LOS		D			D			C			D	

Intersection Summary		
Cycle Length: 120		
Actuated Cycle Length: 117.4		
Natural Cycle: 110		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.94		
Intersection Signal Delay: 36.3	Intersection LOS: D	
Intersection Capacity Utilization 81.6%	ICU Level of Service D	
Analysis Period (min) 15		

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	434	423	476	313	115	144	577	2343	538	142	2071	175
v/c Ratio	0.94	0.78	0.30	0.79	0.25	0.09	0.94	0.74	0.34	0.67	0.89	0.11
Control Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	25.7	0.6	69.6	40.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	25.7	0.6	69.6	40.9	0.1
Queue Length 50th (ft)	173	165	0	121	41	0	229	415	0	56	437	0
Queue Length 95th (ft)	#276	222	0	#184	71	0	#343	463	0	#97	492	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	463	597	1583	416	543	1583	615	3172	1583	217	2339	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.71	0.30	0.75	0.21	0.09	0.94	0.74	0.34	0.65	0.89	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	412	402	452	297	109	137	548	2226	511	135	1967	166
Future Volume (veh/h)	412	402	452	297	109	137	548	2226	511	135	1967	166
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	434	423	0	313	115	0	577	2343	0	142	2071	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	483	511		370	382		628	3303		194	2399	
Arrive On Green	0.16	0.14	0.00	0.12	0.11	0.00	0.20	0.51	0.00	0.06	0.37	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	434	423	0	313	115	0	577	2343	0	142	2071	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	15.5	13.0	0.0	11.1	3.3	0.0	20.5	31.3	0.0	5.1	33.4	0.0
Cycle Q Clear(g_c), s	15.5	13.0	0.0	11.1	3.3	0.0	20.5	31.3	0.0	5.1	33.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	483	511		370	382		628	3303		194	2399	
V/C Ratio(X)	0.90	0.83		0.85	0.30		0.92	0.71		0.73	0.86	
Avail Cap(c_a), veh/h	488	627		438	570		648	3326		229	2455	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.5	46.7	0.0	48.4	46.2	0.0	43.8	20.9	0.0	51.7	32.5	0.0
Incr Delay (d2), s/veh	19.3	7.5	0.0	12.4	0.4	0.0	18.0	0.7	0.0	9.6	3.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	6.2	0.0	4.9	1.5	0.0	9.4	11.5	0.0	2.2	13.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.8	54.2	0.0	60.8	46.6	0.0	61.8	21.6	0.0	61.3	35.9	0.0
LnGrp LOS	E	D		E	D		E	C		E	D	
Approach Vol, veh/h		857	A		428	A		2920	A		2213	A
Approach Delay, s/veh		60.1			57.0			29.5			37.5	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	62.1	17.9	20.6	27.3	46.3	22.0	16.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	7.1	33.3	13.1	15.0	22.5	35.4	17.5	5.3
Green Ext Time (p_c), s	0.0	20.0	0.3	1.2	0.3	6.4	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	38.2
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.984	0.850				
Flt Protected	0.957					
Satd. Flow (prot)	3224	1441	6408	0	0	6408
Flt Permitted	0.957					
Satd. Flow (perm)	3224	1441	6408	0	0	6408
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

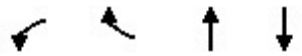
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	698	440	3128	0	0	3173
Future Volume (vph)	698	440	3128	0	0	3173
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	727	458	3258	0	0	3305
Shared Lane Traffic (%)		19%				
Lane Group Flow (vph)	814	371	3258	0	0	3305

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	698	440	3128	3173
Future Volume (vph)	698	440	3128	3173
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	19.0	19.0	36.5	36.5
Actuated g/C Ratio	0.29	0.29	0.57	0.57
v/c Ratio	0.86	0.88	0.90	0.91
Control Delay	32.6	46.0	17.1	17.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.6	46.0	17.1	17.9
LOS	C	D	B	B
Approach Delay	36.8		17.1	17.9
Approach LOS	D		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 64.5	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 20.5	Intersection LOS: C
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	814	371	3258	3305
v/c Ratio	0.86	0.88	0.90	0.91
Control Delay	32.6	46.0	17.1	17.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.6	46.0	17.1	17.9
Queue Length 50th (ft)	154	150	301	310
Queue Length 95th (ft)	#246	#307	364	#378
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	975	436	3628	3628
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.83	0.85	0.90	0.91

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

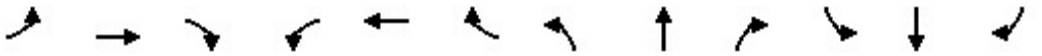
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	698	440	3128	0	0	3173
Future Volume (veh/h)	698	440	3128	0	0	3173
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1772	1870	1870	0	0	1870
Adj Flow Rate, veh/h	786	395	3258	0	0	3305
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	970	456	3677	0	0	3677
Arrive On Green	0.29	0.29	0.57	0.00	0.00	0.57
Sat Flow, veh/h	3375	1585	6958	0	0	6958
Grp Volume(v), veh/h	786	395	3258	0	0	3305
Grp Sat Flow(s),veh/h/ln	1688	1585	1609	0	0	1609
Q Serve(g_s), s	13.8	15.1	28.0	0.0	0.0	28.9
Cycle Q Clear(g_c), s	13.8	15.1	28.0	0.0	0.0	28.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	970	456	3677	0	0	3677
V/C Ratio(X)	0.81	0.87	0.89	0.00	0.00	0.90
Avail Cap(c_a), veh/h	1032	485	3683	0	0	3683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	21.1	21.6	11.9	0.0	0.0	12.0
Incr Delay (d2), s/veh	4.7	14.7	3.0	0.0	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	7.0	8.5	0.0	0.0	8.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.8	36.2	14.8	0.0	0.0	15.4
LnGrp LOS	C	D	B	A	A	B
Approach Vol, veh/h	1181		3258			3305
Approach Delay, s/veh	29.3		14.8			15.4
Approach LOS	C		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		40.9			40.9	22.8
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		30.0			30.9	17.1
Green Ext Time (p_c), s		6.4			5.6	1.2

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

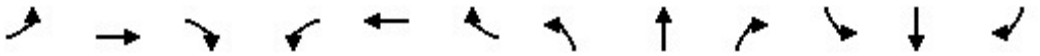
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147			136			182			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



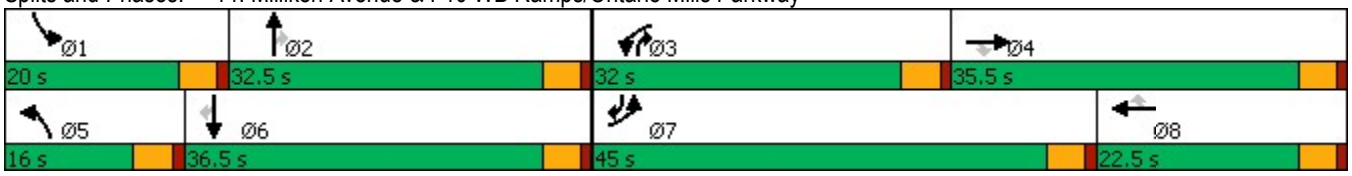
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1085	275	332	354	421	89	337	1428	634	465	1502	670
Future Volume (vph)	1085	275	332	354	421	89	337	1428	634	465	1502	670
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1130	286	346	369	439	93	351	1488	660	484	1565	698
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1130	286	346	369	439	93	351	1488	660	484	1565	698

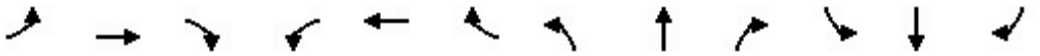
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1085	275	332	354	421	89	337	1428	634	465	1502	670
Future Volume (vph)	1085	275	332	354	421	89	337	1428	634	465	1502	670
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	40.5	36.3	36.3	21.7	17.5	17.5	11.5	28.0	54.2	15.5	32.0	77.0
Actuated g/C Ratio	0.34	0.30	0.30	0.18	0.15	0.15	0.10	0.23	0.45	0.13	0.27	0.64
v/c Ratio	1.09	0.51	0.59	0.66	0.85	0.27	1.19	0.99	0.81	1.22	0.91	0.67
Control Delay	92.2	39.3	25.5	51.0	65.9	4.3	160.0	67.0	28.2	162.4	51.6	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.2	39.3	25.5	51.0	65.9	4.3	160.0	67.0	28.2	162.4	51.6	16.2
LOS	F	D	C	D	E	A	F	E	C	F	D	B
Approach Delay		70.5			53.5			69.8			62.1	
Approach LOS		E			D			E			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.22	
Intersection Signal Delay: 65.4	Intersection LOS: E
Intersection Capacity Utilization 96.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway



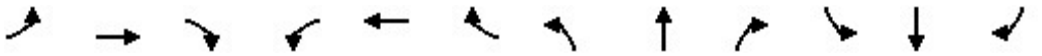


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1130	286	346	369	439	93	351	1488	660	484	1565	698
v/c Ratio	1.09	0.51	0.59	0.66	0.85	0.27	1.19	0.99	0.81	1.22	0.91	0.67
Control Delay	92.2	39.3	25.5	51.0	65.9	4.3	160.0	67.0	28.2	162.4	51.6	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	92.2	39.3	25.5	51.0	65.9	4.3	160.0	67.0	28.2	162.4	51.6	16.2
Queue Length 50th (ft)	~508	180	128	139	175	0	~169	336	330	~237	343	292
Queue Length 95th (ft)	#641	288	249	179	#254	18	#266	#423	456	#345	#398	427
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1041	566	583	707	532	354	295	1502	885	398	1716	1039
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.51	0.59	0.52	0.83	0.26	1.19	0.99	0.75	1.22	0.91	0.67

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1085	275	332	354	421	89	337	1428	634	465	1502	670
Future Volume (veh/h)	1085	275	332	354	421	89	337	1428	634	465	1502	670
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	1130	286	346	369	439	93	351	1488	660	484	1565	698
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1053	638	540	439	506	225	299	1515	598	403	1731	966
Arrive On Green	0.34	0.34	0.34	0.14	0.14	0.14	0.10	0.24	0.24	0.13	0.27	0.27
Sat Flow, veh/h	3092	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	1130	286	346	369	439	93	351	1488	660	484	1565	698
Grp Sat Flow(s),veh/h/ln	1546	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	40.5	14.1	21.9	13.8	14.4	6.4	11.5	27.4	28.0	15.5	27.9	32.0
Cycle Q Clear(g_c), s	40.5	14.1	21.9	13.8	14.4	6.4	11.5	27.4	28.0	15.5	27.9	32.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1053	638	540	439	506	225	299	1515	598	403	1731	966
V/C Ratio(X)	1.07	0.45	0.64	0.84	0.87	0.41	1.17	0.98	1.10	1.20	0.90	0.72
Avail Cap(c_a), veh/h	1053	638	540	715	538	240	299	1515	598	403	1731	966
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	30.5	33.0	49.7	49.9	46.5	53.7	45.2	37.0	51.7	42.0	16.2
Incr Delay (d2), s/veh	49.5	0.5	2.5	4.9	13.6	1.2	107.7	18.9	68.5	112.0	7.1	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.3	6.5	8.7	5.6	7.3	2.6	8.9	12.8	28.3	12.3	11.9	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.8	31.0	35.6	54.6	63.5	47.7	161.5	64.2	105.5	163.7	49.1	18.9
LnGrp LOS	F	C	D	D	E	D	F	E	F	F	D	B
Approach Vol, veh/h		1762			901			2499			2747	
Approach Delay, s/veh		68.9			58.2			88.7			61.6	
Approach LOS		E			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	32.5	21.4	45.0	16.0	36.5	45.0	21.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	17.5	30.0	15.8	23.9	13.5	34.0	42.5	16.4
Green Ext Time (p_c), s	0.0	0.0	1.0	1.8	0.0	0.0	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	71.4
HCM 6th LOS	E

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3247	1441	0	6408	6408	0
Flt Permitted	0.955					
Satd. Flow (perm)	3247	1441	0	6408	6408	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	2	2				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

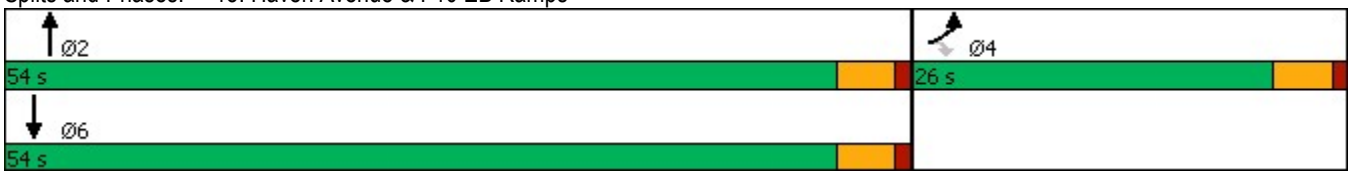
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	707	345	0	3451	2660	0
Future Volume (vph)	707	345	0	3451	2660	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	736	359	0	3595	2771	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	772	323	0	3595	2771	0

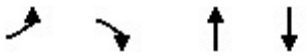
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	707	345	3451	2660
Future Volume (vph)	707	345	3451	2660
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	20.9	20.9	49.5	49.5
Actuated g/C Ratio	0.26	0.26	0.62	0.62
v/c Ratio	0.90	0.85	0.90	0.69
Control Delay	43.7	49.9	17.2	11.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	43.7	49.9	17.2	11.2
LOS	D	D	B	B
Approach Delay	45.5		17.2	11.2
Approach LOS	D		B	B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 79.4	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 19.1	Intersection LOS: B
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	772	323	3595	2771
v/c Ratio	0.90	0.85	0.90	0.69
Control Delay	43.7	49.9	17.2	11.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	43.7	49.9	17.2	11.2
Queue Length 50th (ft)	190	165	406	241
Queue Length 95th (ft)	#291	#319	472	282
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	880	391	3993	3993
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.88	0.83	0.90	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	707	345	0	3451	2660	0
Future Volume (veh/h)	707	345	0	3451	2660	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1772	1870	0	1870	1870	0
Adj Flow Rate, veh/h	736	359	0	3595	2771	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	869	408	0	4041	4041	0
Arrive On Green	0.26	0.26	0.00	0.63	0.63	0.00
Sat Flow, veh/h	3375	1585	0	6958	6958	0
Grp Volume(v), veh/h	736	359	0	3595	2771	0
Grp Sat Flow(s),veh/h/ln	1688	1585	0	1609	1609	0
Q Serve(g_s), s	16.3	17.1	0.0	37.1	22.1	0.0
Cycle Q Clear(g_c), s	16.3	17.1	0.0	37.1	22.1	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	869	408	0	4041	4041	0
V/C Ratio(X)	0.85	0.88	0.00	0.89	0.69	0.00
Avail Cap(c_a), veh/h	922	433	0	4048	4048	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	27.7	28.0	0.0	12.3	9.6	0.0
Incr Delay (d2), s/veh	7.1	17.8	0.0	2.8	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	8.2	0.0	11.5	6.5	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.8	45.8	0.0	15.1	10.0	0.0
LnGrp LOS	C	D	A	B	B	A
Approach Vol, veh/h	1095			3595	2771	
Approach Delay, s/veh	38.4			15.1	10.0	
Approach LOS	D			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		53.9		24.8		53.9
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		39.1		19.1		24.1
Green Ext Time (p_c), s		10.4		1.2		22.8

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1700	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3072	1583	3072	6408	6408	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3072	1583	3072	6408	6408	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				28
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	718	283	456	1688	1425	787
Future Volume (vph)	718	283	456	1688	1425	787
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	740	292	470	1740	1469	811
Shared Lane Traffic (%)						
Lane Group Flow (vph)	740	292	470	1740	1469	811

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	718	283	456	1688	1425	787
Future Volume (vph)	718	283	456	1688	1425	787
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	17.6	32.5	10.4	33.0	18.1	40.2
Actuated g/C Ratio	0.30	0.55	0.17	0.55	0.30	0.67
v/c Ratio	0.82	0.34	0.88	0.49	0.75	0.75
Control Delay	28.7	8.9	44.9	8.8	21.8	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	8.9	44.9	8.8	21.8	12.0
LOS	C	A	D	A	C	B
Approach Delay	23.1			16.5	18.3	
Approach LOS	C			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 59.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 70.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	740	292	470	1740	1469	811
v/c Ratio	0.82	0.34	0.88	0.49	0.75	0.75
Control Delay	28.7	8.9	44.9	8.8	21.8	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	8.9	44.9	8.8	21.8	12.0
Queue Length 50th (ft)	125	52	86	101	138	147
Queue Length 95th (ft)	#207	95	#162	127	176	286
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	927	863	536	3548	1946	1087
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.34	0.88	0.49	0.75	0.75

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

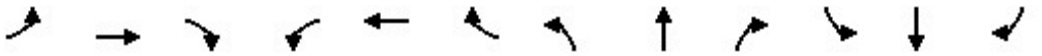
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	718	283	456	1688	1425	787
Future Volume (veh/h)	718	283	456	1688	1425	787
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1870	1673	1870	1870	1870
Adj Flow Rate, veh/h	740	292	470	1740	1469	811
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	870	728	550	3632	1992	937
Arrive On Green	0.28	0.28	0.18	0.56	0.31	0.31
Sat Flow, veh/h	3092	1585	3092	6696	6696	1585
Grp Volume(v), veh/h	740	292	470	1740	1469	811
Grp Sat Flow(s),veh/h/ln	1546	1585	1546	1609	1609	1585
Q Serve(g_s), s	13.2	7.1	8.6	9.4	11.9	18.1
Cycle Q Clear(g_c), s	13.2	7.1	8.6	9.4	11.9	18.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	870	728	550	3632	1992	937
V/C Ratio(X)	0.85	0.40	0.85	0.48	0.74	0.87
Avail Cap(c_a), veh/h	952	770	550	3632	1992	937
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	10.5	23.3	7.6	18.1	8.6
Incr Delay (d2), s/veh	6.9	0.4	12.5	0.1	1.5	8.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	7.4	3.8	2.5	4.2	13.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.8	10.8	35.7	7.7	19.5	17.1
LnGrp LOS	C	B	D	A	B	B
Approach Vol, veh/h	1032			2210	2280	
Approach Delay, s/veh	22.2			13.7	18.7	
Approach LOS	C			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		37.5		21.0	14.9	22.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		11.4		15.2	10.6	20.1
Green Ext Time (p_c), s		13.7		1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.963				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	4897	0	3072	3539	1583	3072	5085	1583	3072	6344	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	4897	0	3072	3539	1583	3072	5085	1583	3072	6344	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		76				252			262		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



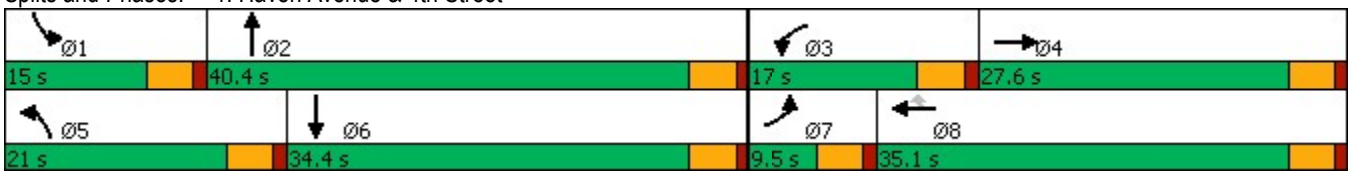
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	73	772	250	327	733	237	306	1607	506	246	1562	111
Future Volume (vph)	73	772	250	327	733	237	306	1607	506	246	1562	111
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	78	821	266	348	780	252	326	1710	538	262	1662	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	1087	0	348	780	252	326	1710	538	262	1780	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	73	772	327	733	237	306	1607	506	246	1562
Future Volume (vph)	73	772	327	733	237	306	1607	506	246	1562
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	23.1	12.5	32.5	32.5	14.8	35.9	100.0	10.5	31.5
Actuated g/C Ratio	0.05	0.23	0.12	0.32	0.32	0.15	0.36	1.00	0.10	0.32
v/c Ratio	0.51	0.91	0.91	0.68	0.37	0.72	0.94	0.34	0.82	0.89
Control Delay	58.3	47.6	71.7	33.4	5.1	49.7	42.1	0.6	64.6	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	47.6	71.7	33.4	5.1	49.7	42.1	0.6	64.6	39.1
LOS	E	D	E	C	A	D	D	A	E	D
Approach Delay		48.3		37.9			34.4			42.4
Approach LOS		D		D			C			D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 39.6	Intersection LOS: D
Intersection Capacity Utilization 84.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	78	1087	348	780	252	326	1710	538	262	1780
v/c Ratio	0.51	0.91	0.91	0.68	0.37	0.72	0.94	0.34	0.82	0.89
Control Delay	58.3	47.6	71.7	33.4	5.1	49.7	42.1	0.6	64.6	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	47.6	71.7	33.4	5.1	49.7	42.1	0.6	64.6	39.1
Queue Length 50th (ft)	25	232	114	232	0	102	380	0	85	313
Queue Length 95th (ft)	50	#316	#197	301	55	147	#485	0	#150	#394
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	153	1189	384	1150	684	506	1825	1583	322	2011
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.91	0.91	0.68	0.37	0.64	0.94	0.34	0.81	0.89

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

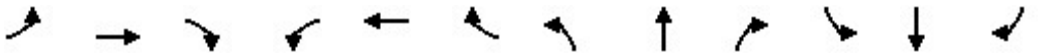
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	772	250	327	733	237	306	1607	506	246	1562	111
Future Volume (veh/h)	73	772	250	327	733	237	306	1607	506	246	1562	111
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	78	821	266	348	780	252	326	1710	0	262	1662	118
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	885	285	387	1110	495	394	1837		319	2072	147
Arrive On Green	0.04	0.23	0.23	0.13	0.31	0.31	0.13	0.36	0.00	0.10	0.34	0.34
Sat Flow, veh/h	3092	3823	1230	3092	3554	1585	3092	5106	1585	3092	6178	439
Grp Volume(v), veh/h	78	730	357	348	780	252	326	1710	0	262	1298	482
Grp Sat Flow(s),veh/h/ln	1546	1702	1649	1546	1777	1585	1546	1702	1585	1546	1609	1791
Q Serve(g_s), s	2.5	21.0	21.2	11.1	19.3	13.0	10.3	32.2	0.0	8.3	24.4	24.4
Cycle Q Clear(g_c), s	2.5	21.0	21.2	11.1	19.3	13.0	10.3	32.2	0.0	8.3	24.4	24.4
Prop In Lane	1.00		0.75	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	137	788	382	387	1110	495	394	1837		319	1618	601
V/C Ratio(X)	0.57	0.93	0.93	0.90	0.70	0.51	0.83	0.93		0.82	0.80	0.80
Avail Cap(c_a), veh/h	155	788	382	387	1110	495	511	1837		325	1618	601
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.8	37.5	37.6	43.0	30.2	28.1	42.5	30.8	0.0	43.8	30.2	30.2
Incr Delay (d2), s/veh	3.8	17.0	29.9	23.0	2.0	0.9	8.5	10.0	0.0	15.1	4.3	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	10.4	11.6	5.4	8.4	5.0	4.3	14.4	0.0	3.8	9.8	12.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.5	54.5	67.5	66.1	32.2	28.9	50.9	40.8	0.0	59.0	34.4	41.0
LnGrp LOS	D	D	E	E	C	C	D	D		E	C	D
Approach Vol, veh/h		1165			1380			2036	A		2042	
Approach Delay, s/veh		58.2			40.2			42.4			39.1	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.8	40.4	17.0	27.6	17.2	38.0	8.9	35.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	10.3	34.2	13.1	23.2	12.3	26.4	4.5	21.3
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.5	2.9	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	43.7
HCM 6th LOS	D

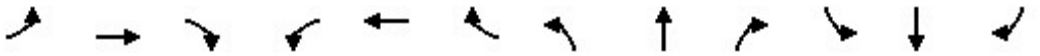
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.999				0.850			0.850		0.850	
Flt Protected				0.950						0.950		
Satd. Flow (prot)	1765	6401	0	1676	5085	1583	1765	1863	1583	1676	3008	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	1765	6401	0	1676	5085	1583	1765	1863	1583	1676	3008	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				176			200		391	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



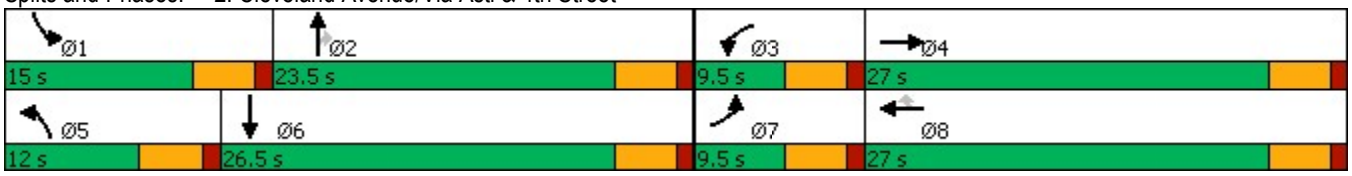
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1639	6	4	1278	177	0	0	6	174	0	1
Future Volume (vph)	0	1639	6	4	1278	177	0	0	6	174	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1690	6	4	1318	182	0	0	6	179	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1696	0	4	1318	182	0	0	6	179	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT	Ø5	Ø7
Lane Configurations									
Traffic Volume (vph)	1639	4	1278	177	6	174	0		
Future Volume (vph)	1639	4	1278	177	6	174	0		
Turn Type	NA	Prot	NA	Perm	Perm	Prot	NA		
Protected Phases	4	3	8			1	6	5	7
Permitted Phases				8	2				
Detector Phase	4	3	8	8	2	1	6		
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	22.5	9.5	22.5	9.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	23.5	15.0	26.5	12.0	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	31.3%	20.0%	35.3%	16%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
Lead/Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min	None	None
Act Effct Green (s)	22.6	5.0	24.3	24.3	5.5	9.9	20.0		
Actuated g/C Ratio	0.42	0.09	0.46	0.46	0.10	0.19	0.38		
v/c Ratio	0.62	0.03	0.57	0.22	0.02	0.57	0.00		
Control Delay	13.9	24.5	11.8	2.5	0.2	29.5	0.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	13.9	24.5	11.8	2.5	0.2	29.5	0.0		
LOS	B	C	B	A	A	C	A		
Approach Delay	13.9		10.7				29.3		
Approach LOS	B		B				C		

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 53.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 49.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



Lane Group	EBT	WBL	WBT	WBR	NBR	SBL	SBT
Lane Group Flow (vph)	1696	4	1318	182	6	179	1
v/c Ratio	0.62	0.03	0.57	0.22	0.02	0.57	0.00
Control Delay	13.9	24.5	11.8	2.5	0.2	29.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	24.5	11.8	2.5	0.2	29.5	0.0
Queue Length 50th (ft)	109	1	106	1	0	49	0
Queue Length 95th (ft)	192	9	139	25	0	#135	0
Internal Link Dist (ft)	2546		362				358
Turn Bay Length (ft)		130		145	165	50	
Base Capacity (vph)	2717	158	2315	816	695	332	1477
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.03	0.57	0.22	0.01	0.54	0.00

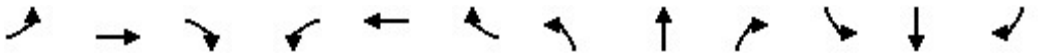
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1639	6	4	1278	177	0	0	6	174	0	1
Future Volume (veh/h)	0	1639	6	4	1278	177	0	0	6	174	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	0	1690	6	4	1318	182	0	0	6	179	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	2639	9	9	2513	780	3	189	160	226	579	516
Arrive On Green	0.00	0.40	0.40	0.01	0.49	0.49	0.00	0.00	0.10	0.13	0.00	0.33
Sat Flow, veh/h	1688	6668	24	1688	5106	1585	1688	1870	1585	1688	1777	1585
Grp Volume(v), veh/h	0	1223	473	4	1318	182	0	0	6	179	0	1
Grp Sat Flow(s),veh/h/ln	1688	1609	1866	1688	1702	1585	1688	1870	1585	1688	1777	1585
Q Serve(g_s), s	0.0	10.1	10.1	0.1	8.7	3.3	0.0	0.0	0.2	5.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	10.1	10.1	0.1	8.7	3.3	0.0	0.0	0.2	5.1	0.0	0.0
Prop In Lane	1.00		0.01	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	3	1910	738	9	2513	780	3	189	160	226	579	516
V/C Ratio(X)	0.00	0.64	0.64	0.44	0.52	0.23	0.00	0.00	0.04	0.79	0.00	0.00
Avail Cap(c_a), veh/h	171	2196	849	171	2513	780	256	719	609	358	791	705
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.1	12.1	24.5	8.6	7.2	0.0	0.0	20.1	20.8	0.0	11.2
Incr Delay (d2), s/veh	0.0	0.5	1.3	29.8	0.2	0.2	0.0	0.0	0.1	6.2	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.0	3.7	0.1	2.5	0.9	0.0	0.0	0.1	2.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.6	13.4	54.3	8.8	7.4	0.0	0.0	20.1	27.0	0.0	11.2
LnGrp LOS	A	B	B	D	A	A	A	A	C	C	A	B
Approach Vol, veh/h		1696			1504			6			180	
Approach Delay, s/veh		12.8			8.7			20.1			26.9	
Approach LOS		B			A			C			C	

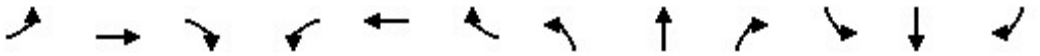
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	9.5	4.8	24.1	0.0	20.6	0.0	28.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	7.1	2.2	2.1	12.1	0.0	2.0	0.0	10.7
Green Ext Time (p_c), s	0.1	0.0	0.0	7.4	0.0	0.0	0.0	7.4

Intersection Summary	
HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	3072	6401	0	1676	5045	0	1676	1863	1583	0	1775	1583
Flt Permitted	0.950			0.950			0.712				0.729	
Satd. Flow (perm)	3072	6401	0	1676	5045	0	1256	1863	1583	0	1358	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			15				218			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



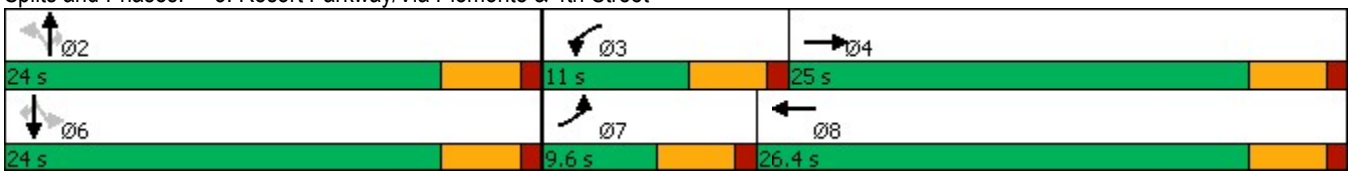
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	16	1611	12	7	1238	66	4	0	12	66	1	22
Future Volume (vph)	16	1611	12	7	1238	66	4	0	12	66	1	22
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	16	1661	12	7	1276	68	4	0	12	68	1	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	1673	0	7	1344	0	4	0	12	0	69	23

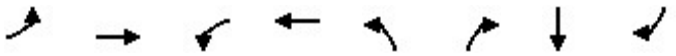
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	16	1611	7	1238	4	12	66	1	22
Future Volume (vph)	16	1611	7	1238	4	12	66	1	22
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	20.7	5.8	20.9	7.4	7.4		7.4	7.4
Actuated g/C Ratio	0.13	0.53	0.15	0.54	0.19	0.19		0.19	0.19
v/c Ratio	0.04	0.49	0.03	0.50	0.02	0.03		0.27	0.06
Control Delay	18.2	7.4	17.6	7.3	14.8	0.1		17.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	18.2	7.4	17.6	7.3	14.8	0.1		17.8	0.3
LOS	B	A	B	A	B	A		B	A
Approach Delay		7.5		7.4				13.4	
Approach LOS		A		A				B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 39	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.50	
Intersection Signal Delay: 7.6	Intersection LOS: A
Intersection Capacity Utilization 45.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	16	1673	7	1344	4	12	69	23
v/c Ratio	0.04	0.49	0.03	0.50	0.02	0.03	0.27	0.06
Control Delay	18.2	7.4	17.6	7.3	14.8	0.1	17.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.2	7.4	17.6	7.3	14.8	0.1	17.8	0.3
Queue Length 50th (ft)	1	45	1	46	1	0	12	0
Queue Length 95th (ft)	9	144	11	145	7	0	45	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	410	3518	285	2904	642	916	694	862
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.48	0.02	0.46	0.01	0.01	0.10	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	1611	12	7	1238	66	4	0	12	66	1	22
Future Volume (veh/h)	16	1611	12	7	1238	66	4	0	12	66	1	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	1661	12	7	1276	68	4	0	12	68	1	23
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	64	3115	23	16	2273	121	330	264	223	396	4	223
Arrive On Green	0.02	0.47	0.47	0.01	0.46	0.46	0.14	0.00	0.14	0.14	0.14	0.14
Sat Flow, veh/h	3092	6639	48	1688	4962	264	1314	1870	1585	1379	31	1585
Grp Volume(v), veh/h	16	1207	466	7	875	469	4	0	12	69	0	23
Grp Sat Flow(s),veh/h/ln	1546	1609	1862	1688	1702	1823	1314	1870	1585	1410	0	1585
Q Serve(g_s), s	0.2	6.3	6.3	0.1	6.7	6.7	0.1	0.0	0.2	1.5	0.0	0.4
Cycle Q Clear(g_c), s	0.2	6.3	6.3	0.1	6.7	6.7	1.7	0.0	0.2	1.6	0.0	0.4
Prop In Lane	1.00		0.03	1.00		0.15	1.00		1.00	0.99		1.00
Lane Grp Cap(c), veh/h	64	2264	874	16	1559	835	330	264	223	400	0	223
V/C Ratio(X)	0.25	0.53	0.53	0.44	0.56	0.56	0.01	0.00	0.05	0.17	0.00	0.10
Avail Cap(c_a), veh/h	444	2788	1076	309	2101	1125	867	1028	871	975	0	871
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.1	6.7	6.7	17.5	7.0	7.0	14.5	0.0	13.2	13.8	0.0	13.3
Incr Delay (d2), s/veh	2.0	0.2	0.5	18.1	0.3	0.6	0.0	0.0	0.1	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.3	1.6	0.1	1.5	1.7	0.0	0.0	0.1	0.4	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.2	6.9	7.2	35.6	7.3	7.6	14.5	0.0	13.3	14.0	0.0	13.5
LnGrp LOS	B	A	A	D	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1689			1351			16			92	
Approach Delay, s/veh		7.1			7.6			13.6			13.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	4.8	21.2		9.5	5.2	20.8				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		3.7	2.1	8.3		3.6	2.2	8.7				
Green Ext Time (p_c), s		0.0	0.0	8.4		0.3	0.0	7.4				

Intersection Summary	
HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	5040	0	0	5085	0	1611
Flt Permitted						
Satd. Flow (perm)	5040	0	0	5085	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1584	105	0	1340	0	22
Future Volume (vph)	1584	105	0	1340	0	22
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1667	111	0	1411	0	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1778	0	0	1411	0	23

Intersection Summary

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1584	105	0	1340	0	22
Future Vol, veh/h	1584	105	0	1340	0	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1667	111	0	1411	0	23

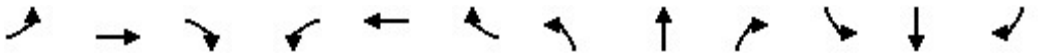
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	889
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	246
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	246
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	21.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	246	-	-	-
HCM Lane V/C Ratio	0.094	-	-	-
HCM Control Delay (s)	21.1	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6260	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6260	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			246			294			95		37	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



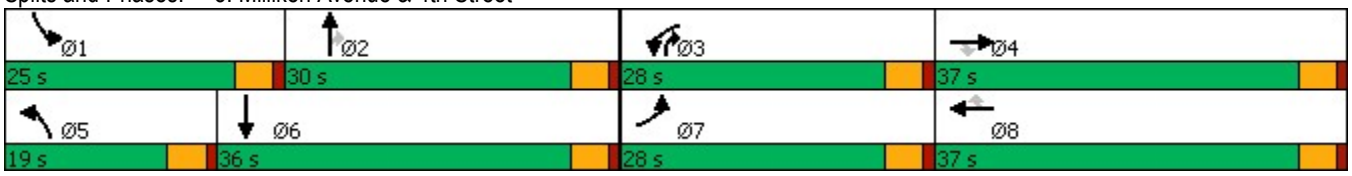
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	383	1285	403	739	927	389	328	1195	510	546	1155	213
Future Volume (vph)	383	1285	403	739	927	389	328	1195	510	546	1155	213
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	403	1353	424	778	976	409	345	1258	537	575	1216	224
Shared Lane Traffic (%)												
Lane Group Flow (vph)	403	1353	424	778	976	409	345	1258	537	575	1440	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	383	1285	403	739	927	389	328	1195	510	546	1155
Future Volume (vph)	383	1285	403	739	927	389	328	1195	510	546	1155
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	20.3	32.5	32.5	23.5	35.7	35.7	14.5	25.5	53.5	20.5	31.5
Actuated g/C Ratio	0.17	0.27	0.27	0.20	0.30	0.30	0.12	0.21	0.45	0.17	0.26
v/c Ratio	0.78	0.98	0.70	1.29	0.65	0.60	0.93	0.92	0.71	1.10	0.86
Control Delay	58.2	64.1	22.8	183.9	39.5	14.7	84.5	58.4	27.9	114.8	47.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.2	64.1	22.8	183.9	39.5	14.7	84.5	58.4	27.9	114.8	47.4
LOS	E	E	C	F	D	B	F	E	C	F	D
Approach Delay		55.0			86.8			55.0			66.6
Approach LOS		D			F			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.29	
Intersection Signal Delay: 65.8	Intersection LOS: E
Intersection Capacity Utilization 98.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

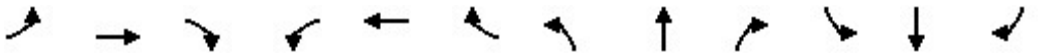


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	403	1353	424	778	976	409	345	1258	537	575	1440
v/c Ratio	0.78	0.98	0.70	1.29	0.65	0.60	0.93	0.92	0.71	1.10	0.86
Control Delay	58.2	64.1	22.8	183.9	39.5	14.7	84.5	58.4	27.9	114.8	47.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.2	64.1	22.8	183.9	39.5	14.7	84.5	58.4	27.9	114.8	47.4
Queue Length 50th (ft)	154	382	124	~396	242	69	138	279	275	~259	302
Queue Length 95th (ft)	205	#488	247	#519	301	185	#228	#346	414	#373	350
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	601	1377	608	601	1512	677	371	1361	758	524	1670
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.98	0.70	1.29	0.65	0.60	0.93	0.92	0.71	1.10	0.86

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

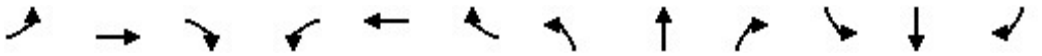
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	383	1285	403	739	927	389	328	1195	510	546	1155	213
Future Volume (veh/h)	383	1285	403	739	927	389	328	1195	510	546	1155	213
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	403	1353	424	778	976	409	345	1258	537	575	1216	224
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	466	1383	429	606	1613	501	374	1367	647	528	1445	265
Arrive On Green	0.15	0.27	0.27	0.20	0.32	0.32	0.12	0.21	0.21	0.17	0.26	0.26
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	3092	6434	1585	3092	5506	1008
Grp Volume(v), veh/h	403	1353	424	778	976	409	345	1258	537	575	1065	375
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1546	1609	1585	1546	1609	1689
Q Serve(g_s), s	15.3	31.5	32.0	23.5	19.4	28.5	13.3	23.0	25.5	20.5	25.1	25.3
Cycle Q Clear(g_c), s	15.3	31.5	32.0	23.5	19.4	28.5	13.3	23.0	25.5	20.5	25.1	25.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.60
Lane Grp Cap(c), veh/h	466	1383	429	606	1613	501	374	1367	647	528	1267	443
V/C Ratio(X)	0.86	0.98	0.99	1.28	0.60	0.82	0.92	0.92	0.83	1.09	0.84	0.85
Avail Cap(c_a), veh/h	606	1383	429	606	1613	501	374	1367	647	528	1267	443
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	43.4	43.6	48.3	34.7	37.8	52.2	46.3	31.8	49.8	41.9	42.0
Incr Delay (d2), s/veh	10.1	19.2	40.1	140.4	0.6	10.2	28.1	10.3	8.9	65.4	5.2	14.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	15.6	17.2	20.8	8.1	12.4	6.6	10.1	15.3	12.7	10.5	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.9	62.6	83.6	188.7	35.4	48.0	80.3	56.6	40.7	115.1	47.1	56.0
LnGrp LOS	E	E	F	F	D	D	F	E	D	F	D	E
Approach Vol, veh/h		2180			2163			2140			2015	
Approach Delay, s/veh		66.2			92.9			56.4			68.2	
Approach LOS		E			F			E			E	

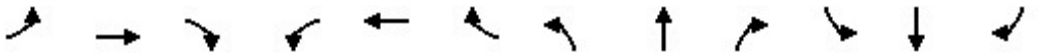
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	30.0	28.0	37.0	19.0	36.0	22.6	42.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	22.5	27.5	25.5	34.0	15.3	27.3	17.3	30.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	3.1	0.8	1.4

Intersection Summary	
HCM 6th Ctrl Delay	71.0
HCM 6th LOS	E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.947	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3211	1441
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3211	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128			224			354		80	397
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



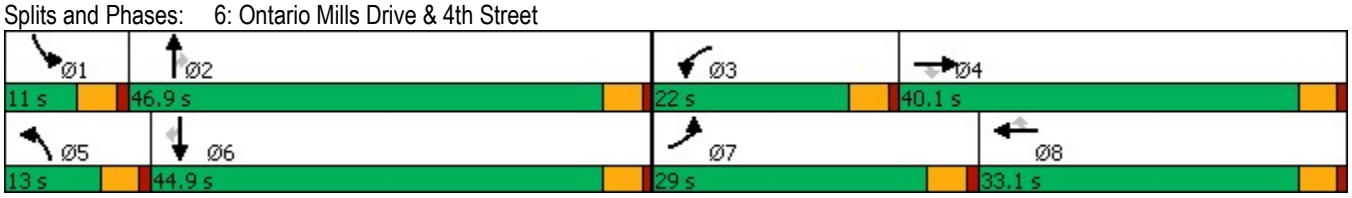
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1023	1495	219	574	1232	589	255	446	683	110	884	1085
Future Volume (vph)	1023	1495	219	574	1232	589	255	446	683	110	884	1085
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1066	1557	228	598	1283	614	266	465	711	115	921	1130
Shared Lane Traffic (%)												44%
Lane Group Flow (vph)	1066	1557	228	598	1283	614	266	465	711	115	1418	633

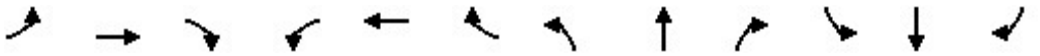
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1023	1495	219	574	1232	589	255	446	683	110	884	1085
Future Volume (vph)	1023	1495	219	574	1232	589	255	446	683	110	884	1085
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	35.6	35.6	17.5	28.6	28.6	8.5	42.4	42.4	6.5	40.4	40.4
Actuated g/C Ratio	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
v/c Ratio	1.70	1.03	0.41	1.33	1.06	1.12	2.25	0.37	0.90	1.28	1.25	0.85
Control Delay	352.9	73.5	16.9	205.3	87.1	104.2	616.4	30.0	34.4	231.7	153.4	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	352.9	73.5	16.9	205.3	87.1	104.2	616.4	30.0	34.4	231.7	153.4	25.3
LOS	F	E	B	F	F	F	F	C	C	F	F	C
Approach Delay		173.4			119.6			140.3			120.1	
Approach LOS		F			F			F			F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.25	
Intersection Signal Delay: 140.2	Intersection LOS: F
Intersection Capacity Utilization 122.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



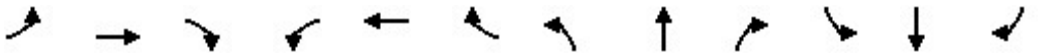


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1066	1557	228	598	1283	614	266	465	711	115	1418	633
v/c Ratio	1.70	1.03	0.41	1.33	1.06	1.12	2.25	0.37	0.90	1.28	1.25	0.85
Control Delay	352.9	73.5	16.9	205.3	87.1	104.2	616.4	30.0	34.4	231.7	153.4	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	352.9	73.5	16.9	205.3	87.1	104.2	616.4	30.0	34.4	231.7	153.4	25.3
Queue Length 50th (ft)	~625	~473	58	~310	~399	~408	~333	140	296	~112	~733	204
Queue Length 95th (ft)	#756	#571	131	#425	#495	#636	#504	186	#556	#235	#880	#468
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	627	1508	559	448	1211	547	118	1250	788	90	1134	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.70	1.03	0.41	1.33	1.06	1.12	2.25	0.37	0.90	1.28	1.25	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



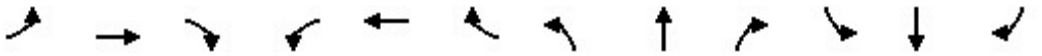
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1023	1495	219	574	1232	589	255	446	683	110	884	1085
Future Volume (veh/h)	1023	1495	219	574	1232	589	255	446	683	110	884	1085
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	1066	1557	228	598	1283	614	266	465	711	115	907	1139
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	631	1515	470	451	1217	378	120	1256	560	91	630	1067
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	1688	3554	1585	1688	1870	3170
Grp Volume(v), veh/h	1066	1557	228	598	1283	614	266	465	711	115	907	1139
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1688	1777	1585	1688	1870	1585
Q Serve(g_s), s	24.5	35.6	14.2	17.5	28.6	28.6	8.5	11.7	42.4	6.5	40.4	40.4
Cycle Q Clear(g_c), s	24.5	35.6	14.2	17.5	28.6	28.6	8.5	11.7	42.4	6.5	40.4	40.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	631	1515	470	451	1217	378	120	1256	560	91	630	1067
V/C Ratio(X)	1.69	1.03	0.48	1.33	1.05	1.63	2.23	0.37	1.27	1.26	1.44	1.07
Avail Cap(c_a), veh/h	631	1515	470	451	1217	378	120	1256	560	91	630	1067
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	42.2	34.7	51.2	45.7	45.7	55.7	28.9	38.8	56.8	39.8	39.8
Incr Delay (d2), s/veh	316.7	30.5	0.8	161.5	41.4	293.3	577.5	0.2	134.9	178.6	207.1	47.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	37.1	19.0	5.6	16.9	16.6	41.9	22.8	5.0	37.1	7.3	54.5	22.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	364.5	72.7	35.4	212.8	87.1	339.0	633.2	29.1	173.7	235.3	246.9	87.2
LnGrp LOS	F	F	D	F	F	F	F	C	F	F	F	F
Approach Vol, veh/h		2851			2495			1442			2161	
Approach Delay, s/veh		178.8			179.2			211.8			162.1	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	46.9	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	8.5	44.4	19.5	37.6	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	180.2
HCM 6th LOS	F

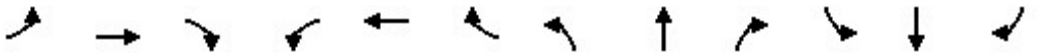
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.981			0.939				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.987	
Satd. Flow (prot)	3072	5085	1583	1676	4989	0	1676	3323	0	1593	1747	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.987	
Satd. Flow (perm)	3072	5085	1583	1676	4989	0	1676	3323	0	1593	1747	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			138		19			70				298
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



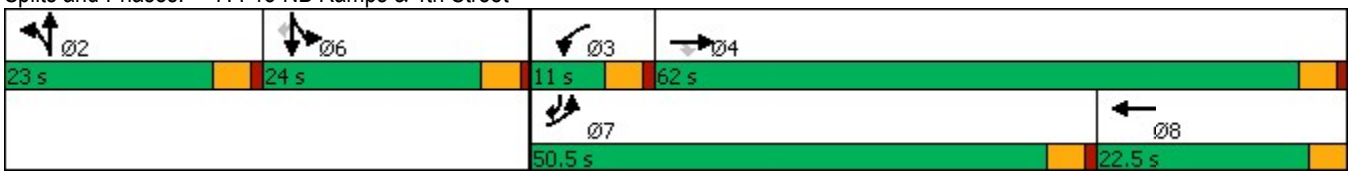
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1420	669	130	45	745	107	133	95	66	175	106	1588
Future Volume (vph)	1420	669	130	45	745	107	133	95	66	175	106	1588
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1511	712	138	48	793	114	141	101	70	186	113	1689
Shared Lane Traffic (%)										21%		
Lane Group Flow (vph)	1511	712	138	48	907	0	141	171	0	147	152	1689

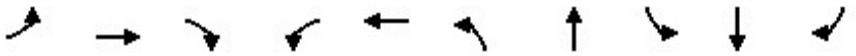
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1420	669	130	45	745	133	95	175	106	1588
Future Volume (vph)	1420	669	130	45	745	133	95	175	106	1588
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	46.2	60.2	60.2	6.3	19.1	14.1	14.1	15.0	15.0	65.7
Actuated g/C Ratio	0.41	0.54	0.54	0.06	0.17	0.13	0.13	0.13	0.13	0.59
v/c Ratio	1.19	0.26	0.15	0.51	1.04	0.67	0.35	0.69	0.65	1.01
Control Delay	123.6	15.6	3.2	72.4	86.9	62.5	28.2	63.7	59.7	43.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.6	15.6	3.2	72.4	86.9	62.5	28.2	63.7	59.7	43.5
LOS	F	B	A	E	F	E	C	E	E	D
Approach Delay		84.0			86.2		43.7		46.2	
Approach LOS		F			F		D		D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 68.7	Intersection LOS: E
Intersection Capacity Utilization 94.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1511	712	138	48	907	141	171	147	152	1689
v/c Ratio	1.19	0.26	0.15	0.51	1.04	0.67	0.35	0.69	0.65	1.01
Control Delay	123.6	15.6	3.2	72.4	86.9	62.5	28.2	63.7	59.7	43.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.6	15.6	3.2	72.4	86.9	62.5	28.2	63.7	59.7	43.5
Queue Length 50th (ft)	~684	102	0	34	~258	98	34	107	110	~609
Queue Length 95th (ft)	#902	147	34	#86	#385	171	70	185	189	#878
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1273	2746	918	98	869	279	612	279	306	1678
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.19	0.26	0.15	0.49	1.04	0.51	0.28	0.53	0.50	1.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

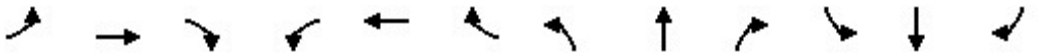
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1420	669	130	45	745	107	133	95	66	175	106	1588
Future Volume (veh/h)	1420	669	130	45	745	107	133	95	66	175	106	1588
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1772
Adj Flow Rate, veh/h	1511	712	138	48	793	114	141	101	70	150	164	1689
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1241	2712	842	60	748	107	179	220	141	287	318	1716
Arrive On Green	0.40	0.53	0.53	0.04	0.17	0.17	0.11	0.11	0.11	0.17	0.17	0.17
Sat Flow, veh/h	3092	5106	1585	1688	4514	645	1688	2076	1332	1688	1870	3003
Grp Volume(v), veh/h	1511	712	138	48	597	310	141	85	86	150	164	1689
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1688	1702	1754	1688	1777	1631	1688	1870	1502
Q Serve(g_s), s	46.0	8.7	5.1	3.2	19.0	19.0	9.3	5.2	5.7	9.3	9.1	19.5
Cycle Q Clear(g_c), s	46.0	8.7	5.1	3.2	19.0	19.0	9.3	5.2	5.7	9.3	9.1	19.5
Prop In Lane	1.00		1.00	1.00		0.37	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	1241	2712	842	60	564	291	179	188	173	287	318	1716
V/C Ratio(X)	1.22	0.26	0.16	0.79	1.06	1.07	0.79	0.45	0.50	0.52	0.52	0.98
Avail Cap(c_a), veh/h	1241	2712	842	96	564	291	272	287	263	287	318	1716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	14.6	13.8	54.8	47.8	47.8	50.0	48.1	48.4	43.3	43.3	24.1
Incr Delay (d2), s/veh	105.5	0.1	0.1	20.5	54.0	71.7	8.5	1.7	2.2	1.7	1.4	18.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.0	3.3	1.8	1.7	12.2	14.0	4.4	2.4	2.4	4.0	4.4	25.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	139.8	14.7	13.9	75.4	101.8	119.5	58.5	49.8	50.6	45.0	44.7	42.1
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	D
Approach Vol, veh/h		2361			955			312			2003	
Approach Delay, s/veh		94.7			106.2			53.9			42.5	
Approach LOS		F			F			D			D	

Timer - Assigned Phs	2	3	4	6	7	8
Phs Duration (G+Y+Rc), s	16.6	8.6	65.4	24.0	50.5	23.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	* 4.5
Max Green Setting (Gmax), s	18.5	6.5	57.5	19.5	46.0	* 19
Max Q Clear Time (g_c+I1), s	11.3	5.2	10.7	21.5	48.0	21.0
Green Ext Time (p_c), s	0.8	0.0	6.4	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	75.9
HCM 6th LOS	E

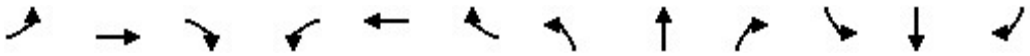
Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.902				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3192	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3192	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70				236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



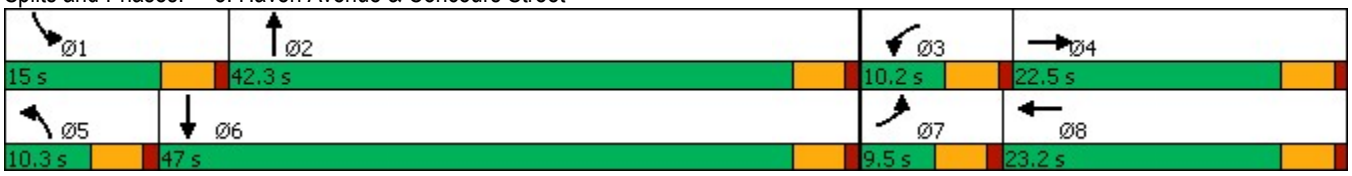
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	17	35	66	195	76	84	63	2219	280	274	2063	44
Future Volume (vph)	17	35	66	195	76	84	63	2219	280	274	2063	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	18	37	70	207	81	89	67	2361	298	291	2195	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	107	0	207	81	89	67	2361	298	291	2195	47

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	17	35	195	76	84	63	2219	280	274	2063	44
Future Volume (vph)	17	35	195	76	84	63	2219	280	274	2063	44
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	6.6	5.7	12.7	76.3	5.8	38.0	76.3	10.2	44.8	76.3
Actuated g/C Ratio	0.07	0.09	0.07	0.17	1.00	0.08	0.50	1.00	0.13	0.59	1.00
v/c Ratio	0.09	0.32	0.66	0.14	0.06	0.29	0.74	0.19	0.71	0.58	0.03
Control Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.7	0.3	43.1	12.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.7	0.3	43.1	12.1	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.2		31.8			16.3			15.5	
Approach LOS		C		C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 76.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 63.2%	ICU Level of Service B
Analysis Period (min) 15	

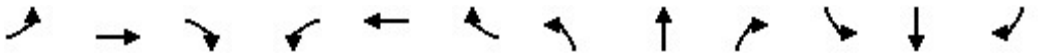
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	107	207	81	89	67	2361	298	291	2195	47
v/c Ratio	0.09	0.32	0.66	0.14	0.06	0.29	0.74	0.19	0.71	0.58	0.03
Control Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.7	0.3	43.1	12.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.7	0.3	43.1	12.1	0.0
Queue Length 50th (ft)	4	8	35	16	0	16	260	0	71	200	0
Queue Length 95th (ft)	14	32	#68	40	0	36	325	0	#126	254	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	202	809	315	871	1583	234	3188	1583	424	3760	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.13	0.66	0.09	0.06	0.29	0.74	0.19	0.69	0.58	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



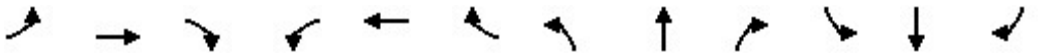
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	35	66	195	76	84	63	2219	280	274	2063	44
Future Volume (veh/h)	17	35	66	195	76	84	63	2219	280	274	2063	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	18	37	70	207	81	0	67	2361	0	291	2195	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	131	117	312	451		156	3140		373	3592	
Arrive On Green	0.02	0.07	0.07	0.07	0.13	0.00	0.05	0.49	0.00	0.12	0.56	0.00
Sat Flow, veh/h	3092	1777	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	18	37	70	207	81	0	67	2361	0	291	2195	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	0.4	1.5	3.2	3.5	1.5	0.0	1.6	21.9	0.0	6.8	16.9	0.0
Cycle Q Clear(g_c), s	0.4	1.5	3.2	3.5	1.5	0.0	1.6	21.9	0.0	6.8	16.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	65	131	117	312	451		156	3140		373	3592	
V/C Ratio(X)	0.28	0.28	0.60	0.66	0.18		0.43	0.75		0.78	0.61	
Avail Cap(c_a), veh/h	209	433	386	326	899		243	3290		439	3699	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.6	32.4	33.2	33.3	28.8	0.0	34.1	15.3	0.0	31.5	10.9	0.0
Incr Delay (d2), s/veh	2.3	1.2	4.8	4.7	0.2	0.0	1.9	1.0	0.0	7.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.7	1.3	1.3	0.6	0.0	0.6	7.3	0.0	2.8	5.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.9	33.5	38.0	38.0	29.0	0.0	35.9	16.3	0.0	39.0	11.2	0.0
LnGrp LOS	D	C	D	D	C		D	B		D	B	
Approach Vol, veh/h		125			288	A		2428	A		2486	A
Approach Delay, s/veh		36.6			35.5			16.8			14.5	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	40.6	10.0	10.0	8.2	45.8	6.0	13.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	8.8	23.9	5.5	5.2	3.6	18.9	2.4	3.5
Green Ext Time (p_c), s	0.2	12.1	0.0	0.4	0.0	18.2	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

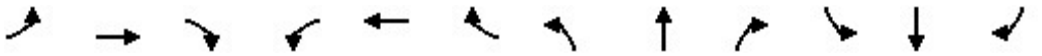
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.945									0.990	
Flt Protected	0.950	0.969					0.950					
Satd. Flow (prot)	1593	1620	0	0	1863	0	1676	5085	0	1765	5034	0
Flt Permitted	0.950	0.969					0.950					
Satd. Flow (perm)	1593	1620	0	0	1863	0	1676	5085	0	1765	5034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143									13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



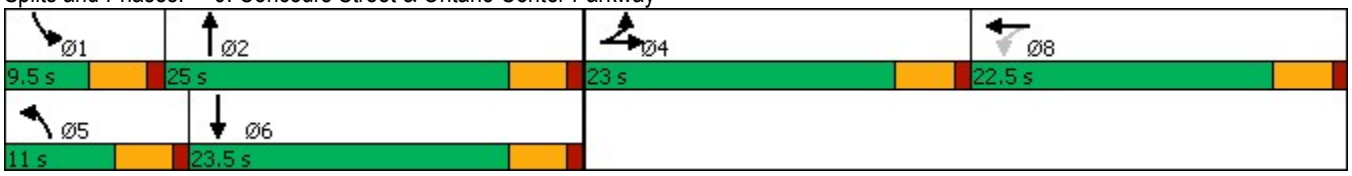
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	16	0	4	0	0	0	7	424	1	0	316	22
Future Volume (vph)	16	0	4	0	0	0	7	424	1	0	316	22
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	18	0	4	0	0	0	8	471	1	0	351	24
Shared Lane Traffic (%)	38%											
Lane Group Flow (vph)	11	11	0	0	0	0	8	472	0	0	375	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	16	0	7	424	316		
Future Volume (vph)	16	0	7	424	316		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	6.0	6.0	5.9	26.9	25.4		
Actuated g/C Ratio	0.21	0.21	0.20	0.92	0.87		
v/c Ratio	0.03	0.02	0.02	0.10	0.09		
Control Delay	12.1	0.1	12.3	1.1	3.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	12.1	0.1	12.3	1.1	3.1		
LOS	B	A	B	A	A		
Approach Delay		6.1		1.3	3.1		
Approach LOS		A		A	A		

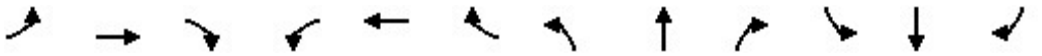
Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 29.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.10	
Intersection Signal Delay: 2.2	Intersection LOS: A
Intersection Capacity Utilization 19.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	11	11	8	472	375
v/c Ratio	0.03	0.02	0.02	0.10	0.09
Control Delay	12.1	0.1	12.3	1.1	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.1	0.1	12.3	1.1	3.1
Queue Length 50th (ft)	1	0	1	0	0
Queue Length 95th (ft)	11	0	9	20	34
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	1039	1106	384	4690	4508
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.02	0.10	0.08

Intersection Summary



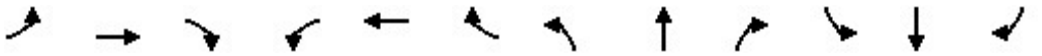
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	0	4	0	0	0	7	424	1	0	316	22
Future Volume (veh/h)	16	0	4	0	0	0	7	424	1	0	316	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	22	0	0	0	0	0	8	471	1	0	351	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	54	0	0	10	0	18	2674	6	9	1298	88
Arrive On Green	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.51	0.51	0.00	0.27	0.27
Sat Flow, veh/h	3375	1870	0	0	1870	0	1688	5261	11	1688	4885	330
Grp Volume(v), veh/h	22	0	0	0	0	0	8	305	167	0	243	132
Grp Sat Flow(s),veh/h/ln	1688	1870	0	0	1870	0	1688	1702	1868	1688	1702	1811
Q Serve(g_s), s	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.9	0.0	1.1	1.1
Cycle Q Clear(g_c), s	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.9	0.0	1.1	1.1
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.01	1.00		0.18
Lane Grp Cap(c), veh/h	97	54	0	0	10	0	18	1730	949	9	905	481
V/C Ratio(X)	0.23	0.00	0.00	0.00	0.00	0.00	0.44	0.18	0.18	0.00	0.27	0.27
Avail Cap(c_a), veh/h	3212	1780	0	0	1732	0	564	3590	1970	434	3327	1770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	0.0	0.0	0.0	0.0	9.6	2.6	2.6	0.0	5.6	5.7
Incr Delay (d2), s/veh	1.2	0.0	0.0	0.0	0.0	0.0	15.4	0.0	0.1	0.0	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	0.0	0.0	0.0	0.0	0.0	25.0	2.6	2.7	0.0	5.8	6.0
LnGrp LOS	B	A	A	A	A	A	C	A	A	A	A	A
Approach Vol, veh/h		22			0			480			375	
Approach Delay, s/veh		10.4			0.0			3.0			5.9	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	14.4		5.1	4.7	9.7		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	2.9		2.1	2.1	3.1		0.0				
Green Ext Time (p_c), s	0.0	2.7		0.0	0.0	2.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	4.4
HCM 6th LOS	A

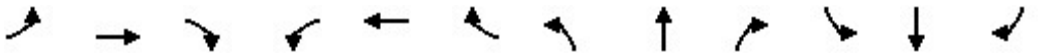
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			271			243			215			238
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



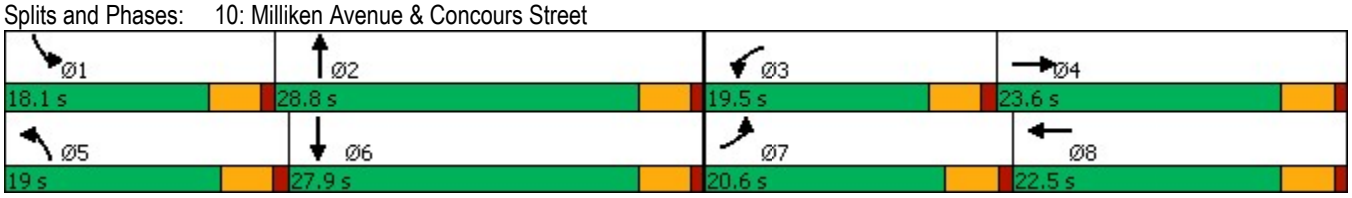
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	422	219	252	366	143	226	312	1400	341	393	1406	329
Future Volume (vph)	422	219	252	366	143	226	312	1400	341	393	1406	329
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	454	235	271	394	154	243	335	1505	367	423	1512	354
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	235	271	394	154	243	335	1505	367	423	1512	354

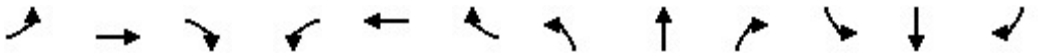
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	422	219	252	366	143	226	312	1400	341	393	1406	329
Future Volume (vph)	422	219	252	366	143	226	312	1400	341	393	1406	329
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	15.3	10.7	80.6	14.0	9.4	80.6	13.0	24.3	80.6	13.5	24.9	80.6
Actuated g/C Ratio	0.19	0.13	1.00	0.17	0.12	1.00	0.16	0.30	1.00	0.17	0.31	1.00
v/c Ratio	0.78	0.50	0.17	0.74	0.37	0.15	0.68	0.78	0.23	0.82	0.76	0.22
Control Delay	42.1	36.5	0.2	41.2	35.6	0.2	39.6	29.4	0.3	47.8	29.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	36.5	0.2	41.2	35.6	0.2	39.6	29.4	0.3	47.8	29.2	0.3
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		28.9			27.5			26.1			28.2	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 80.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street

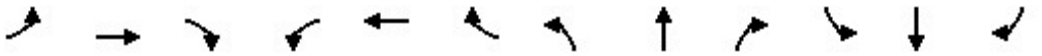




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	454	235	271	394	154	243	335	1505	367	423	1512	354
v/c Ratio	0.78	0.50	0.17	0.74	0.37	0.15	0.68	0.78	0.23	0.82	0.76	0.22
Control Delay	42.1	36.5	0.2	41.2	35.6	0.2	39.6	29.4	0.3	47.8	29.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	36.5	0.2	41.2	35.6	0.2	39.6	29.4	0.3	47.8	29.2	0.3
Queue Length 50th (ft)	113	60	0	97	38	0	82	203	0	108	206	0
Queue Length 95th (ft)	#186	94	0	#151	67	0	129	259	0	#192	265	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	614	840	1583	572	791	1583	553	1935	1583	519	1979	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.28	0.17	0.69	0.19	0.15	0.61	0.78	0.23	0.82	0.76	0.22

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



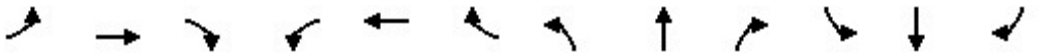
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	422	219	252	366	143	226	312	1400	341	393	1406	329
Future Volume (veh/h)	422	219	252	366	143	226	312	1400	341	393	1406	329
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	454	235	0	394	154	0	335	1505	0	423	1512	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	554	380		493	310		434	2019		513	2183	
Arrive On Green	0.18	0.11	0.00	0.16	0.09	0.00	0.14	0.31	0.00	0.17	0.34	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	454	235	0	394	154	0	335	1505	0	423	1512	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	10.0	4.5	0.0	8.7	2.9	0.0	7.4	14.8	0.0	9.4	14.4	0.0
Cycle Q Clear(g_c), s	10.0	4.5	0.0	8.7	2.9	0.0	7.4	14.8	0.0	9.4	14.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	554	380		493	310		434	2019		513	2183	
V/C Ratio(X)	0.82	0.62		0.80	0.50		0.77	0.75		0.83	0.69	
Avail Cap(c_a), veh/h	702	958		654	903		633	2206		593	2183	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.0	30.3	0.0	28.7	30.9	0.0	29.4	21.8	0.0	28.6	20.2	0.0
Incr Delay (d2), s/veh	6.1	1.6	0.0	5.2	1.2	0.0	3.6	1.3	0.0	8.2	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	1.9	0.0	3.4	1.3	0.0	2.9	5.4	0.0	3.9	5.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	31.9	0.0	33.9	32.1	0.0	32.9	23.1	0.0	36.8	21.2	0.0
LnGrp LOS	C	C		C	C		C	C		D	C	
Approach Vol, veh/h		689	A		548	A		1840	A		1935	A
Approach Delay, s/veh		33.3			33.4			24.9			24.6	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.3	26.7	15.8	12.1	14.4	28.5	17.2	10.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	11.4	16.8	10.7	6.5	9.4	16.4	12.0	4.9
Green Ext Time (p_c), s	0.4	5.4	0.6	1.1	0.6	5.1	0.7	0.7

Intersection Summary	
HCM 6th Ctrl Delay	26.9
HCM 6th LOS	C

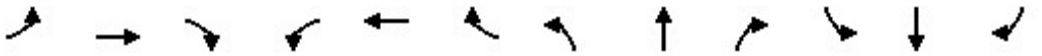
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			474			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



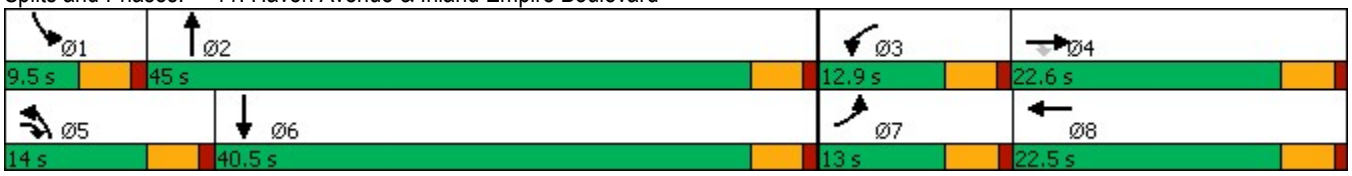
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	224	176	367	265	173	99	252	2367	798	77	2079	199
Future Volume (vph)	224	176	367	265	173	99	252	2367	798	77	2079	199
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	231	181	378	273	178	102	260	2440	823	79	2143	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	181	378	273	178	102	260	2440	823	79	2143	205

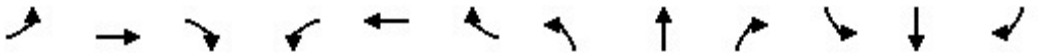
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	176	367	265	173	99	252	2367	798	77	2079	199
Future Volume (vph)	224	176	367	265	173	99	252	2367	798	77	2079	199
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	8.5	9.6	23.5	8.3	9.4	81.4	9.4	42.4	81.4	5.0	36.0	81.4
Actuated g/C Ratio	0.10	0.12	0.29	0.10	0.12	1.00	0.12	0.52	1.00	0.06	0.44	1.00
v/c Ratio	0.72	0.43	0.74	0.64	0.44	0.06	0.73	0.73	0.52	0.42	0.76	0.13
Control Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.5	1.2	44.5	21.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.5	1.2	44.5	21.4	0.2
LOS	D	D	C	D	D	A	D	B	A	D	C	A
Approach Delay		37.8			33.0			16.0			20.3	
Approach LOS		D			C			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 21.1	Intersection LOS: C
Intersection Capacity Utilization 70.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	231	181	378	273	178	102	260	2440	823	79	2143	205
v/c Ratio	0.72	0.43	0.74	0.64	0.44	0.06	0.73	0.73	0.52	0.42	0.76	0.13
Control Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.5	1.2	44.5	21.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.5	1.2	44.5	21.4	0.2
Queue Length 50th (ft)	59	45	140	48	45	0	67	278	0	20	256	0
Queue Length 95th (ft)	#114	76	241	76	76	0	#124	347	0	43	320	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	320	787	510	434	783	1583	358	3340	1583	188	2836	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.23	0.74	0.63	0.23	0.06	0.73	0.73	0.52	0.42	0.76	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	176	367	265	173	99	252	2367	798	77	2079	199
Future Volume (veh/h)	224	176	367	265	173	99	252	2367	798	77	2079	199
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	231	181	378	273	178	0	260	2440	0	79	2143	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	730	492	367	699		325	2928		150	2564	
Arrive On Green	0.10	0.21	0.21	0.09	0.20	0.00	0.10	0.46	0.00	0.05	0.40	0.00
Sat Flow, veh/h	3092	3554	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	231	181	378	273	178	0	260	2440	0	79	2143	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	6.4	3.8	18.1	5.6	3.7	0.0	7.2	29.3	0.0	2.2	26.5	0.0
Cycle Q Clear(g_c), s	6.4	3.8	18.1	5.6	3.7	0.0	7.2	29.3	0.0	2.2	26.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	295	730	492	367	699		325	2928		150	2564	
V/C Ratio(X)	0.78	0.25	0.77	0.74	0.25		0.80	0.83		0.53	0.84	
Avail Cap(c_a), veh/h	298	730	492	403	726		333	2958		175	2629	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.9	29.3	27.5	39.3	29.9	0.0	38.5	21.1	0.0	40.9	23.9	0.0
Incr Delay (d2), s/veh	12.6	0.2	7.2	6.7	0.2	0.0	12.8	2.2	0.0	2.8	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	1.6	7.9	2.1	1.6	0.0	3.3	10.7	0.0	0.9	9.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.5	29.5	34.7	46.0	30.1	0.0	51.3	23.2	0.0	43.8	26.3	0.0
LnGrp LOS	D	C	C	D	C		D	C		D	C	
Approach Vol, veh/h		790			451	A		2700	A		2222	A
Approach Delay, s/veh		38.4			39.7			25.9			27.0	
Approach LOS		D			D			C			C	

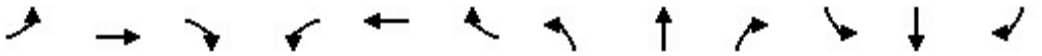
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	44.6	12.1	22.6	13.7	39.6	12.9	21.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	4.2	31.3	7.6	20.1	9.2	28.5	8.4	5.7
Green Ext Time (p_c), s	0.0	8.4	0.1	0.0	0.0	6.7	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	28.9
HCM 6th LOS	C

Notes

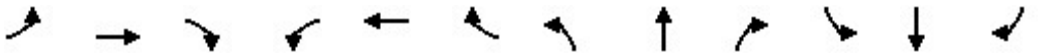
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			354			197			594			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



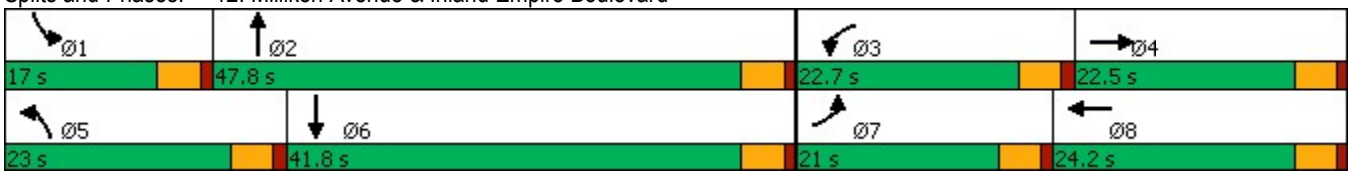
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	251	417	382	504	195	191	488	1557	1112	200	1863	157
Future Volume (vph)	251	417	382	504	195	191	488	1557	1112	200	1863	157
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	259	430	394	520	201	197	503	1605	1146	206	1921	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	430	394	520	201	197	503	1605	1146	206	1921	162

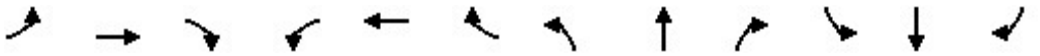
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	417	382	504	195	191	488	1557	1112	200	1863	157
Future Volume (vph)	251	417	382	504	195	191	488	1557	1112	200	1863	157
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	14.0	16.8	108.8	18.2	21.0	108.8	18.5	44.4	108.8	11.4	37.3	108.8
Actuated g/C Ratio	0.13	0.15	1.00	0.17	0.19	1.00	0.17	0.41	1.00	0.10	0.34	1.00
v/c Ratio	0.66	0.79	0.25	1.01	0.29	0.12	0.96	0.61	0.72	0.64	0.87	0.10
Control Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.0	2.9	56.2	39.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.0	2.9	56.2	39.2	0.1
LOS	D	E	A	F	D	A	E	C	A	E	D	A
Approach Delay		35.0			58.9			26.3			38.0	
Approach LOS		C			E			C			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 108.8	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 35.0	Intersection LOS: D
Intersection Capacity Utilization 85.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	259	430	394	520	201	197	503	1605	1146	206	1921	162
v/c Ratio	0.66	0.79	0.25	1.01	0.29	0.12	0.96	0.61	0.72	0.64	0.87	0.10
Control Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.0	2.9	56.2	39.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.0	2.9	56.2	39.2	0.1
Queue Length 50th (ft)	90	154	0	~202	64	0	184	262	0	72	369	0
Queue Length 95th (ft)	131	210	0	#309	101	0	#292	303	0	111	420	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	465	585	1583	514	682	1583	522	2614	1583	353	2197	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.74	0.25	1.01	0.29	0.12	0.96	0.61	0.72	0.58	0.87	0.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	251	417	382	504	195	191	488	1557	1112	200	1863	157
Future Volume (veh/h)	251	417	382	504	195	191	488	1557	1112	200	1863	157
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	259	430	0	520	201	0	503	1605	0	206	1921	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	323	515		527	749		536	2767		265	2204	
Arrive On Green	0.10	0.14	0.00	0.17	0.21	0.00	0.17	0.43	0.00	0.09	0.34	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	259	430	0	520	201	0	503	1605	0	206	1921	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	8.7	12.6	0.0	17.9	5.0	0.0	17.1	20.2	0.0	7.0	29.9	0.0
Cycle Q Clear(g_c), s	8.7	12.6	0.0	17.9	5.0	0.0	17.1	20.2	0.0	7.0	29.9	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	323	515		527	749		536	2767		265	2204	
V/C Ratio(X)	0.80	0.84		0.99	0.27		0.94	0.58		0.78	0.87	
Avail Cap(c_a), veh/h	478	600		527	749		536	2767		362	2249	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.7	44.4	0.0	44.1	35.2	0.0	43.5	23.1	0.0	47.8	32.9	0.0
Incr Delay (d2), s/veh	5.9	8.8	0.0	35.4	0.2	0.0	24.5	0.3	0.0	7.1	4.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	6.1	0.0	9.4	2.2	0.0	8.3	7.5	0.0	2.9	12.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.6	53.2	0.0	79.6	35.4	0.0	68.0	23.4	0.0	54.9	36.9	0.0
LnGrp LOS	D	D		E	D		E	C		D	D	
Approach Vol, veh/h		689	A		721	A		2108	A		2127	A
Approach Delay, s/veh		53.0			67.3			34.0			38.6	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	50.4	22.7	20.0	23.0	41.0	15.7	27.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	9.0	22.2	19.9	14.6	19.1	31.9	10.7	7.0
Green Ext Time (p_c), s	0.2	12.4	0.0	0.9	0.0	4.7	0.4	0.9

Intersection Summary	
HCM 6th Ctrl Delay	42.3
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.925	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	3091	1441	6408	0	0	6408
Flt Permitted	0.976					
Satd. Flow (perm)	3091	1441	6408	0	0	6408
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

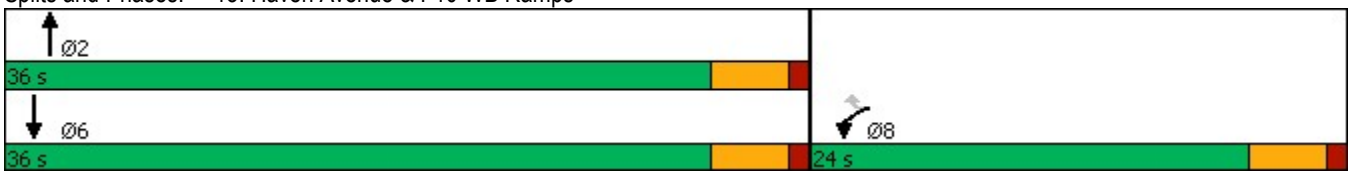
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	339	677	2672	0	0	1817
Future Volume (vph)	339	677	2672	0	0	1817
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	346	691	2727	0	0	1854
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	692	345	2727	0	0	1854

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	339	677	2672	1817
Future Volume (vph)	339	677	2672	1817
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	17.5	17.5	31.6	31.6
Actuated g/C Ratio	0.30	0.30	0.54	0.54
v/c Ratio	0.74	0.79	0.78	0.53
Control Delay	23.7	34.1	13.0	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.7	34.1	13.0	9.6
LOS	C	C	B	A
Approach Delay	27.2		13.0	9.6
Approach LOS	C		B	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 58.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 14.5	Intersection LOS: B
Intersection Capacity Utilization 88.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	692	345	2727	1854
v/c Ratio	0.74	0.79	0.78	0.53
Control Delay	23.7	34.1	13.0	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.7	34.1	13.0	9.6
Queue Length 50th (ft)	109	118	215	118
Queue Length 95th (ft)	162	#249	265	148
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1040	485	3482	3482
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	0.71	0.78	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

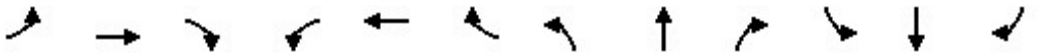
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	339	677	2672	0	0	1817
Future Volume (veh/h)	339	677	2672	0	0	1817
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1772	1870	1870	0	0	1870
Adj Flow Rate, veh/h	346	691	2727	0	0	1854
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	473	889	3584	0	0	3584
Arrive On Green	0.28	0.28	0.56	0.00	0.00	0.56
Sat Flow, veh/h	1688	3170	6958	0	0	6958
Grp Volume(v), veh/h	346	691	2727	0	0	1854
Grp Sat Flow(s),veh/h/ln	1688	1585	1609	0	0	1609
Q Serve(g_s), s	10.3	11.1	18.0	0.0	0.0	9.9
Cycle Q Clear(g_c), s	10.3	11.1	18.0	0.0	0.0	9.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	473	889	3584	0	0	3584
V/C Ratio(X)	0.73	0.78	0.76	0.00	0.00	0.52
Avail Cap(c_a), veh/h	595	1117	3662	0	0	3662
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	18.3	9.4	0.0	0.0	7.6
Incr Delay (d2), s/veh	3.5	2.8	1.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.0	4.9	0.0	0.0	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.5	21.1	10.4	0.0	0.0	7.8
LnGrp LOS	C	C	B	A	A	A
Approach Vol, veh/h	1037		2727			1854
Approach Delay, s/veh	21.2		10.4			7.8
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		35.3			35.3	20.0
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s		20.0			11.9	13.1
Green Ext Time (p_c), s		10.8			13.6	2.4

Intersection Summary	
HCM 6th Ctrl Delay	11.5
HCM 6th LOS	B

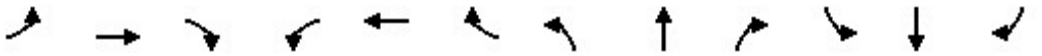
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			155			125			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



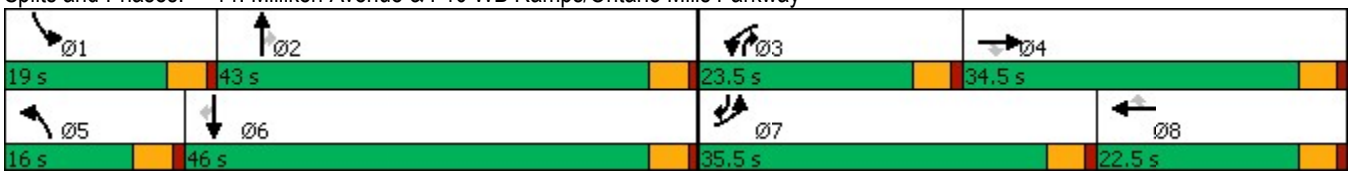
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	867	320	182	388	484	144	294	1895	589	427	1404	1117
Future Volume (vph)	867	320	182	388	484	144	294	1895	589	427	1404	1117
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	932	344	196	417	520	155	316	2038	633	459	1510	1201
Shared Lane Traffic (%)												
Lane Group Flow (vph)	932	344	196	417	520	155	316	2038	633	459	1510	1201

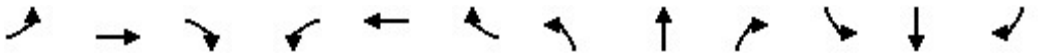
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	867	320	182	388	484	144	294	1895	589	427	1404	1117
Future Volume (vph)	867	320	182	388	484	144	294	1895	589	427	1404	1117
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	31.0	30.3	30.3	18.7	18.0	18.0	11.5	38.5	61.7	14.5	41.5	77.0
Actuated g/C Ratio	0.26	0.25	0.25	0.16	0.15	0.15	0.10	0.32	0.51	0.12	0.35	0.64
v/c Ratio	1.18	0.73	0.42	0.87	0.98	0.42	1.07	0.99	0.72	1.24	0.68	1.16
Control Delay	131.8	51.7	22.0	68.9	85.8	10.7	124.8	58.7	23.4	171.6	35.5	105.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	131.8	51.7	22.0	68.9	85.8	10.7	124.8	58.7	23.4	171.6	35.5	105.4
LOS	F	D	C	E	F	B	F	E	C	F	D	F
Approach Delay		98.4			68.7			58.2			81.7	
Approach LOS		F			E			E			F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 74.9	Intersection LOS: E
Intersection Capacity Utilization 103.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway



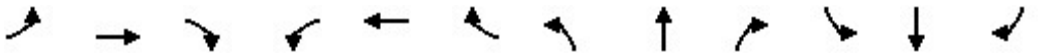


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	932	344	196	417	520	155	316	2038	633	459	1510	1201
v/c Ratio	1.18	0.73	0.42	0.87	0.98	0.42	1.07	0.99	0.72	1.24	0.68	1.16
Control Delay	131.8	51.7	22.0	68.9	85.8	10.7	124.8	58.7	23.4	171.6	35.5	105.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	131.8	51.7	22.0	68.9	85.8	10.7	124.8	58.7	23.4	171.6	35.5	105.4
Queue Length 50th (ft)	~444	246	63	163	213	0	~140	455	298	~227	289	~1089
Queue Length 95th (ft)	#572	356	134	#247	#328	60	#233	#549	449	#333	331	#1353
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	793	469	470	486	530	369	294	2055	878	371	2216	1035
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.18	0.73	0.42	0.86	0.98	0.42	1.07	0.99	0.72	1.24	0.68	1.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	867	320	182	388	484	144	294	1895	589	427	1404	1117
Future Volume (veh/h)	867	320	182	388	484	144	294	1895	589	427	1404	1117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	932	344	196	417	520	155	316	2038	633	459	1510	1201
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	799	482	408	466	533	238	296	2064	747	374	2225	958
Arrive On Green	0.26	0.26	0.26	0.15	0.15	0.15	0.10	0.32	0.32	0.12	0.35	0.35
Sat Flow, veh/h	3092	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	932	344	196	417	520	155	316	2038	633	459	1510	1201
Grp Sat Flow(s),veh/h/ln	1546	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	31.0	20.1	12.6	15.9	17.5	11.1	11.5	37.8	38.5	14.5	24.1	41.5
Cycle Q Clear(g_c), s	31.0	20.1	12.6	15.9	17.5	11.1	11.5	37.8	38.5	14.5	24.1	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	799	482	408	466	533	238	296	2064	747	374	2225	958
V/C Ratio(X)	1.17	0.71	0.48	0.89	0.98	0.65	1.07	0.99	0.85	1.23	0.68	1.25
Avail Cap(c_a), veh/h	799	482	408	490	533	238	296	2064	747	374	2225	958
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	40.5	37.7	50.0	50.8	48.0	54.2	40.5	27.9	52.8	33.5	23.7
Incr Delay (d2), s/veh	88.4	5.0	0.9	18.2	32.6	6.2	71.0	16.8	9.0	124.3	0.8	123.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	21.6	9.9	5.0	7.3	10.2	4.8	7.4	17.1	17.4	12.1	9.5	57.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	132.9	45.5	38.6	68.2	83.4	54.2	125.2	57.3	36.8	177.0	34.4	146.7
LnGrp LOS	F	D	D	E	F	D	F	E	D	F	C	F
Approach Vol, veh/h		1472			1092			2987			3170	
Approach Delay, s/veh		99.9			73.5			60.2			97.6	
Approach LOS		F			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	43.0	22.6	35.4	16.0	46.0	35.5	22.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	16.5	40.5	17.9	22.1	13.5	43.5	33.0	19.5
Green Ext Time (p_c), s	0.0	0.0	0.2	1.8	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	82.2
HCM 6th LOS	F

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.992	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3243	1441	0	6408	6408	0
Flt Permitted	0.955					
Satd. Flow (perm)	3243	1441	0	6408	6408	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

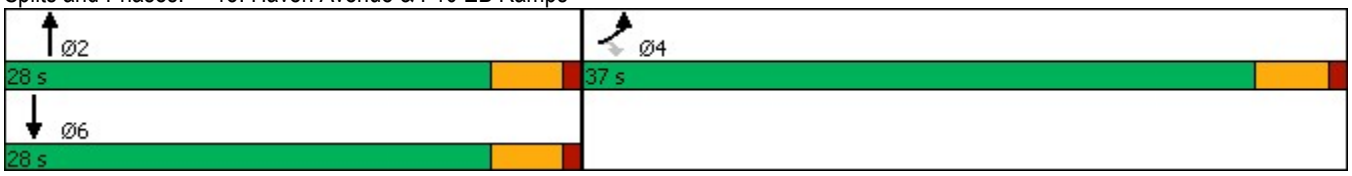
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1400	752	0	2079	1704	0
Future Volume (vph)	1400	752	0	2079	1704	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1443	775	0	2143	1757	0
Shared Lane Traffic (%)		11%				
Lane Group Flow (vph)	1528	690	0	2143	1757	0

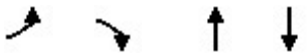
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1400	752	2079	1704
Future Volume (vph)	1400	752	2079	1704
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	32.5	32.5	23.5	23.5
Actuated g/C Ratio	0.50	0.50	0.36	0.36
v/c Ratio	0.94	0.96	0.93	0.76
Control Delay	29.3	43.3	28.7	20.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.3	43.3	28.7	20.9
LOS	C	D	C	C
Approach Delay	33.7		28.7	20.9
Approach LOS	C		C	C

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 88.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1528	690	2143	1757
v/c Ratio	0.94	0.96	0.93	0.76
Control Delay	29.3	43.3	28.7	20.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	29.3	43.3	28.7	20.9
Queue Length 50th (ft)	274	268	230	173
Queue Length 95th (ft)	#437	#518	#315	215
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1622	721	2316	2316
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.94	0.96	0.93	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1400	752	0	2079	1704	0
Future Volume (veh/h)	1400	752	0	2079	1704	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1772	1870	0	1870	1870	0
Adj Flow Rate, veh/h	1476	739	0	2143	1757	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1679	789	0	2336	2336	0
Arrive On Green	0.50	0.50	0.00	0.36	0.36	0.00
Sat Flow, veh/h	3375	1585	0	6958	6958	0
Grp Volume(v), veh/h	1476	739	0	2143	1757	0
Grp Sat Flow(s),veh/h/ln	1688	1585	0	1609	1609	0
Q Serve(g_s), s	25.2	28.3	0.0	20.5	15.4	0.0
Cycle Q Clear(g_c), s	25.2	28.3	0.0	20.5	15.4	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1679	789	0	2336	2336	0
V/C Ratio(X)	0.88	0.94	0.00	0.92	0.75	0.00
Avail Cap(c_a), veh/h	1699	798	0	2342	2342	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.5	15.3	0.0	19.6	18.0	0.0
Incr Delay (d2), s/veh	5.6	18.3	0.0	6.3	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.3	12.5	0.0	7.9	5.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.1	33.6	0.0	26.0	19.4	0.0
LnGrp LOS	C	C	A	C	B	A
Approach Vol, veh/h	2215			2143	1757	
Approach Delay, s/veh	24.6			26.0	19.4	
Approach LOS	C			C	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		27.9		36.6		27.9
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		22.5		30.3		17.4
Green Ext Time (p_c), s		0.9		1.8		4.9

Intersection Summary	
HCM 6th Ctrl Delay	23.6
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1700	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3072	1583	3072	6408	6408	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3072	1583	3072	6408	6408	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		2				51
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1243	310	221	1605	1171	839
Future Volume (vph)	1243	310	221	1605	1171	839
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1281	320	228	1655	1207	865
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1281	320	228	1655	1207	865

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1243	310	221	1605	1171	839
Future Volume (vph)	1243	310	221	1605	1171	839
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	33.8	45.8	7.5	31.3	19.3	57.6
Actuated g/C Ratio	0.46	0.62	0.10	0.42	0.26	0.78
v/c Ratio	0.91	0.33	0.73	0.61	0.72	0.70
Control Delay	30.7	7.9	48.3	18.0	28.0	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	7.9	48.3	18.0	28.0	7.4
LOS	C	A	D	B	C	A
Approach Delay	26.1			21.6	19.4	
Approach LOS	C			C	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 74.1	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 22.1	Intersection LOS: C
Intersection Capacity Utilization 74.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1281	320	228	1655	1207	865
v/c Ratio	0.91	0.33	0.73	0.61	0.72	0.70
Control Delay	30.7	7.9	48.3	18.0	28.0	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	7.9	48.3	18.0	28.0	7.4
Queue Length 50th (ft)	271	62	54	168	148	127
Queue Length 95th (ft)	#413	105	#105	205	186	230
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1431	979	311	2726	1688	1256
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.33	0.73	0.61	0.72	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1243	310	221	1605	1171	839
Future Volume (veh/h)	1243	310	221	1605	1171	839
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1870	1673	1870	1870	1870
Adj Flow Rate, veh/h	1281	320	228	1655	1207	865
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1393	870	304	2743	1714	1137
Arrive On Green	0.45	0.45	0.10	0.43	0.27	0.27
Sat Flow, veh/h	3092	1585	3092	6696	6696	1585
Grp Volume(v), veh/h	1281	320	228	1655	1207	865
Grp Sat Flow(s),veh/h/ln	1546	1585	1546	1609	1609	1585
Q Serve(g_s), s	28.4	8.3	5.3	14.5	12.4	19.5
Cycle Q Clear(g_c), s	28.4	8.3	5.3	14.5	12.4	19.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1393	870	304	2743	1714	1137
V/C Ratio(X)	0.92	0.37	0.75	0.60	0.70	0.76
Avail Cap(c_a), veh/h	1458	903	317	2770	1714	1137
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.9	9.3	32.1	16.2	24.2	5.7
Incr Delay (d2), s/veh	9.5	0.3	9.2	0.4	1.3	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	9.5	2.3	5.0	4.6	16.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.3	9.6	41.3	16.6	25.6	8.8
LnGrp LOS	C	A	D	B	C	A
Approach Vol, veh/h	1601			1883	2072	
Approach Delay, s/veh	24.6			19.6	18.5	
Approach LOS	C			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		35.7		37.5	11.7	24.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		16.5		30.4	7.3	21.5
Green Ext Time (p_c), s		10.1		2.5	0.0	0.0

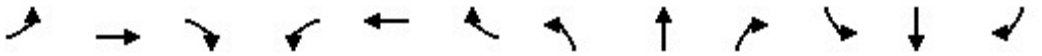
Intersection Summary	
HCM 6th Ctrl Delay	20.6
HCM 6th LOS	C

Appendix I

Intersection LOS Analysis Sheets
Horizon Year (2040) With Project Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.962				0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	4892	0	3072	3539	1583	3072	5085	1583	3072	6369	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	4892	0	3072	3539	1583	3072	5085	1583	3072	6369	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66				149			238		9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



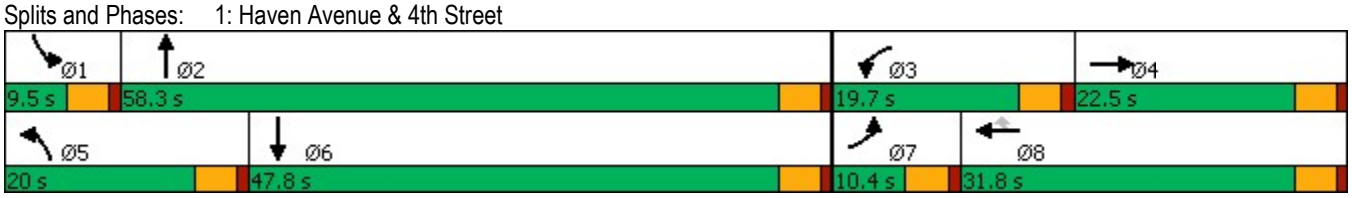
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	130	425	143	372	741	205	293	2155	681	134	1728	77
Future Volume (vph)	130	425	143	372	741	205	293	2155	681	134	1728	77
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	143	467	157	409	814	225	322	2368	748	147	1899	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	624	0	409	814	225	322	2368	748	147	1984	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	130	425	372	741	205	293	2155	681	134	1728
Future Volume (vph)	130	425	372	741	205	293	2155	681	134	1728
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	10.4	22.5	19.7	31.8	31.8	20.0	58.3		9.5	47.8
Total Split (%)	9.5%	20.5%	17.9%	28.9%	28.9%	18.2%	53.0%		8.6%	43.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.9	18.0	15.2	27.3	27.3	14.8	53.8	110.0	5.0	44.1
Actuated g/C Ratio	0.05	0.16	0.14	0.25	0.25	0.13	0.49	1.00	0.05	0.40
v/c Ratio	0.87	0.73	0.96	0.93	0.45	0.78	0.95	0.47	1.06	0.78
Control Delay	95.2	44.7	83.4	58.2	15.5	60.0	37.1	1.0	143.4	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.2	44.7	83.4	58.2	15.5	60.0	37.1	1.0	143.4	31.3
LOS	F	D	F	E	B	E	D	A	F	C
Approach Delay		54.1		58.7			31.4			39.0
Approach LOS		D		E			C			D

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 110	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 40.8	Intersection LOS: D
Intersection Capacity Utilization 85.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	143	624	409	814	225	322	2368	748	147	1984
v/c Ratio	0.87	0.73	0.96	0.93	0.45	0.78	0.95	0.47	1.06	0.78
Control Delay	95.2	44.7	83.4	58.2	15.5	60.0	37.1	1.0	143.4	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.2	44.7	83.4	58.2	15.5	60.0	37.1	1.0	143.4	31.3
Queue Length 50th (ft)	52	138	150	296	43	113	566	0	~58	351
Queue Length 95th (ft)	#111	182	#247	#414	113	#171	#701	0	#125	400
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	164	855	424	878	504	432	2488	1583	139	2556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.73	0.96	0.93	0.45	0.75	0.95	0.47	1.06	0.78

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

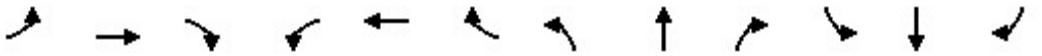
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	425	143	372	741	205	293	2155	681	134	1728	77
Future Volume (veh/h)	130	425	143	372	741	205	293	2155	681	134	1728	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	143	467	157	409	814	225	322	2368	0	147	1899	85
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	166	616	200	428	876	391	379	2503		141	2627	118
Arrive On Green	0.05	0.16	0.16	0.14	0.25	0.25	0.12	0.49	0.00	0.05	0.41	0.41
Sat Flow, veh/h	3092	3814	1238	3092	3554	1585	3092	5106	1585	3092	6360	285
Grp Volume(v), veh/h	143	415	209	409	814	225	322	2368	0	147	1441	543
Grp Sat Flow(s),veh/h/ln	1546	1702	1648	1546	1777	1585	1546	1702	1585	1546	1609	1819
Q Serve(g_s), s	5.0	12.8	13.4	14.4	24.6	13.7	11.2	48.4	0.0	5.0	27.4	27.4
Cycle Q Clear(g_c), s	5.0	12.8	13.4	14.4	24.6	13.7	11.2	48.4	0.0	5.0	27.4	27.4
Prop In Lane	1.00		0.75	1.00		1.00	1.00		1.00	1.00		0.16
Lane Grp Cap(c), veh/h	166	550	266	428	876	391	379	2503		141	1993	751
V/C Ratio(X)	0.86	0.75	0.78	0.95	0.93	0.58	0.85	0.95		1.04	0.72	0.72
Avail Cap(c_a), veh/h	166	558	270	428	884	394	437	2503		141	1993	751
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.5	43.9	44.2	46.9	40.4	36.3	47.1	26.6	0.0	52.4	26.9	26.9
Incr Delay (d2), s/veh	33.8	5.7	13.9	32.1	15.9	2.0	13.1	9.1	0.0	87.8	2.3	6.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	5.8	6.5	7.4	12.5	5.5	5.0	20.8	0.0	3.7	10.7	12.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	85.3	49.6	58.1	79.0	56.3	38.3	60.2	35.7	0.0	140.2	29.3	32.9
LnGrp LOS	F	D	E	E	E	D	E	D		F	C	C
Approach Vol, veh/h		767			1448			2690	A		2131	
Approach Delay, s/veh		58.6			59.9			38.7			37.8	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	58.3	19.7	22.2	18.0	49.8	10.4	31.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	53.8	15.2	18.0	15.5	43.3	5.9	27.3
Max Q Clear Time (g_c+I1), s	7.0	50.4	16.4	15.4	13.2	29.4	7.0	26.6
Green Ext Time (p_c), s	0.0	3.2	0.0	1.0	0.3	10.5	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	45.0
HCM 6th LOS	D

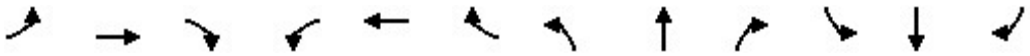
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.990				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	6344	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	6344	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				164			164		315	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	54	693	49	1	976	109	44	1	1	176	0	4
Future Volume (vph)	54	693	49	1	976	109	44	1	1	176	0	4
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	60	770	54	1	1084	121	49	1	1	196	0	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	824	0	1	1084	121	49	1	1	196	4	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	54	693	1	976	109	44	1	1	176	0
Future Volume (vph)	54	693	1	976	109	44	1	1	176	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Perm	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			2		
Detector Phase	7	4	3	8	8	5	2	2	1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	9.5	22.5	9.5	22.5	22.5	11.3	23.0	23.0	15.0	26.7
Total Split (%)	13.6%	32.1%	13.6%	32.1%	32.1%	16.1%	32.9%	32.9%	21.4%	38.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	5.1	20.9	5.1	17.4	17.4	6.4	5.7	5.7	10.0	14.1
Actuated g/C Ratio	0.10	0.40	0.10	0.33	0.33	0.12	0.11	0.11	0.19	0.27
v/c Ratio	0.37	0.32	0.01	0.64	0.19	0.24	0.00	0.00	0.61	0.00
Control Delay	31.2	11.2	24.0	17.5	2.4	25.8	23.0	0.0	30.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	11.2	24.0	17.5	2.4	25.8	23.0	0.0	30.8	0.0
LOS	C	B	C	B	A	C	C	A	C	A
Approach Delay		12.6		16.0			25.2			30.2
Approach LOS		B		B			C			C

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 52	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 16.1	Intersection LOS: B
Intersection Capacity Utilization 51.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	60	824	1	1084	121	49	1	1	196	4
v/c Ratio	0.37	0.32	0.01	0.64	0.19	0.24	0.00	0.00	0.61	0.00
Control Delay	31.2	11.2	24.0	17.5	2.4	25.8	23.0	0.0	30.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	11.2	24.0	17.5	2.4	25.8	23.0	0.0	30.8	0.0
Queue Length 50th (ft)	20	43	0	115	0	16	0	0	62	0
Queue Length 95th (ft)	51	85	4	157	18	42	4	0	#138	0
Internal Link Dist (ft)		2546		362			269			358
Turn Bay Length (ft)	130		130		145	165		165	50	
Base Capacity (vph)	164	2669	164	1791	664	223	674	677	344	1485
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.31	0.01	0.61	0.18	0.22	0.00	0.00	0.57	0.00

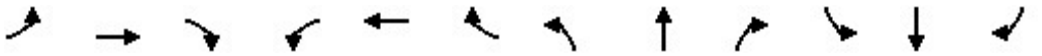
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	54	693	49	1	976	109	44	1	1	176	0	4
Future Volume (veh/h)	54	693	49	1	976	109	44	1	1	176	0	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	60	770	54	1	1084	121	49	1	1	196	0	4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	2300	160	4	1611	500	84	196	166	246	356	318
Arrive On Green	0.06	0.37	0.37	0.00	0.32	0.32	0.05	0.10	0.10	0.15	0.00	0.20
Sat Flow, veh/h	1688	6189	429	1688	5106	1585	1688	1870	1585	1688	1777	1585
Grp Volume(v), veh/h	60	599	225	1	1084	121	49	1	1	196	0	4
Grp Sat Flow(s),veh/h/ln	1688	1609	1793	1688	1702	1585	1688	1870	1585	1688	1777	1585
Q Serve(g_s), s	1.7	4.3	4.3	0.0	8.8	2.7	1.4	0.0	0.0	5.4	0.0	0.1
Cycle Q Clear(g_c), s	1.7	4.3	4.3	0.0	8.8	2.7	1.4	0.0	0.0	5.4	0.0	0.1
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	97	1793	666	4	1611	500	84	196	166	246	356	318
V/C Ratio(X)	0.62	0.33	0.34	0.28	0.67	0.24	0.58	0.01	0.01	0.80	0.00	0.01
Avail Cap(c_a), veh/h	177	1817	675	177	1923	597	240	724	614	371	825	736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.0	10.8	10.8	23.8	14.2	12.1	22.2	19.2	19.2	19.7	0.0	15.3
Incr Delay (d2), s/veh	6.3	0.1	0.3	38.8	0.7	0.2	6.2	0.0	0.0	7.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.3	1.5	0.0	3.0	0.8	0.6	0.0	0.0	2.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.3	10.9	11.1	62.7	14.9	12.4	28.4	19.2	19.2	26.7	0.0	15.3
LnGrp LOS	C	B	B	E	B	B	C	B	B	C	A	B
Approach Vol, veh/h		884			1206			51			200	
Approach Delay, s/veh		12.1			14.7			28.0			26.5	
Approach LOS		B			B			C			C	

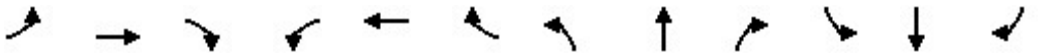
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.5	9.5	4.6	22.3	6.9	14.1	7.2	19.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	18.5	5.0	18.0	6.8	22.2	5.0	18.0
Max Q Clear Time (g_c+I1), s	7.4	2.0	2.0	6.3	3.4	2.1	3.7	10.8
Green Ext Time (p_c), s	0.2	0.0	0.0	4.3	0.0	0.0	0.0	4.3

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.996				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.956	
Satd. Flow (prot)	3072	6401	0	1676	5065	0	1676	1863	1583	0	1781	1583
Flt Permitted	0.950			0.950			0.720				0.739	
Satd. Flow (perm)	3072	6401	0	1676	5065	0	1271	1863	1583	0	1377	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			7				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



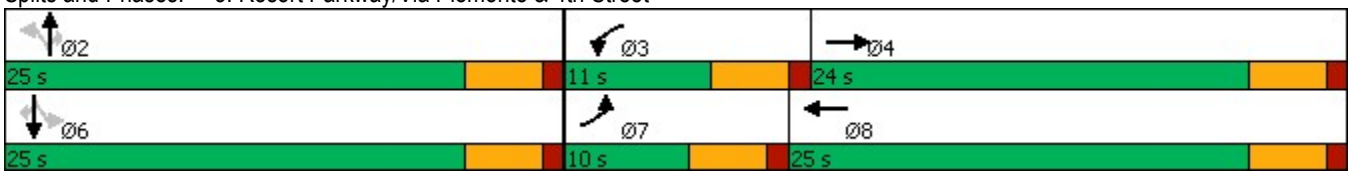
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	716	6	42	983	28	32	4	36	48	4	23
Future Volume (vph)	20	716	6	42	983	28	32	4	36	48	4	23
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	22	770	6	45	1057	30	34	4	39	52	4	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	776	0	45	1087	0	34	4	39	0	56	25

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	716	42	983	32	4	36	48	4	23
Future Volume (vph)	20	716	42	983	32	4	36	48	4	23
Turn Type	Prot	NA	Prot	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8		2			6	
Permitted Phases					2		2	6		6
Detector Phase	7	4	3	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	10.0	24.0	11.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	16.7%	40.0%	18.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	5.9	14.8	6.4	16.8	7.2	7.2	7.2		7.2	7.2
Actuated g/C Ratio	0.17	0.42	0.18	0.48	0.21	0.21	0.21		0.21	0.21
v/c Ratio	0.04	0.29	0.15	0.45	0.13	0.01	0.09		0.20	0.06
Control Delay	17.2	8.0	17.2	7.2	15.9	14.8	0.4		16.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	17.2	8.0	17.2	7.2	15.9	14.8	0.4		16.3	0.3
LOS	B	A	B	A	B	B	A		B	A
Approach Delay		8.2		7.6		8.0			11.4	
Approach LOS		A		A		A			B	

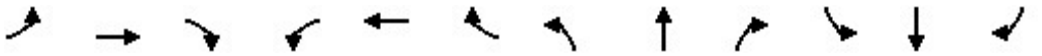
Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 35	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.45	
Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 44.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	22	776	45	1087	34	4	39	56	25
v/c Ratio	0.04	0.29	0.15	0.45	0.13	0.01	0.09	0.20	0.06
Control Delay	17.2	8.0	17.2	7.2	15.9	14.8	0.4	16.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	8.0	17.2	7.2	15.9	14.8	0.4	16.3	0.3
Queue Length 50th (ft)	1	17	6	34	5	1	0	8	0
Queue Length 95th (ft)	10	59	35	109	26	7	1	38	0
Internal Link Dist (ft)		362		428		302		378	
Turn Bay Length (ft)	220		125		115		115		110
Base Capacity (vph)	513	3794	331	3254	792	1160	1027	858	1027
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.20	0.14	0.33	0.04	0.00	0.04	0.07	0.02

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	716	6	42	983	28	32	4	36	48	4	23
Future Volume (veh/h)	20	716	6	42	983	28	32	4	36	48	4	23
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	770	6	45	1057	30	34	4	39	52	4	25
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	86	2518	20	87	2058	58	378	288	244	406	24	244
Arrive On Green	0.03	0.38	0.38	0.05	0.40	0.40	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	3092	6635	52	1688	5104	145	1308	1870	1585	1251	154	1585
Grp Volume(v), veh/h	22	560	216	45	705	382	34	4	39	56	0	25
Grp Sat Flow(s),veh/h/ln	1546	1609	1861	1688	1702	1844	1308	1870	1585	1405	0	1585
Q Serve(g_s), s	0.2	2.6	2.7	0.8	5.1	5.1	0.8	0.1	0.7	0.9	0.0	0.4
Cycle Q Clear(g_c), s	0.2	2.6	2.7	0.8	5.1	5.1	1.9	0.1	0.7	1.1	0.0	0.4
Prop In Lane	1.00		0.03	1.00		0.08	1.00		1.00	0.93		1.00
Lane Grp Cap(c), veh/h	86	1832	706	87	1373	744	378	288	244	430	0	244
V/C Ratio(X)	0.26	0.31	0.31	0.52	0.51	0.51	0.09	0.01	0.16	0.13	0.00	0.10
Avail Cap(c_a), veh/h	523	2895	1116	337	2147	1163	1002	1179	1000	1093	0	1000
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.5	7.1	7.1	15.0	7.3	7.3	12.9	11.7	11.9	12.1	0.0	11.8
Incr Delay (d2), s/veh	1.6	0.1	0.2	4.7	0.3	0.6	0.1	0.0	0.3	0.1	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.6	0.7	0.4	1.2	1.3	0.2	0.0	0.2	0.3	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.0	7.2	7.3	19.8	7.6	7.9	13.0	11.7	12.2	12.2	0.0	12.0
LnGrp LOS	B	A	A	B	A	A	B	B	B	B	A	B
Approach Vol, veh/h		798			1132			77			81	
Approach Delay, s/veh		7.5			8.2			12.6			12.2	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	6.2	16.8		9.5	5.4	17.6				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		20.5	6.5	19.5		20.5	5.5	20.5				
Max Q Clear Time (g_c+I1), s		3.9	2.8	4.7		3.1	2.2	7.1				
Green Ext Time (p_c), s		0.2	0.0	4.5		0.3	0.0	6.0				

Intersection Summary	
HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	5060	0	0	5085	0	1611
Flt Permitted						
Satd. Flow (perm)	5060	0	0	5085	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	774	29	0	993	0	24
Future Volume (vph)	774	29	0	993	0	24
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	841	32	0	1079	0	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	873	0	0	1079	0	26

Intersection Summary

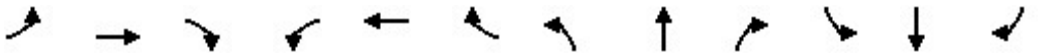
Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	774	29	0	993	0	24
Future Vol, veh/h	774	29	0	993	0	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	841	32	0	1079	0	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	437
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	485
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	485
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

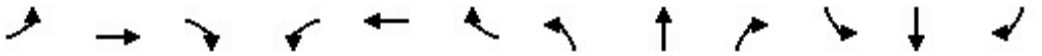
Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	485	-	-	-
HCM Lane V/C Ratio	0.054	-	-	-
HCM Control Delay (s)	12.8	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.985	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6312	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6312	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			219			278			73		29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



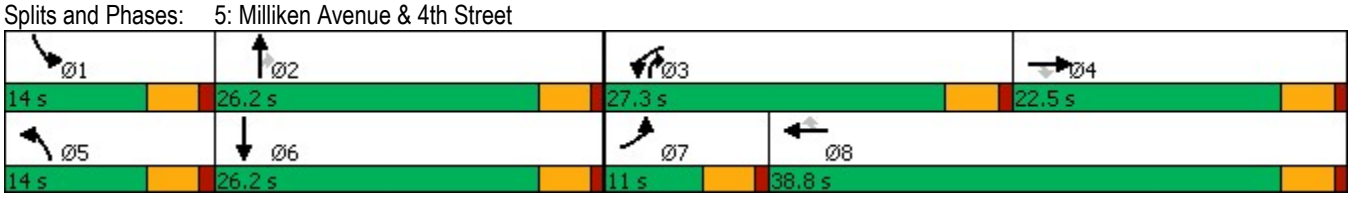
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	205	572	226	650	1669	549	278	1327	214	277	1154	133
Future Volume (vph)	205	572	226	650	1669	549	278	1327	214	277	1154	133
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	220	615	243	699	1795	590	299	1427	230	298	1241	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	220	615	243	699	1795	590	299	1427	230	298	1384	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	205	572	226	650	1669	549	278	1327	214	277	1154
Future Volume (vph)	205	572	226	650	1669	549	278	1327	214	277	1154
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	11.0	22.5	22.5	27.3	38.8	38.8	14.0	26.2	27.3	14.0	26.2
Total Split (%)	12.2%	25.0%	25.0%	30.3%	43.1%	43.1%	15.6%	29.1%	30.3%	15.6%	29.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	6.5	18.4	18.4	22.4	34.3	34.3	9.5	21.7	48.6	9.5	21.7
Actuated g/C Ratio	0.07	0.20	0.20	0.25	0.38	0.38	0.11	0.24	0.54	0.11	0.24
v/c Ratio	1.00	0.59	0.49	0.91	0.93	0.76	0.92	0.92	0.26	0.92	0.90
Control Delay	103.6	35.2	9.9	51.2	36.5	19.9	75.4	44.7	8.1	74.8	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.6	35.2	9.9	51.2	36.5	19.9	75.4	44.7	8.1	74.8	41.4
LOS	F	D	A	D	D	B	E	D	A	E	D
Approach Delay		43.5			36.7			45.1			47.4
Approach LOS		D			D			D			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 42.0	Intersection LOS: D
Intersection Capacity Utilization 81.8%	ICU Level of Service D
Analysis Period (min) 15	

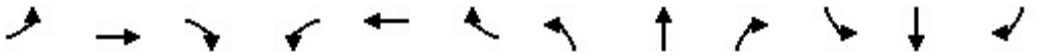
Splits and Phases: 5: Milliken Avenue & 4th Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	220	615	243	699	1795	590	299	1427	230	298	1384
v/c Ratio	1.00	0.59	0.49	0.91	0.93	0.76	0.92	0.92	0.26	0.92	0.90
Control Delay	103.6	35.2	9.9	51.2	36.5	19.9	75.4	44.7	8.1	74.8	41.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	103.6	35.2	9.9	51.2	36.5	19.9	75.4	44.7	8.1	74.8	41.4
Queue Length 50th (ft)	65	117	11	197	350	154	88	230	42	88	217
Queue Length 95th (ft)	#139	156	75	#300	#456	297	#165	#300	82	#164	#281
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	221	1041	497	778	1937	775	324	1545	895	324	1543
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.59	0.49	0.90	0.93	0.76	0.92	0.92	0.26	0.92	0.90

Intersection Summary

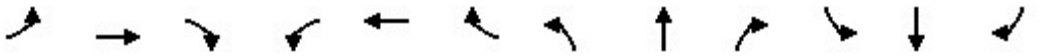
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	205	572	226	650	1669	549	278	1327	214	277	1154	133
Future Volume (veh/h)	205	572	226	650	1669	549	278	1327	214	277	1154	133
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	220	615	243	699	1795	590	299	1427	230	298	1241	143
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	1059	329	761	1947	604	326	1550	772	326	1420	163
Arrive On Green	0.07	0.21	0.21	0.25	0.38	0.38	0.11	0.24	0.24	0.11	0.24	0.24
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	3092	6434	1585	3092	5898	677
Grp Volume(v), veh/h	220	615	243	699	1795	590	299	1427	230	298	1014	370
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1546	1609	1585	1546	1609	1749
Q Serve(g_s), s	6.4	9.8	12.9	19.8	30.2	33.0	8.6	19.5	7.8	8.6	18.2	18.3
Cycle Q Clear(g_c), s	6.4	9.8	12.9	19.8	30.2	33.0	8.6	19.5	7.8	8.6	18.2	18.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.39
Lane Grp Cap(c), veh/h	223	1059	329	761	1947	604	326	1550	772	326	1162	421
V/C Ratio(X)	0.98	0.58	0.74	0.92	0.92	0.98	0.92	0.92	0.30	0.91	0.87	0.88
Avail Cap(c_a), veh/h	223	1059	329	784	1947	604	326	1552	773	326	1164	422
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.7	32.1	33.4	33.0	26.6	27.4	39.8	33.3	13.8	39.8	32.8	32.9
Incr Delay (d2), s/veh	55.7	0.8	8.6	15.5	7.8	30.6	29.3	9.4	0.2	28.7	7.5	18.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	4.0	5.6	8.8	13.0	16.9	4.6	8.4	2.7	4.5	7.7	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.4	32.9	42.0	48.6	34.4	58.0	69.2	42.7	14.1	68.6	40.3	51.4
LnGrp LOS	F	C	D	D	C	E	E	D	B	E	D	D
Approach Vol, veh/h		1078			3084			1956			1682	
Approach Delay, s/veh		48.1			42.1			43.4			47.8	
Approach LOS		D			D			D			D	

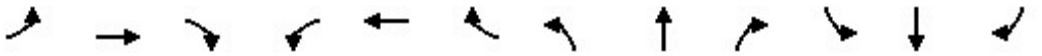
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.0	26.2	26.6	23.2	14.0	26.2	11.0	38.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.5	21.7	22.8	18.0	9.5	21.7	6.5	34.3
Max Q Clear Time (g_c+I1), s	10.6	21.5	21.8	14.9	10.6	20.3	8.4	35.0
Green Ext Time (p_c), s	0.0	0.2	0.3	1.5	0.0	1.1	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	44.5
HCM 6th LOS	D



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.901	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	1770	3539	1583	1770	3055	1441
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	1770	3539	1583	1770	3055	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			136			136		208	208
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



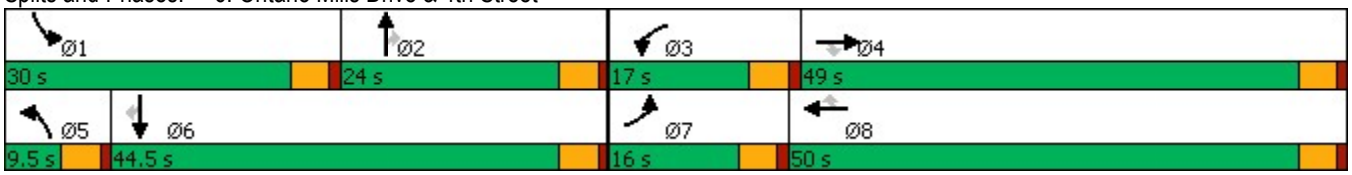
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	401	519	83	154	1821	184	101	99	109	205	312	1227
Future Volume (vph)	401	519	83	154	1821	184	101	99	109	205	312	1227
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	461	597	95	177	2093	211	116	114	125	236	359	1410
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	461	597	95	177	2093	211	116	114	125	236	1064	705

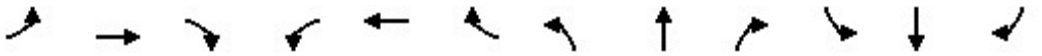
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	519	83	154	1821	184	101	99	109	205	312	1227
Future Volume (vph)	401	519	83	154	1821	184	101	99	109	205	312	1227
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	16.0	49.0	49.0	17.0	50.0	50.0	9.5	24.0	24.0	30.0	44.5	44.5
Total Split (%)	13.3%	40.8%	40.8%	14.2%	41.7%	41.7%	7.9%	20.0%	20.0%	25.0%	37.1%	37.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	11.5	45.7	45.7	11.3	45.5	45.5	5.0	24.4	24.4	20.6	40.0	40.0
Actuated g/C Ratio	0.10	0.38	0.38	0.09	0.38	0.38	0.04	0.20	0.20	0.17	0.33	0.33
v/c Ratio	1.57	0.31	0.14	0.61	1.09	0.31	1.59	0.16	0.29	0.78	1.10dr	1.14
Control Delay	307.4	26.8	1.8	61.4	84.0	10.8	356.9	41.7	7.9	64.6	44.3	108.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	307.4	26.8	1.8	61.4	84.0	10.8	356.9	41.7	7.9	64.6	44.3	108.0
LOS	F	C	A	E	F	B	F	D	A	E	D	F
Approach Delay		137.0			76.2			132.8			69.1	
Approach LOS		F			E			F			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.59	
Intersection Signal Delay: 88.8	Intersection LOS: F
Intersection Capacity Utilization 102.7%	ICU Level of Service G
Analysis Period (min) 15	
dr Defacto Right Lane. Recode with 1 though lane as a right lane.	

Splits and Phases: 6: Ontario Mills Drive & 4th Street





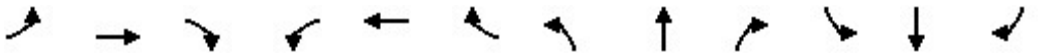
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	461	597	95	177	2093	211	116	114	125	236	1064	705
v/c Ratio	1.57	0.31	0.14	0.61	1.09	0.31	1.59	0.16	0.29	0.78	1.10dr	1.14
Control Delay	307.4	26.8	1.8	61.4	84.0	10.8	356.9	41.7	7.9	64.6	44.3	108.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	307.4	26.8	1.8	61.4	84.0	10.8	356.9	41.7	7.9	64.6	44.3	108.0
Queue Length 50th (ft)	~260	119	0	68	~666	38	~128	38	0	175	363	~575
Queue Length 95th (ft)	#350	146	11	102	#717	88	#239	66	42	245	#470	#784
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	294	1935	686	320	1928	684	73	719	430	376	1157	619
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.57	0.31	0.14	0.55	1.09	0.31	1.59	0.16	0.29	0.63	0.92	1.14

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

dr Defacto Right Lane. Recode with 1 though lane as a right lane.



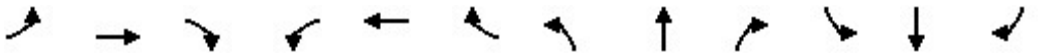
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	401	519	83	154	1821	184	101	99	109	205	312	1227
Future Volume (veh/h)	401	519	83	154	1821	184	101	99	109	205	312	1227
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	461	597	95	177	2093	211	116	114	125	236	359	1410
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	296	2047	635	229	1936	601	74	800	357	267	623	1057
Arrive On Green	0.10	0.40	0.40	0.07	0.38	0.38	0.04	0.23	0.23	0.15	0.33	0.33
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	1781	3554	1585	1781	1870	3170
Grp Volume(v), veh/h	461	597	95	177	2093	211	116	114	125	236	359	1410
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1781	1777	1585	1781	1870	1585
Q Serve(g_s), s	11.5	9.5	4.6	6.7	45.5	11.4	5.0	3.1	8.0	15.6	19.0	40.0
Cycle Q Clear(g_c), s	11.5	9.5	4.6	6.7	45.5	11.4	5.0	3.1	8.0	15.6	19.0	40.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	296	2047	635	229	1936	601	74	800	357	267	623	1057
V/C Ratio(X)	1.56	0.29	0.15	0.77	1.08	0.35	1.56	0.14	0.35	0.88	0.58	1.33
Avail Cap(c_a), veh/h	296	2047	635	322	1936	601	74	800	357	379	623	1057
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	54.2	24.4	22.9	54.5	37.2	26.7	57.5	37.2	39.1	50.0	33.0	40.0
Incr Delay (d2), s/veh	266.1	0.1	0.1	7.3	46.3	0.3	308.6	0.1	0.6	16.1	1.3	157.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.4	3.9	1.7	2.9	26.8	4.4	8.6	1.4	3.2	8.1	8.8	38.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	320.3	24.5	23.0	61.8	83.5	27.0	366.1	37.3	39.7	66.1	34.3	197.0
LnGrp LOS	F	C	C	E	F	C	F	D	D	E	C	F
Approach Vol, veh/h		1153			2481			355			2005	
Approach Delay, s/veh		142.6			77.2			145.6			152.4	
Approach LOS		F			E			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.5	31.5	13.4	52.6	9.5	44.5	16.0	50.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	25.5	19.5	12.5	44.5	5.0	40.0	11.5	45.5
Max Q Clear Time (g_c+I1), s	17.6	10.0	8.7	11.5	7.0	42.0	13.5	47.5
Green Ext Time (p_c), s	0.4	0.7	0.2	4.9	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	119.0
HCM 6th LOS	F

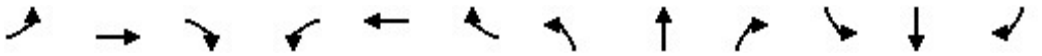
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.983			0.892				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (prot)	3072	5085	1583	1676	4999	0	1676	3157	0	1593	1709	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.966	
Satd. Flow (perm)	3072	5085	1583	1676	4999	0	1676	3157	0	1593	1709	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127		25			84				334
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



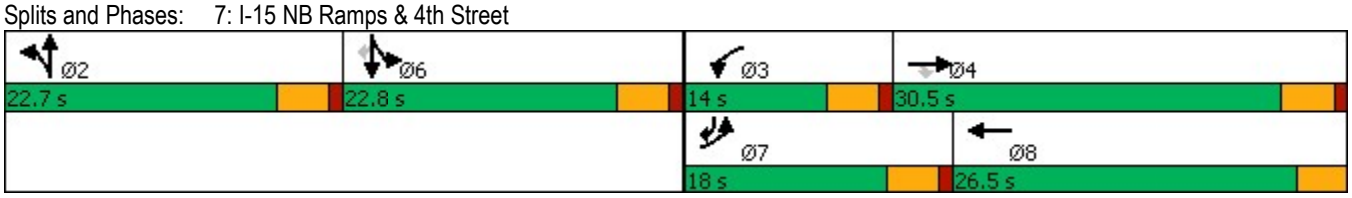
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	303	477	108	63	666	87	154	31	80	519	92	1346
Future Volume (vph)	303	477	108	63	666	87	154	31	80	519	92	1346
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	319	502	114	66	701	92	162	33	84	546	97	1417
Shared Lane Traffic (%)										42%		
Lane Group Flow (vph)	319	502	114	66	793	0	162	117	0	317	326	1417

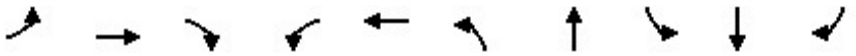
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	303	477	108	63	666	154	31	519	92	1346
Future Volume (vph)	303	477	108	63	666	154	31	519	92	1346
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	18.0	30.5	30.5	14.0	26.5	22.7	22.7	22.8	22.8	18.0
Total Split (%)	20.0%	33.9%	33.9%	15.6%	29.4%	25.2%	25.2%	25.3%	25.3%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	13.6	26.1	26.1	8.0	19.2	12.9	12.9	18.4	18.4	36.6
Actuated g/C Ratio	0.17	0.32	0.32	0.10	0.24	0.16	0.16	0.23	0.23	0.45
v/c Ratio	0.62	0.31	0.19	0.40	0.66	0.61	0.20	0.88	0.84	1.03
Control Delay	38.9	23.0	4.8	43.8	30.4	42.5	12.5	59.1	53.1	53.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	23.0	4.8	43.8	30.4	42.5	12.5	59.1	53.1	53.3
LOS	D	C	A	D	C	D	B	E	D	D
Approach Delay		26.2			31.4		29.9		54.1	
Approach LOS		C			C		C		D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 41.5	Intersection LOS: D
Intersection Capacity Utilization 84.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street



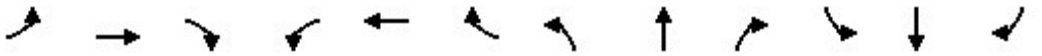


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	319	502	114	66	793	162	117	317	326	1417
v/c Ratio	0.62	0.31	0.19	0.40	0.66	0.61	0.20	0.88	0.84	1.03
Control Delay	38.9	23.0	4.8	43.8	30.4	42.5	12.5	59.1	53.1	53.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	23.0	4.8	43.8	30.4	42.5	12.5	59.1	53.1	53.3
Queue Length 50th (ft)	79	73	0	32	129	79	7	167	170	~398
Queue Length 95th (ft)	135	112	32	77	183	144	30	#365	#364	#611
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	514	1706	615	197	1443	378	777	361	387	1371
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.29	0.19	0.34	0.55	0.43	0.15	0.88	0.84	1.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



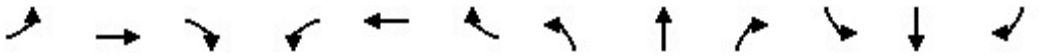
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	303	477	108	63	666	87	154	31	80	519	92	1346
Future Volume (veh/h)	303	477	108	63	666	87	154	31	80	519	92	1346
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1772
Adj Flow Rate, veh/h	319	502	114	66	701	92	162	33	84	615	0	1417
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	414	1570	487	86	1027	134	221	233	208	868	0	1175
Arrive On Green	0.13	0.31	0.31	0.05	0.22	0.22	0.13	0.13	0.13	0.26	0.00	0.26
Sat Flow, veh/h	3092	5106	1585	1688	4573	595	1688	1777	1585	3375	0	3003
Grp Volume(v), veh/h	319	502	114	66	520	273	162	33	84	615	0	1417
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1688	1702	1763	1688	1777	1585	1688	0	1502
Q Serve(g_s), s	7.1	5.4	3.8	2.7	10.0	10.1	6.6	1.2	3.5	11.8	0.0	18.3
Cycle Q Clear(g_c), s	7.1	5.4	3.8	2.7	10.0	10.1	6.6	1.2	3.5	11.8	0.0	18.3
Prop In Lane	1.00		1.00	1.00		0.34	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	414	1570	487	86	765	396	221	233	208	868	0	1175
V/C Ratio(X)	0.77	0.32	0.23	0.76	0.68	0.69	0.73	0.14	0.40	0.71	0.00	1.21
Avail Cap(c_a), veh/h	587	1865	579	225	1100	570	432	454	405	868	0	1175
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.8	18.9	18.4	33.3	25.3	25.3	29.7	27.4	28.4	24.0	0.0	21.7
Incr Delay (d2), s/veh	4.0	0.1	0.2	13.0	1.1	2.1	4.6	0.3	1.3	2.7	0.0	101.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	2.0	1.4	1.4	3.9	4.2	2.8	0.5	1.3	4.8	0.0	25.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.7	19.0	18.6	46.3	26.3	27.4	34.3	27.6	29.6	26.7	0.0	122.7
LnGrp LOS	C	B	B	D	C	C	C	C	C	C	A	F
Approach Vol, veh/h		935			859			279			2032	
Approach Delay, s/veh		24.0			28.2			32.1			93.6	
Approach LOS		C			C			C			F	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		13.8	8.1	26.4		22.8	14.0	20.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.2	9.5	26.0		18.3	13.5	* 23				
Max Q Clear Time (g_c+I1), s		8.6	4.7	7.4		20.3	9.1	12.1				
Green Ext Time (p_c), s		0.8	0.0	3.6		0.0	0.5	3.9				

Intersection Summary	
HCM 6th Ctrl Delay	59.9
HCM 6th LOS	E

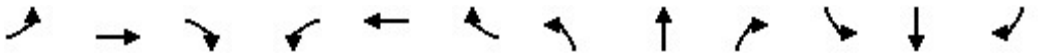
Notes

User approved volume balancing among the lanes for turning movement.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.903				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3196	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3196	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		127				182			182			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



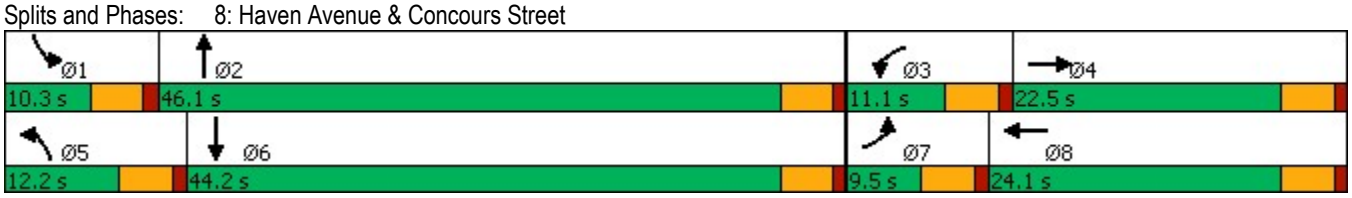
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	29	63	114	229	83	25	99	2535	201	139	1956	61
Future Volume (vph)	29	63	114	229	83	25	99	2535	201	139	1956	61
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	32	70	127	254	92	28	110	2817	223	154	2173	68
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	197	0	254	92	28	110	2817	223	154	2173	68

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	29	63	229	83	25	99	2535	201	139	1956	61
Future Volume (vph)	29	63	229	83	25	99	2535	201	139	1956	61
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	11.1	24.1		12.2	46.1		10.3	44.2	
Total Split (%)	10.6%	25.0%	12.3%	26.8%		13.6%	51.2%		11.4%	49.1%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.4	6.6	14.8	79.5	7.3	41.6	79.5	5.8	42.3	79.5
Actuated g/C Ratio	0.06	0.09	0.08	0.19	1.00	0.09	0.52	1.00	0.07	0.53	1.00
v/c Ratio	0.17	0.48	0.73	0.14	0.02	0.39	0.84	0.14	0.69	0.64	0.04
Control Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.3	0.2	53.8	15.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.3	0.2	53.8	15.2	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.4		40.9			18.6			17.2	
Approach LOS		C		D			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 79.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

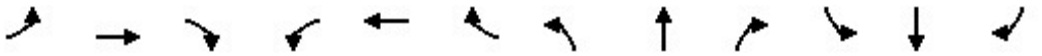
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	32	197	254	92	28	110	2817	223	154	2173	68
v/c Ratio	0.17	0.48	0.73	0.14	0.02	0.39	0.84	0.14	0.69	0.64	0.04
Control Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.3	0.2	53.8	15.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	17.5	49.5	29.6	0.0	38.6	19.3	0.2	53.8	15.2	0.0
Queue Length 50th (ft)	7	17	44	18	0	26	320	0	39	222	0
Queue Length 95th (ft)	22	47	#82	43	0	53	408	0	#85	285	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	193	822	349	873	1583	297	3356	1583	224	3411	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.24	0.73	0.11	0.02	0.37	0.84	0.14	0.69	0.64	0.04

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



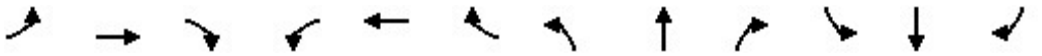
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	63	114	229	83	25	99	2535	201	139	1956	61
Future Volume (veh/h)	29	63	114	229	83	25	99	2535	201	139	1956	61
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	32	70	127	254	92	0	110	2817	0	154	2173	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	98	197	176	347	573		176	3295		220	3387	
Arrive On Green	0.03	0.11	0.11	0.08	0.16	0.00	0.06	0.51	0.00	0.07	0.53	0.00
Sat Flow, veh/h	3092	1777	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	32	70	127	254	92	0	110	2817	0	154	2173	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	0.8	2.9	6.2	4.7	1.8	0.0	2.8	30.6	0.0	3.9	19.4	0.0
Cycle Q Clear(g_c), s	0.8	2.9	6.2	4.7	1.8	0.0	2.8	30.6	0.0	3.9	19.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	98	197	176	347	573		176	3295		220	3387	
V/C Ratio(X)	0.33	0.35	0.72	0.73	0.16		0.63	0.85		0.70	0.64	
Avail Cap(c_a), veh/h	192	397	354	347	865		296	3325		223	3387	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.1	33.1	34.6	36.1	29.1	0.0	37.1	17.0	0.0	36.5	13.6	0.0
Incr Delay (d2), s/veh	1.9	1.1	5.5	7.7	0.1	0.0	3.6	2.4	0.0	9.2	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.3	2.6	1.8	0.8	0.0	1.1	10.6	0.0	1.7	6.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.0	34.2	40.0	43.8	29.2	0.0	40.8	19.4	0.0	45.7	14.0	0.0
LnGrp LOS	D	C	D	D	C		D	B		D	B	
Approach Vol, veh/h		229			346	A		2927	A		2327	A
Approach Delay, s/veh		38.2			39.9			20.2			16.1	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.2	45.7	11.1	13.4	9.1	46.9	7.1	17.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.8	41.6	6.6	18.0	7.7	39.7	5.0	19.6
Max Q Clear Time (g_c+I1), s	5.9	32.6	6.7	8.2	4.8	21.4	2.8	3.8
Green Ext Time (p_c), s	0.0	8.6	0.0	0.7	0.1	14.7	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	20.5
HCM 6th LOS	C

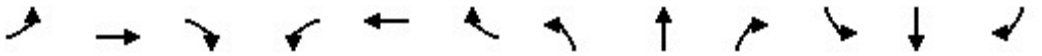
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.990			0.977			0.994			0.982	
Flt Protected	0.950	0.956			0.968		0.950			0.950		
Satd. Flow (prot)	1593	1675	0	0	1762	0	1676	5055	0	1676	4994	0
Flt Permitted	0.950	0.956					0.950			0.950		
Satd. Flow (perm)	1593	1675	0	0	1820	0	1676	5055	0	1676	4994	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143			1			7			29	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



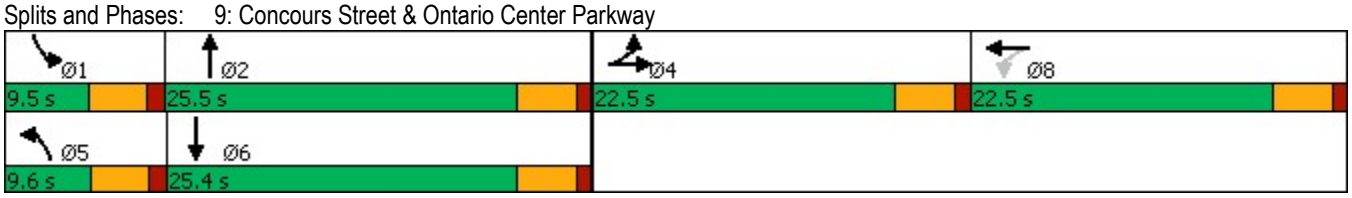
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	101	0	4	4	1	1	64	693	29	1	956	129
Future Volume (vph)	101	0	4	4	1	1	64	693	29	1	956	129
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	112	0	4	4	1	1	71	770	32	1	1062	143
Shared Lane Traffic (%)	48%											
Lane Group Flow (vph)	58	58	0	0	6	0	71	802	0	1	1205	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	101	0	4	1	64	693	1	956
Future Volume (vph)	101	0	4	1	64	693	1	956
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	9.6	25.5	9.5	25.4
Total Split (%)	28.1%	28.1%	28.1%	28.1%	12.0%	31.9%	11.9%	31.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.4	7.4		6.0	5.3	31.9	5.2	26.2
Actuated g/C Ratio	0.16	0.16		0.13	0.11	0.67	0.11	0.55
v/c Ratio	0.23	0.15		0.03	0.38	0.24	0.01	0.44
Control Delay	22.3	0.8		20.8	30.1	6.5	23.0	10.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	0.8		20.8	30.1	6.5	23.0	10.6
LOS	C	A		C	C	A	C	B
Approach Delay		11.6		20.8		8.5		10.6
Approach LOS		B		C		A		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 47.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 9.8	Intersection LOS: A
Intersection Capacity Utilization 40.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	58	58	6	71	802	1	1205
v/c Ratio	0.23	0.15	0.03	0.38	0.24	0.01	0.44
Control Delay	22.3	0.8	20.8	30.1	6.5	23.0	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.3	0.8	20.8	30.1	6.5	23.0	10.6
Queue Length 50th (ft)	14	0	1	18	23	0	76
Queue Length 95th (ft)	49	0	11	#70	110	5	174
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	630	749	720	187	3391	184	2765
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.08	0.01	0.38	0.24	0.01	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

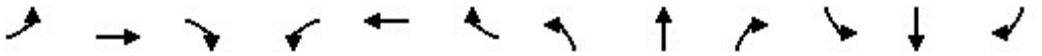
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	101	0	4	4	1	1	64	693	29	1	956	129
Future Volume (veh/h)	101	0	4	4	1	1	64	693	29	1	956	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	116	0	0	4	1	1	71	770	32	1	1062	143
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	305	169	0	9	2	2	115	2281	95	4	1761	237
Arrive On Green	0.09	0.00	0.00	0.01	0.01	0.01	0.07	0.45	0.45	0.00	0.39	0.39
Sat Flow, veh/h	3375	1870	0	1173	293	293	1688	5029	208	1688	4552	612
Grp Volume(v), veh/h	116	0	0	6	0	0	71	521	281	1	794	411
Grp Sat Flow(s),veh/h/ln	1688	1870	0	1759	0	0	1688	1702	1833	1688	1702	1760
Q Serve(g_s), s	1.3	0.0	0.0	0.1	0.0	0.0	1.6	4.0	4.0	0.0	7.5	7.5
Cycle Q Clear(g_c), s	1.3	0.0	0.0	0.1	0.0	0.0	1.6	4.0	4.0	0.0	7.5	7.5
Prop In Lane	1.00		0.00	0.67		0.17	1.00		0.11	1.00		0.35
Lane Grp Cap(c), veh/h	305	169	0	14	0	0	115	1544	831	4	1317	681
V/C Ratio(X)	0.38	0.00	0.00	0.42	0.00	0.00	0.62	0.34	0.34	0.24	0.60	0.60
Avail Cap(c_a), veh/h	1508	836	0	786	0	0	214	1774	955	209	1766	913
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.3	0.0	0.0	19.9	0.0	0.0	18.3	7.1	7.1	20.1	9.9	9.9
Incr Delay (d2), s/veh	0.8	0.0	0.0	18.8	0.0	0.0	5.3	0.1	0.2	27.0	0.4	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.1	0.0	0.0	0.7	1.0	1.1	0.0	2.1	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.1	0.0	0.0	38.7	0.0	0.0	23.6	7.2	7.3	47.1	10.3	10.7
LnGrp LOS	B	A	A	D	A	A	C	A	A	D	B	B
Approach Vol, veh/h		116			6			873			1206	
Approach Delay, s/veh		18.1			38.7			8.6			10.5	
Approach LOS		B			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	22.8		8.1	7.2	20.1		4.8				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	21.0		18.0	5.1	20.9		18.0				
Max Q Clear Time (g_c+I1), s	2.0	6.0		3.3	3.6	9.5		2.1				
Green Ext Time (p_c), s	0.0	4.6		0.3	0.0	6.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		10.2
HCM 6th LOS		B

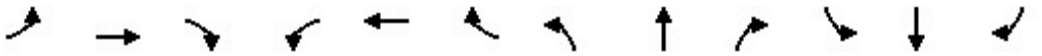
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			234			234			234			357
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



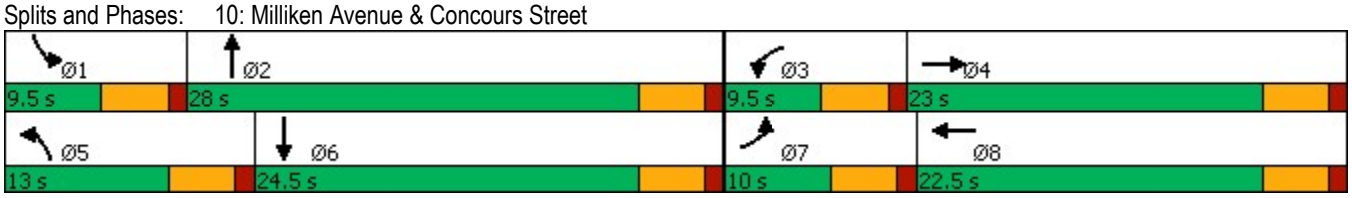
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	128	34	141	68	109	55	252	1314	83	103	1259	344
Future Volume (vph)	128	34	141	68	109	55	252	1314	83	103	1259	344
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	149	40	164	79	127	64	293	1528	97	120	1464	400
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	40	164	79	127	64	293	1528	97	120	1464	400

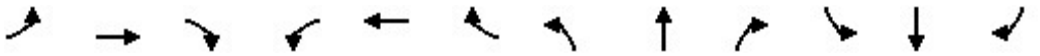
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	34	141	68	109	55	252	1314	83	103	1259	344
Future Volume (vph)	128	34	141	68	109	55	252	1314	83	103	1259	344
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	10.0	23.0		9.5	22.5		13.0	28.0		9.5	24.5	
Total Split (%)	14.3%	32.9%		13.6%	32.1%		18.6%	40.0%		13.6%	35.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.8	9.4	54.9	7.6	7.6	54.9	8.7	28.2	54.9	5.3	20.3	54.9
Actuated g/C Ratio	0.11	0.17	1.00	0.14	0.14	1.00	0.16	0.51	1.00	0.10	0.37	1.00
v/c Ratio	0.46	0.07	0.10	0.19	0.26	0.04	0.60	0.46	0.06	0.41	0.62	0.25
Control Delay	31.3	22.4	0.1	25.4	24.9	0.1	30.4	13.4	0.1	31.0	17.2	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	22.4	0.1	25.4	24.9	0.1	30.4	13.4	0.1	31.0	17.2	0.4
LOS	C	C	A	C	C	A	C	B	A	C	B	A
Approach Delay		15.8			19.1			15.3			14.7	
Approach LOS		B			B			B			B	

Intersection Summary			
Cycle Length: 70			
Actuated Cycle Length: 54.9			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 48.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 10: Milliken Avenue & Concours Street

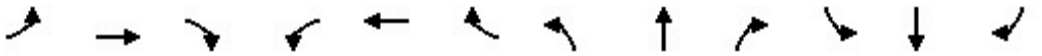




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	149	40	164	79	127	64	293	1528	97	120	1464	400
v/c Ratio	0.46	0.07	0.10	0.19	0.26	0.04	0.60	0.46	0.06	0.41	0.62	0.25
Control Delay	31.3	22.4	0.1	25.4	24.9	0.1	30.4	13.4	0.1	31.0	17.2	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	22.4	0.1	25.4	24.9	0.1	30.4	13.4	0.1	31.0	17.2	0.4
Queue Length 50th (ft)	26	6	0	10	22	0	52	121	0	21	128	0
Queue Length 95th (ft)	51	17	0	31	41	0	#88	153	0	42	161	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	323	1252	1583	422	1218	1583	499	3291	1583	293	2451	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.03	0.10	0.19	0.10	0.04	0.59	0.46	0.06	0.41	0.60	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



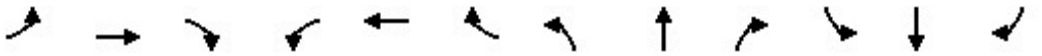
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	128	34	141	68	109	55	252	1314	83	103	1259	344
Future Volume (veh/h)	128	34	141	68	109	55	252	1314	83	103	1259	344
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	149	40	0	79	127	0	293	1528	0	120	1464	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	264	404		203	334		406	2528		246	2194	
Arrive On Green	0.09	0.11	0.00	0.07	0.09	0.00	0.13	0.39	0.00	0.08	0.34	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	149	40	0	79	127	0	293	1528	0	120	1464	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	2.4	0.5	0.0	1.3	1.7	0.0	4.7	9.8	0.0	1.9	10.0	0.0
Cycle Q Clear(g_c), s	2.4	0.5	0.0	1.3	1.7	0.0	4.7	9.8	0.0	1.9	10.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	264	404		203	334		406	2528		246	2194	
V/C Ratio(X)	0.56	0.10		0.39	0.38		0.72	0.60		0.49	0.67	
Avail Cap(c_a), veh/h	329	1272		299	1238		509	2926		299	2490	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.7	20.5	0.0	23.2	22.0	0.0	21.5	12.5	0.0	22.8	14.5	0.0
Incr Delay (d2), s/veh	1.9	0.1	0.0	1.2	0.7	0.0	3.7	0.3	0.0	1.5	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.2	0.0	0.5	0.7	0.0	1.8	3.0	0.0	0.7	3.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.6	20.6	0.0	24.4	22.7	0.0	25.3	12.8	0.0	24.3	15.1	0.0
LnGrp LOS	C	C		C	C		C	B		C	B	
Approach Vol, veh/h		189	A		206	A		1821	A		1584	A
Approach Delay, s/veh		23.8			23.3			14.8			15.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	24.8	7.9	10.4	11.3	22.1	8.9	9.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	23.5	5.0	18.5	8.5	20.0	5.5	18.0
Max Q Clear Time (g_c+I1), s	3.9	11.8	3.3	2.5	6.7	12.0	4.4	3.7
Green Ext Time (p_c), s	0.0	7.9	0.0	0.1	0.2	5.6	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	16.1
HCM 6th LOS	B

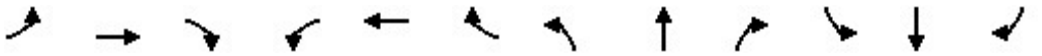
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			236			434			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



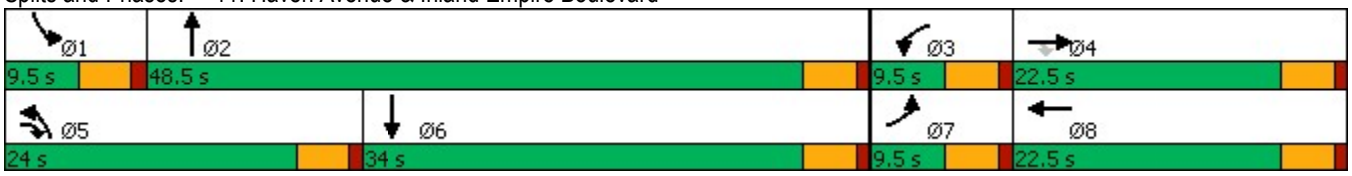
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	90	137	335	165	144	29	644	2927	906	73	1925	128
Future Volume (vph)	90	137	335	165	144	29	644	2927	906	73	1925	128
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	97	147	360	177	155	31	692	3147	974	78	2070	138
Shared Lane Traffic (%)												
Lane Group Flow (vph)	97	147	360	177	155	31	692	3147	974	78	2070	138

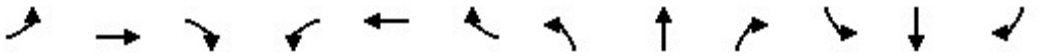
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	137	335	165	144	29	644	2927	906	73	1925	128
Future Volume (vph)	90	137	335	165	144	29	644	2927	906	73	1925	128
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	24.0	9.5	22.5		24.0	48.5		9.5	34.0	
Total Split (%)	10.6%	25.0%	26.7%	10.6%	25.0%		26.7%	53.9%		10.6%	37.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	8.9	32.9	5.0	10.8	80.9	19.5	46.0	80.9	5.0	29.5	80.9
Actuated g/C Ratio	0.06	0.11	0.41	0.06	0.13	1.00	0.24	0.57	1.00	0.06	0.36	1.00
v/c Ratio	0.51	0.38	0.52	0.68	0.33	0.02	0.93	0.86	0.62	0.41	0.89	0.09
Control Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.3	1.8	44.0	30.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.3	1.8	44.0	30.2	0.1
LOS	D	D	B	D	C	A	D	B	A	D	C	A
Approach Delay		26.7			40.4			20.5			28.9	
Approach LOS		C			D			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 80.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 71.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	97	147	360	177	155	31	692	3147	974	78	2070	138
v/c Ratio	0.51	0.38	0.52	0.68	0.33	0.02	0.93	0.86	0.62	0.41	0.89	0.09
Control Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.3	1.8	44.0	30.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	36.3	17.3	52.3	34.9	0.0	52.4	19.3	1.8	44.0	30.2	0.1
Queue Length 50th (ft)	25	36	105	31	38	0	177	386	0	20	280	0
Queue Length 95th (ft)	50	64	183	#63	67	0	#294	481	0	42	#356	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	189	787	686	259	787	1583	741	3642	1583	189	2338	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.19	0.52	0.68	0.20	0.02	0.93	0.86	0.62	0.41	0.89	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	137	335	165	144	29	644	2927	906	73	1925	128
Future Volume (veh/h)	90	137	335	165	144	29	644	2927	906	73	1925	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	97	147	360	177	155	0	692	3147	0	78	2070	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	157	697	656	236	715		673	3212		148	2119	
Arrive On Green	0.05	0.20	0.20	0.06	0.20	0.00	0.22	0.50	0.00	0.05	0.33	0.00
Sat Flow, veh/h	3092	3554	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	97	147	360	177	155	0	692	3147	0	78	2070	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	2.8	3.1	15.4	3.7	3.3	0.0	19.5	43.0	0.0	2.2	28.5	0.0
Cycle Q Clear(g_c), s	2.8	3.1	15.4	3.7	3.3	0.0	19.5	43.0	0.0	2.2	28.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	157	697	656	236	715		673	3212		148	2119	
V/C Ratio(X)	0.62	0.21	0.55	0.75	0.22		1.03	0.98		0.53	0.98	
Avail Cap(c_a), veh/h	173	714	664	236	715		673	3212		173	2119	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	41.7	30.2	19.9	41.7	29.9	0.0	35.0	22.0	0.0	41.7	29.7	0.0
Incr Delay (d2), s/veh	5.6	0.1	0.9	12.5	0.2	0.0	42.1	11.6	0.0	2.9	14.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.3	5.6	1.5	1.4	0.0	11.1	17.3	0.0	0.9	12.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	30.3	20.8	54.2	30.0	0.0	77.1	33.6	0.0	44.6	44.2	0.0
LnGrp LOS	D	C	C	D	C		F	C		D	D	
Approach Vol, veh/h		604			332	A		3839	A		2148	A
Approach Delay, s/veh		27.4			42.9			41.4			44.2	
Approach LOS		C			D			D			D	

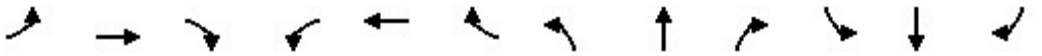
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	49.2	9.5	22.1	24.0	34.0	9.1	22.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	44.0	5.0	18.0	19.5	29.5	5.0	18.0
Max Q Clear Time (g_c+I1), s	4.2	45.0	5.7	17.4	21.5	30.5	4.8	5.3
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.7

Intersection Summary	
HCM 6th Ctrl Delay	41.1
HCM 6th LOS	D

Notes

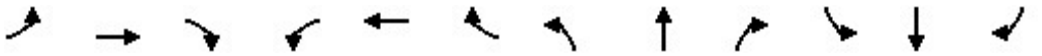
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			236			236			236			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



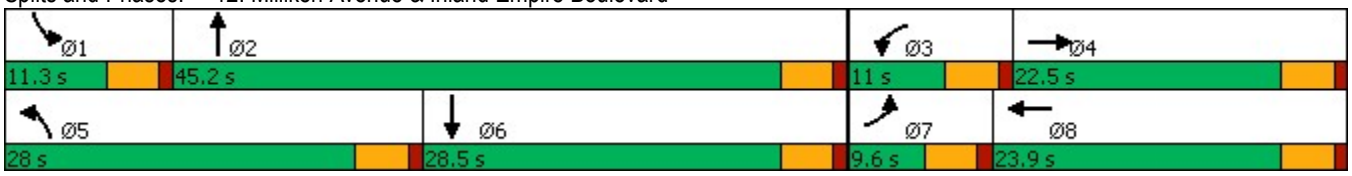
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	89	47	73	138	109	35	568	1505	154	82	1224	182
Future Volume (vph)	89	47	73	138	109	35	568	1505	154	82	1224	182
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	103	55	85	160	127	41	660	1750	179	95	1423	212
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	55	85	160	127	41	660	1750	179	95	1423	212

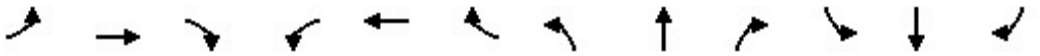
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	47	73	138	109	35	568	1505	154	82	1224	182
Future Volume (vph)	89	47	73	138	109	35	568	1505	154	82	1224	182
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.6	22.5		11.0	23.9		28.0	45.2		11.3	28.5	
Total Split (%)	10.7%	25.0%		12.2%	26.6%		31.1%	50.2%		12.6%	31.7%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	5.2	7.0	73.1	8.7	8.3	73.1	20.3	39.9	73.1	6.7	23.5	73.1
Actuated g/C Ratio	0.07	0.10	1.00	0.12	0.11	1.00	0.28	0.55	1.00	0.09	0.32	1.00
v/c Ratio	0.47	0.16	0.05	0.44	0.32	0.03	0.77	0.50	0.11	0.34	0.69	0.13
Control Delay	43.3	33.9	0.1	37.9	34.3	0.0	32.0	12.4	0.1	37.6	24.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	33.9	0.1	37.9	34.3	0.0	32.0	12.4	0.1	37.6	24.8	0.2
LOS	D	C	A	D	C	A	C	B	A	D	C	A
Approach Delay		26.0			31.7			16.6			22.5	
Approach LOS		C			C			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 20.2	Intersection LOS: C
Intersection Capacity Utilization 58.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	103	55	85	160	127	41	660	1750	179	95	1423	212
v/c Ratio	0.47	0.16	0.05	0.44	0.32	0.03	0.77	0.50	0.11	0.34	0.69	0.13
Control Delay	43.3	33.9	0.1	37.9	34.3	0.0	32.0	12.4	0.1	37.6	24.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.3	33.9	0.1	37.9	34.3	0.0	32.0	12.4	0.1	37.6	24.8	0.2
Queue Length 50th (ft)	25	13	0	39	30	0	148	156	0	22	174	0
Queue Length 95th (ft)	48	29	0	#73	54	0	202	186	0	44	215	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	218	891	1583	366	960	1583	1010	3649	1583	292	2152	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.06	0.05	0.44	0.13	0.03	0.65	0.48	0.11	0.33	0.66	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	89	47	73	138	109	35	568	1505	154	82	1224	182
Future Volume (veh/h)	89	47	73	138	109	35	568	1505	154	82	1224	182
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	103	55	0	160	127	0	660	1750	0	95	1423	0
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	199	268		239	313		797	3298		193	2041	
Arrive On Green	0.06	0.08	0.00	0.08	0.09	0.00	0.26	0.51	0.00	0.06	0.32	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	103	55	0	160	127	0	660	1750	0	95	1423	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	2.1	1.0	0.0	3.3	2.2	0.0	13.3	12.0	0.0	2.0	12.8	0.0
Cycle Q Clear(g_c), s	2.1	1.0	0.0	3.3	2.2	0.0	13.3	12.0	0.0	2.0	12.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	199	268		239	313		797	3298		193	2041	
V/C Ratio(X)	0.52	0.21		0.67	0.41		0.83	0.53		0.49	0.70	
Avail Cap(c_a), veh/h	239	968		304	1044		1100	3964		318	2338	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.9	28.7	0.0	29.7	28.5	0.0	23.1	10.8	0.0	30.0	19.8	0.0
Incr Delay (d2), s/veh	2.1	0.4	0.0	3.8	0.8	0.0	3.9	0.1	0.0	1.9	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.4	0.0	1.3	0.9	0.0	4.9	3.7	0.0	0.8	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.0	29.1	0.0	33.5	29.3	0.0	27.0	10.9	0.0	31.9	20.5	0.0
LnGrp LOS	C	C		C	C		C	B		C	C	
Approach Vol, veh/h		158	A		287	A		2410	A		1518	A
Approach Delay, s/veh		31.0			31.7			15.3			21.3	
Approach LOS		C			C			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	38.4	9.6	9.5	21.5	25.5	8.7	10.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.8	40.7	6.5	18.0	23.5	24.0	5.1	19.4
Max Q Clear Time (g_c+I1), s	4.0	14.0	5.3	3.0	15.3	14.8	4.1	4.2
Green Ext Time (p_c), s	0.1	15.8	0.1	0.2	1.7	6.1	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	19.0
HCM 6th LOS	B

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.943	0.850				
Flt Protected	0.970					
Satd. Flow (prot)	3132	1441	6408	0	0	6408
Flt Permitted	0.970					
Satd. Flow (perm)	3132	1441	6408	0	0	6408
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

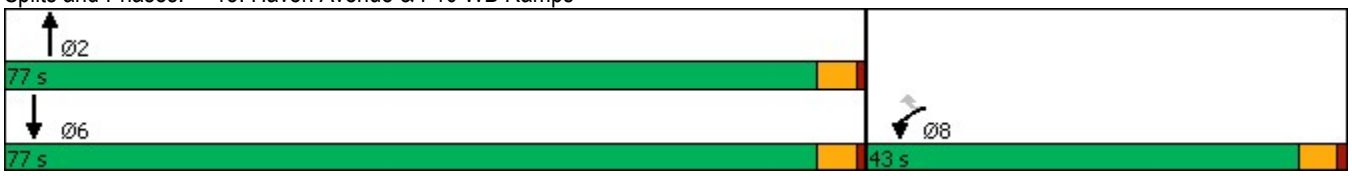
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	695	951	3661	0	0	2153
Future Volume (vph)	695	951	3661	0	0	2153
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	764	1045	4023	0	0	2366
Shared Lane Traffic (%)		45%				
Lane Group Flow (vph)	1234	575	4023	0	0	2366

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	695	951	3661	2153
Future Volume (vph)	695	951	3661	2153
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	43.0	43.0	77.0	77.0
Total Split (%)	35.8%	35.8%	64.2%	64.2%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	38.5	38.5	72.5	72.5
Actuated g/C Ratio	0.32	0.32	0.60	0.60
v/c Ratio	1.23	1.24	1.04	0.61
Control Delay	148.0	163.0	50.3	15.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	148.0	163.0	50.3	15.8
LOS	F	F	D	B
Approach Delay	152.8		50.3	15.8
Approach LOS	F		D	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 62.9	Intersection LOS: E
Intersection Capacity Utilization 103.6%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	1234	575	4023	2366
v/c Ratio	1.23	1.24	1.04	0.61
Control Delay	148.0	163.0	50.3	15.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	148.0	163.0	50.3	15.8
Queue Length 50th (ft)	~607	~608	~977	314
Queue Length 95th (ft)	#742	#851	#1030	348
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1004	462	3871	3871
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.23	1.24	1.04	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

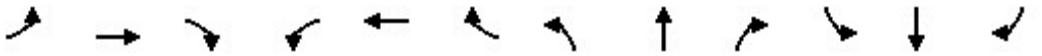
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	695	951	3661	0	0	2153
Future Volume (veh/h)	695	951	3661	0	0	2153
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1772	1870	1870	0	0	1870
Adj Flow Rate, veh/h	603	1217	4023	0	0	2366
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	541	1017	3887	0	0	3887
Arrive On Green	0.32	0.32	0.60	0.00	0.00	0.60
Sat Flow, veh/h	1688	3170	6958	0	0	6958
Grp Volume(v), veh/h	603	1217	4023	0	0	2366
Grp Sat Flow(s),veh/h/ln	1688	1585	1609	0	0	1609
Q Serve(g_s), s	38.5	38.5	72.5	0.0	0.0	27.6
Cycle Q Clear(g_c), s	38.5	38.5	72.5	0.0	0.0	27.6
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	541	1017	3887	0	0	3887
V/C Ratio(X)	1.11	1.20	1.03	0.00	0.00	0.61
Avail Cap(c_a), veh/h	541	1017	3887	0	0	3887
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	40.8	40.8	23.8	0.0	0.0	14.9
Incr Delay (d2), s/veh	73.8	98.2	24.5	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.8	28.6	31.9	0.0	0.0	9.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	114.5	138.9	48.3	0.0	0.0	15.1
LnGrp LOS	F	F	F	A	A	B
Approach Vol, veh/h	1820		4023			2366
Approach Delay, s/veh	130.8		48.3			15.1
Approach LOS	F		D			B

Timer - Assigned Phs	2			6	8
Phs Duration (G+Y+Rc), s	77.0			77.0	43.0
Change Period (Y+Rc), s	4.5			4.5	4.5
Max Green Setting (Gmax), s	72.5			72.5	38.5
Max Q Clear Time (g_c+I1), s	74.5			29.6	40.5
Green Ext Time (p_c), s	0.0			30.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	57.0
HCM 6th LOS	E

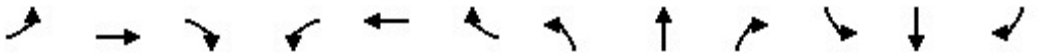
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			220			182			473			130
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



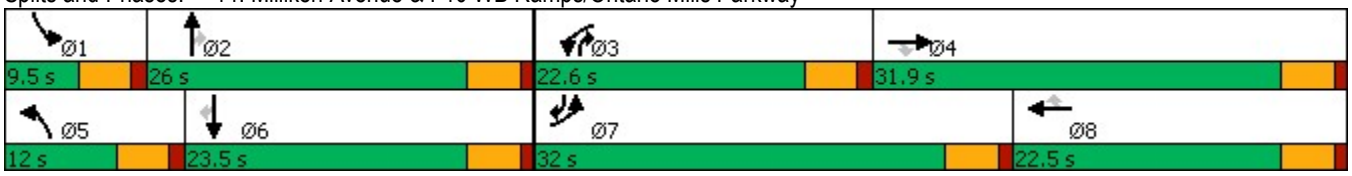
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Future Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	957	140	373	255	291	54	243	1411	473	131	938	398
Shared Lane Traffic (%)												
Lane Group Flow (vph)	957	140	373	255	291	54	243	1411	473	131	938	398

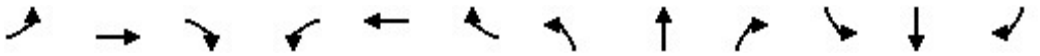
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Future Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	32.0	31.9	31.9	22.6	22.5	22.5	12.0	26.0	22.6	9.5	23.5	32.0
Total Split (%)	35.6%	35.4%	35.4%	25.1%	25.0%	25.0%	13.3%	28.9%	25.1%	10.6%	26.1%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	27.5	27.0	27.0	12.9	12.4	12.4	7.5	21.5	39.0	5.0	19.0	51.1
Actuated g/C Ratio	0.33	0.32	0.32	0.15	0.15	0.15	0.09	0.25	0.46	0.06	0.22	0.60
v/c Ratio	0.96	0.24	0.57	0.54	0.56	0.14	0.89	0.86	0.48	0.72	0.65	0.39
Control Delay	49.4	23.4	13.9	37.3	37.7	0.8	73.3	37.3	3.1	63.2	32.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	23.4	13.9	37.3	37.7	0.8	73.3	37.3	3.1	63.2	32.5	7.3
LOS	D	C	B	D	D	A	E	D	A	E	C	A
Approach Delay		37.9			34.2			33.8			28.4	
Approach LOS		D			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 84.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 33.5	Intersection LOS: C
Intersection Capacity Utilization 71.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

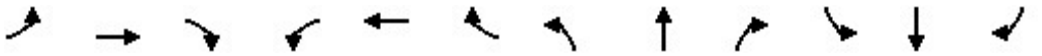




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	957	140	373	255	291	54	243	1411	473	131	938	398
v/c Ratio	0.96	0.24	0.57	0.54	0.56	0.14	0.89	0.86	0.48	0.72	0.65	0.39
Control Delay	49.4	23.4	13.9	37.3	37.7	0.8	73.3	37.3	3.1	63.2	32.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	23.4	13.9	37.3	37.7	0.8	73.3	37.3	3.1	63.2	32.5	7.3
Queue Length 50th (ft)	252	54	61	64	76	0	66	206	0	36	131	61
Queue Length 95th (ft)	#405	106	156	100	114	0	#141	#286	45	#83	175	130
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1001	606	664	659	755	480	273	1633	1053	182	1443	1008
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.23	0.56	0.39	0.39	0.11	0.89	0.86	0.45	0.72	0.65	0.39

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	852	125	332	227	259	48	216	1256	421	117	835	354
Future Volume (veh/h)	852	125	332	227	259	48	216	1256	421	117	835	354
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	957	140	373	255	291	54	243	1411	473	131	938	398
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1024	636	539	345	427	190	286	1706	597	191	1507	896
Arrive On Green	0.33	0.34	0.34	0.11	0.12	0.12	0.09	0.27	0.27	0.06	0.23	0.23
Sat Flow, veh/h	3092	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	957	140	373	255	291	54	243	1411	473	131	938	398
Grp Sat Flow(s),veh/h/ln	1546	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	24.3	4.3	16.5	6.5	6.4	2.5	6.3	16.7	21.5	3.4	10.6	11.8
Cycle Q Clear(g_c), s	24.3	4.3	16.5	6.5	6.4	2.5	6.3	16.7	21.5	3.4	10.6	11.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1024	636	539	345	427	190	286	1706	597	191	1507	896
V/C Ratio(X)	0.93	0.22	0.69	0.74	0.68	0.28	0.85	0.83	0.79	0.69	0.62	0.44
Avail Cap(c_a), veh/h	1048	636	539	690	789	352	286	1706	597	191	1507	896
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	19.1	23.1	34.9	34.2	32.5	36.2	28.1	22.5	37.3	27.8	10.2
Incr Delay (d2), s/veh	14.5	0.2	3.8	3.1	1.9	0.8	20.8	3.5	7.2	9.9	0.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	1.8	6.4	2.5	2.8	1.0	3.1	6.6	8.7	1.5	4.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.7	19.3	26.9	38.0	36.1	33.3	57.1	31.6	29.7	47.2	28.6	10.6
LnGrp LOS	D	B	C	D	D	C	E	C	C	D	C	B
Approach Vol, veh/h		1470			600			2127			1467	
Approach Delay, s/veh		35.2			36.7			34.1			25.4	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.5	26.0	13.5	32.1	12.0	23.5	31.4	14.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	21.5	18.1	27.4	7.5	19.0	27.5	18.0
Max Q Clear Time (g_c+I1), s	5.4	23.5	8.5	18.5	8.3	13.8	26.3	8.4
Green Ext Time (p_c), s	0.0	0.0	0.6	1.5	0.0	3.3	0.6	1.4

Intersection Summary	
HCM 6th Ctrl Delay	32.4
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3243	1441	0	6408	6408	0
Flt Permitted	0.954					
Satd. Flow (perm)	3243	1441	0	6408	6408	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

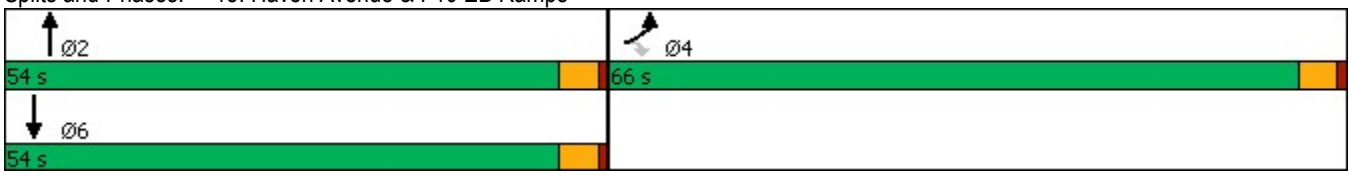
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1749	816	0	2373	2137	0
Future Volume (vph)	1749	816	0	2373	2137	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1965	917	0	2666	2401	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	2057	825	0	2666	2401	0

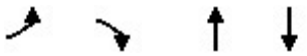
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1749	816	2373	2137
Future Volume (vph)	1749	816	2373	2137
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	66.0	66.0	54.0	54.0
Total Split (%)	55.0%	55.0%	45.0%	45.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	61.5	61.5	49.5	49.5
Actuated g/C Ratio	0.51	0.51	0.41	0.41
v/c Ratio	1.24	1.12	1.01	0.91
Control Delay	140.7	99.7	54.9	39.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	140.7	99.7	54.9	39.3
LOS	F	F	D	D
Approach Delay	129.0		54.9	39.3
Approach LOS	F		D	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 77.1	Intersection LOS: E
Intersection Capacity Utilization 103.6%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	2057	825	2666	2401
v/c Ratio	1.24	1.12	1.01	0.91
Control Delay	140.7	99.7	54.9	39.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	140.7	99.7	54.9	39.3
Queue Length 50th (ft)	~1018	~807	~603	500
Queue Length 95th (ft)	#1133	#1054	#686	543
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1662	738	2643	2643
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.24	1.12	1.01	0.91

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1749	816	0	2373	2137	0
Future Volume (veh/h)	1749	816	0	2373	2137	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1772	1870	0	1870	1870	0
Adj Flow Rate, veh/h	1965	917	0	2666	2401	0
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1730	812	0	2654	2654	0
Arrive On Green	0.51	0.51	0.00	0.41	0.41	0.00
Sat Flow, veh/h	3375	1585	0	6958	6958	0
Grp Volume(v), veh/h	1965	917	0	2666	2401	0
Grp Sat Flow(s),veh/h/ln	1688	1585	0	1609	1609	0
Q Serve(g_s), s	61.5	61.5	0.0	49.5	42.0	0.0
Cycle Q Clear(g_c), s	61.5	61.5	0.0	49.5	42.0	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1730	812	0	2654	2654	0
V/C Ratio(X)	1.14	1.13	0.00	1.00	0.90	0.00
Avail Cap(c_a), veh/h	1730	812	0	2654	2654	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	29.3	29.3	0.0	35.3	33.0	0.0
Incr Delay (d2), s/veh	68.9	73.3	0.0	18.6	4.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	40.2	38.8	0.0	22.3	16.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	98.2	102.6	0.0	53.8	37.9	0.0
LnGrp LOS	F	F	A	F	D	A
Approach Vol, veh/h	2882			2666	2401	
Approach Delay, s/veh	99.6			53.8	37.9	
Approach LOS	F			D	D	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		54.0		66.0		54.0
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		61.5		49.5
Max Q Clear Time (g_c+I1), s		51.5		63.5		44.0
Green Ext Time (p_c), s		0.0		0.0		5.2

Intersection Summary		
HCM 6th Ctrl Delay	65.6	
HCM 6th LOS	E	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1700	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3072	1583	3072	6408	6408	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3072	1583	3072	6408	6408	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				288
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	916	822	223	983	1028	443
Future Volume (vph)	916	822	223	983	1028	443
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1053	945	256	1130	1182	509
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1053	945	256	1130	1182	509

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	916	822	223	983	1028	443
Future Volume (vph)	916	822	223	983	1028	443
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	38.0	27.0	27.0	52.0	25.0	38.0
Total Split (%)	42.2%	30.0%	30.0%	57.8%	27.8%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	32.3	56.9	20.1	45.0	20.3	57.1
Actuated g/C Ratio	0.37	0.66	0.23	0.52	0.24	0.66
v/c Ratio	0.92	0.91	0.36	0.34	0.78	0.44
Control Delay	40.0	26.5	29.4	12.4	35.9	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	26.5	29.4	12.4	35.9	4.3
LOS	D	C	C	B	D	A
Approach Delay	33.6			15.5	26.4	
Approach LOS	C			B	C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 86.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 26.3	Intersection LOS: C
Intersection Capacity Utilization 73.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1053	945	256	1130	1182	509
v/c Ratio	0.92	0.91	0.36	0.34	0.78	0.44
Control Delay	40.0	26.5	29.4	12.4	35.9	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	26.5	29.4	12.4	35.9	4.3
Queue Length 50th (ft)	289	383	61	100	186	46
Queue Length 95th (ft)	#393	#681	91	118	217	87
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1199	1090	805	3547	1530	1166
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.87	0.32	0.32	0.77	0.44

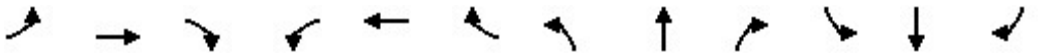
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	916	822	223	983	1028	443
Future Volume (veh/h)	916	822	223	983	1028	443
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1870	1673	1870	1870	1870
Adj Flow Rate, veh/h	1053	945	256	1130	1182	509
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1389	896	358	2767	1633	1114
Arrive On Green	0.45	0.45	0.12	0.43	0.25	0.25
Sat Flow, veh/h	3092	1585	3092	6696	6696	1585
Grp Volume(v), veh/h	1053	945	256	1130	1182	509
Grp Sat Flow(s),veh/h/ln	1546	1585	1546	1609	1609	1585
Q Serve(g_s), s	21.2	33.5	6.0	9.1	12.5	10.5
Cycle Q Clear(g_c), s	21.2	33.5	6.0	9.1	12.5	10.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1389	896	358	2767	1633	1114
V/C Ratio(X)	0.76	1.05	0.71	0.41	0.72	0.46
Avail Cap(c_a), veh/h	1389	896	933	4098	1769	1148
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	16.2	31.8	14.7	25.4	4.8
Incr Delay (d2), s/veh	2.5	45.6	2.7	0.1	1.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	38.0	2.3	3.1	4.7	9.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.6	61.8	34.4	14.8	26.8	5.1
LnGrp LOS	B	F	C	B	C	A
Approach Vol, veh/h	1998			1386	1691	
Approach Delay, s/veh	39.6			18.4	20.3	
Approach LOS	D			B	C	

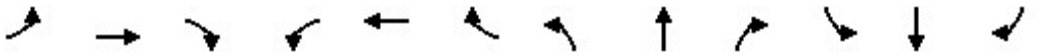
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.6		38.0	13.1	23.4
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		47.5		33.5	22.5	20.5
Max Q Clear Time (g_c+I1), s		11.1		35.5	8.0	14.5
Green Ext Time (p_c), s		10.3		0.0	0.7	4.4

Intersection Summary	
HCM 6th Ctrl Delay	27.4
HCM 6th LOS	C



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.964				0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	4902	0	3072	3539	1583	3072	5085	1583	3072	6216	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	4902	0	3072	3539	1583	3072	5085	1583	3072	6216	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		64				136			177		65	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	510	976	303	237	835	168	353	2139	278	234	2057	519
Future Volume (vph)	510	976	303	237	835	168	353	2139	278	234	2057	519
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	554	1061	329	258	908	183	384	2325	302	254	2236	564
Shared Lane Traffic (%)												
Lane Group Flow (vph)	554	1390	0	258	908	183	384	2325	302	254	2800	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	510	976	237	835	168	353	2139	278	234	2057
Future Volume (vph)	510	976	237	835	168	353	2139	278	234	2057
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	22.0	37.0	14.0	29.0	29.0	14.0	57.0		12.0	55.0
Total Split (%)	18.3%	30.8%	11.7%	24.2%	24.2%	11.7%	47.5%		10.0%	45.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	17.5	32.5	9.5	24.5	24.5	9.5	52.5	120.0	7.5	50.5
Actuated g/C Ratio	0.15	0.27	0.08	0.20	0.20	0.08	0.44	1.00	0.06	0.42
v/c Ratio	1.24	1.01	1.06	1.26	0.42	1.58	1.05	0.19	1.32	1.06
Control Delay	167.3	68.7	127.4	167.0	15.7	316.0	65.7	0.3	220.1	67.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.3	68.7	127.4	167.0	15.7	316.0	65.7	0.3	220.1	67.8
LOS	F	E	F	F	B	F	E	A	F	E
Approach Delay		96.8		138.9			91.0			80.4
Approach LOS		F		F			F			F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.58	
Intersection Signal Delay: 95.7	Intersection LOS: F
Intersection Capacity Utilization 104.1%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	554	1390	258	908	183	384	2325	302	254	2800
v/c Ratio	1.24	1.01	1.06	1.26	0.42	1.58	1.05	0.19	1.32	1.06
Control Delay	167.3	68.7	127.4	167.0	15.7	316.0	65.7	0.3	220.1	67.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.3	68.7	127.4	167.0	15.7	316.0	65.7	0.3	220.1	67.8
Queue Length 50th (ft)	~274	~389	~113	~463	30	~218	~716	0	~131	~682
Queue Length 95th (ft)	#386	#498	#200	#593	98	#318	#809	0	#217	#753
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	448	1374	243	722	431	243	2224	1583	192	2653
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.24	1.01	1.06	1.26	0.42	1.58	1.05	0.19	1.32	1.06

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

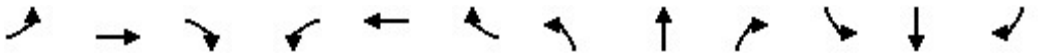
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	510	976	303	237	835	168	353	2139	278	234	2057	519
Future Volume (veh/h)	510	976	303	237	835	168	353	2139	278	234	2057	519
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	554	1061	329	258	908	183	384	2325	0	254	2236	564
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	451	1046	324	245	726	324	245	2234		193	2183	538
Arrive On Green	0.15	0.27	0.27	0.08	0.20	0.20	0.08	0.44	0.00	0.06	0.42	0.42
Sat Flow, veh/h	3092	3862	1197	3092	3554	1585	3092	5106	1585	3092	5186	1279
Grp Volume(v), veh/h	554	935	455	258	908	183	384	2325	0	254	2077	723
Grp Sat Flow(s),veh/h/ln	1546	1702	1655	1546	1777	1585	1546	1702	1585	1546	1609	1640
Q Serve(g_s), s	17.5	32.5	32.5	9.5	24.5	12.5	9.5	52.5	0.0	7.5	50.5	50.5
Cycle Q Clear(g_c), s	17.5	32.5	32.5	9.5	24.5	12.5	9.5	52.5	0.0	7.5	50.5	50.5
Prop In Lane	1.00		0.72	1.00		1.00	1.00		1.00	1.00		0.78
Lane Grp Cap(c), veh/h	451	922	448	245	726	324	245	2234		193	2031	690
V/C Ratio(X)	1.23	1.01	1.01	1.05	1.25	0.57	1.57	1.04		1.31	1.02	1.05
Avail Cap(c_a), veh/h	451	922	448	245	726	324	245	2234		193	2031	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.2	43.8	43.8	55.3	47.8	43.0	55.3	33.8	0.0	56.3	34.8	34.8
Incr Delay (d2), s/veh	121.1	33.3	46.3	72.4	124.4	2.3	274.8	30.7	0.0	173.3	26.0	47.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.3	17.8	18.9	6.2	23.3	5.1	13.0	27.3	0.0	7.6	24.1	28.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	172.4	77.0	90.0	127.7	172.1	45.2	330.1	64.4	0.0	229.5	60.7	82.1
LnGrp LOS	F	F	F	F	F	D	F	F		F	F	F
Approach Vol, veh/h		1944			1349			2709	A		3054	
Approach Delay, s/veh		107.2			146.4			102.1			79.8	
Approach LOS		F			F			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	57.0	14.0	37.0	14.0	55.0	22.0	29.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.5	52.5	9.5	32.5	9.5	50.5	17.5	24.5
Max Q Clear Time (g_c+I1), s	9.5	54.5	11.5	34.5	11.5	52.5	19.5	26.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	102.3
HCM 6th LOS	F

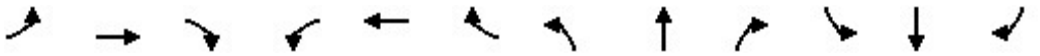
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.996				0.850			0.850		0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1676	6382	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1676	6382	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				160			132		162	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	6	2522	67	1	1546	193	69	0	13	151	0	17
Future Volume (vph)	6	2522	67	1	1546	193	69	0	13	151	0	17
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	6	2655	71	1	1627	203	73	0	14	159	0	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	2726	0	1	1627	203	73	0	14	159	18	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	6	2522	1	1546	193	69	13	151	0
Future Volume (vph)	6	2522	1	1546	193	69	13	151	0
Turn Type	Prot	NA	Prot	NA	Perm	Prot	Perm	Prot	NA
Protected Phases	7	4	3	8		5		1	6
Permitted Phases					8		2		
Detector Phase	7	4	3	8	8	5	2	1	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	9.5	42.4	9.5	42.4	42.4	11.8	23.7	14.4	26.3
Total Split (%)	10.6%	47.1%	10.6%	47.1%	47.1%	13.1%	26.3%	16.0%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.0	38.0	5.0	38.0	38.0	7.0	5.5	9.8	10.5
Actuated g/C Ratio	0.07	0.55	0.07	0.55	0.55	0.10	0.08	0.14	0.15
v/c Ratio	0.05	0.77	0.01	0.58	0.21	0.43	0.06	0.66	0.03
Control Delay	32.5	14.3	32.0	11.5	3.3	38.1	0.5	44.3	0.1
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	14.3	32.0	11.7	3.3	38.1	0.5	44.3	0.1
LOS	C	B	C	B	A	D	A	D	A
Approach Delay		14.3		10.8					39.8
Approach LOS		B		B					D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 14.2	Intersection LOS: B
Intersection Capacity Utilization 61.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	6	2726	1	1627	203	73	14	159	18
v/c Ratio	0.05	0.77	0.01	0.58	0.21	0.43	0.06	0.66	0.03
Control Delay	32.5	14.3	32.0	11.5	3.3	38.1	0.5	44.3	0.1
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	14.3	32.0	11.7	3.3	38.1	0.5	44.3	0.1
Queue Length 50th (ft)	2	219	0	139	7	28	0	62	0
Queue Length 95th (ft)	14	365	5	245	42	74	0	#163	0
Internal Link Dist (ft)		2546		362					358
Turn Bay Length (ft)	130		130		145	165	165	50	
Base Capacity (vph)	122	3537	122	2816	948	179	539	242	1068
Starvation Cap Reductn	0	0	0	394	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.77	0.01	0.67	0.21	0.41	0.03	0.66	0.02

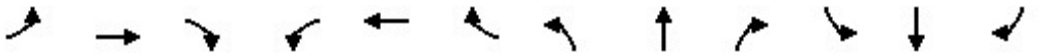
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	2522	67	1	1546	193	69	0	13	151	0	17
Future Volume (veh/h)	6	2522	67	1	1546	193	69	0	13	151	0	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	6	2655	71	1	1627	203	73	0	14	159	0	18
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	13	3514	94	3	2731	848	93	139	117	196	240	214
Arrive On Green	0.01	0.54	0.54	0.00	0.53	0.53	0.06	0.00	0.07	0.12	0.00	0.14
Sat Flow, veh/h	1688	6491	173	1688	5106	1585	1688	1870	1585	1688	1777	1585
Grp Volume(v), veh/h	6	1972	754	1	1627	203	73	0	14	159	0	18
Grp Sat Flow(s),veh/h/ln	1688	1609	1839	1688	1702	1585	1688	1870	1585	1688	1777	1585
Q Serve(g_s), s	0.2	21.4	21.5	0.0	14.7	4.6	2.9	0.0	0.6	6.2	0.0	0.7
Cycle Q Clear(g_c), s	0.2	21.4	21.5	0.0	14.7	4.6	2.9	0.0	0.6	6.2	0.0	0.7
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	13	2612	996	3	2731	848	93	139	117	196	240	214
V/C Ratio(X)	0.45	0.75	0.76	0.40	0.60	0.24	0.78	0.00	0.12	0.81	0.00	0.08
Avail Cap(c_a), veh/h	125	2711	1033	125	2869	890	183	532	451	248	574	512
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	33.3	12.0	12.0	33.7	10.7	8.4	31.5	0.0	29.2	29.1	0.0	25.5
Incr Delay (d2), s/veh	22.1	1.2	3.2	79.9	0.3	0.1	13.3	0.0	0.4	14.6	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	6.6	8.2	0.1	4.7	1.4	1.5	0.0	0.2	3.2	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.4	13.2	15.2	113.6	11.0	8.5	44.7	0.0	29.6	43.7	0.0	25.7
LnGrp LOS	E	B	B	F	B	A	D	A	C	D	A	C
Approach Vol, veh/h		2732			1831			87			177	
Approach Delay, s/veh		13.8			10.8			42.3			41.9	
Approach LOS		B			B			D			D	

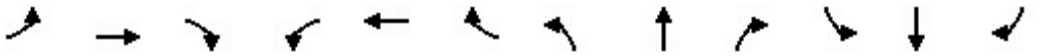
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.3	9.5	4.6	41.0	8.2	13.6	5.0	40.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	9.9	19.2	5.0	37.9	7.3	21.8	5.0	37.9
Max Q Clear Time (g_c+I1), s	8.2	2.6	2.0	23.5	4.9	2.7	2.2	16.7
Green Ext Time (p_c), s	0.1	0.0	0.0	13.0	0.0	0.0	0.0	13.4

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.995				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	3072	6401	0	1676	5060	0	1676	1863	1583	0	1775	1583
Flt Permitted	0.950			0.950			0.715				0.730	
Satd. Flow (perm)	3072	6401	0	1676	5060	0	1262	1863	1583	0	1360	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			10				152			94
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



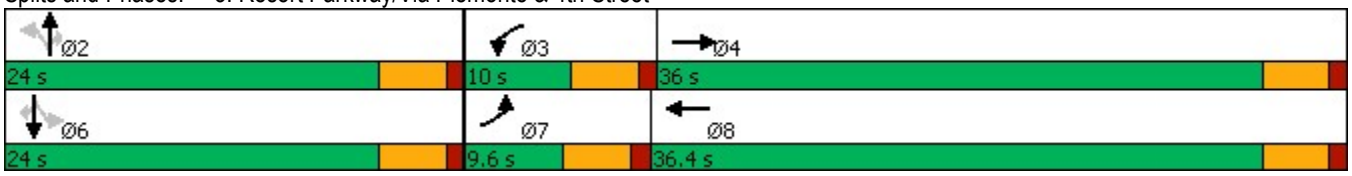
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	41	2545	12	67	1521	54	41	0	53	60	1	28
Future Volume (vph)	41	2545	12	67	1521	54	41	0	53	60	1	28
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	43	2679	13	71	1601	57	43	0	56	63	1	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	2692	0	71	1658	0	43	0	56	0	64	29

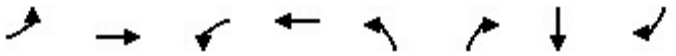
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	41	2545	67	1521	41	53	60	1	28
Future Volume (vph)	41	2545	67	1521	41	53	60	1	28
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	36.0	10.0	36.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	13.7%	51.4%	14.3%	52.0%	34.3%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.2	32.0	5.6	34.0	8.0	8.0		8.0	8.0
Actuated g/C Ratio	0.10	0.59	0.10	0.62	0.15	0.15		0.15	0.15
v/c Ratio	0.15	0.72	0.42	0.53	0.23	0.16		0.32	0.09
Control Delay	26.7	10.8	33.8	7.7	25.3	0.9		26.8	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	26.7	10.8	33.8	7.7	25.3	0.9		26.8	0.6
LOS	C	B	C	A	C	A		C	A
Approach Delay		11.1		8.7				18.6	
Approach LOS		B		A				B	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 54.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 10.4	Intersection LOS: B
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	43	2692	71	1658	43	56	64	29
v/c Ratio	0.15	0.72	0.42	0.53	0.23	0.16	0.32	0.09
Control Delay	26.7	10.8	33.8	7.7	25.3	0.9	26.8	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	10.8	33.8	7.7	25.3	0.9	26.8	0.6
Queue Length 50th (ft)	7	196	24	67	14	0	21	0
Queue Length 95th (ft)	21	277	#67	190	38	0	52	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	291	3752	171	3173	457	671	493	634
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.72	0.42	0.52	0.09	0.08	0.13	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	2545	12	67	1521	54	41	0	53	60	1	28
Future Volume (veh/h)	41	2545	12	67	1521	54	41	0	53	60	1	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	43	2679	13	71	1601	57	43	0	56	63	1	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	3780	18	103	2959	105	231	218	185	289	4	185
Arrive On Green	0.04	0.57	0.57	0.06	0.58	0.58	0.12	0.00	0.12	0.12	0.12	0.12
Sat Flow, veh/h	3092	6658	32	1688	5062	180	1307	1870	1585	1325	31	1585
Grp Volume(v), veh/h	43	1941	751	71	1077	581	43	0	56	64	0	29
Grp Sat Flow(s),veh/h/ln	1546	1609	1865	1688	1702	1838	1307	1870	1585	1356	0	1585
Q Serve(g_s), s	0.7	15.4	15.4	2.2	10.2	10.2	1.7	0.0	1.7	2.3	0.0	0.9
Cycle Q Clear(g_c), s	0.7	15.4	15.4	2.2	10.2	10.2	4.0	0.0	1.7	2.3	0.0	0.9
Prop In Lane	1.00		0.02	1.00		0.10	1.00		1.00	0.98		1.00
Lane Grp Cap(c), veh/h	137	2740	1059	103	1990	1075	231	218	185	293	0	185
V/C Ratio(X)	0.31	0.71	0.71	0.69	0.54	0.54	0.19	0.00	0.30	0.22	0.00	0.16
Avail Cap(c_a), veh/h	297	2867	1108	175	2048	1106	559	688	583	633	0	583
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.6	8.3	8.3	24.4	6.7	6.7	23.6	0.0	21.5	21.7	0.0	21.1
Incr Delay (d2), s/veh	1.3	0.8	2.0	7.9	0.3	0.5	0.4	0.0	0.9	0.4	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	4.0	5.0	1.0	2.6	2.9	0.5	0.0	0.6	0.7	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.9	9.1	10.3	32.3	7.0	7.2	23.9	0.0	22.4	22.1	0.0	21.5
LnGrp LOS	C	A	B	C	A	A	C	A	C	C	A	C
Approach Vol, veh/h		2735			1729			99			93	
Approach Delay, s/veh		9.7			8.1			23.1			21.9	
Approach LOS		A			A			C			C	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		10.7	7.7	34.6		10.7	6.8	35.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	5.5	31.5		19.5	5.1	31.9				
Max Q Clear Time (g_c+I1), s		6.0	4.2	17.4		4.3	2.7	12.2				
Green Ext Time (p_c), s		0.2	0.0	12.7		0.3	0.0	11.8				

Intersection Summary	
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	5060	0	0	5085	0	1611
Flt Permitted						
Satd. Flow (perm)	5060	0	0	5085	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	2580	89	0	1604	0	63
Future Volume (vph)	2580	89	0	1604	0	63
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	2688	93	0	1671	0	66
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2781	0	0	1671	0	66

Intersection Summary

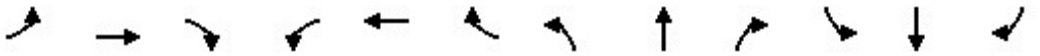
Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	2580	89	0	1604	0	63
Future Vol, veh/h	2580	89	0	1604	0	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2688	93	0	1671	0	66

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1391
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	113
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	113
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

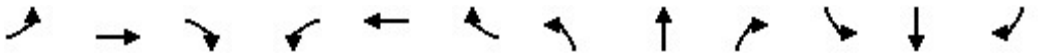
Approach	EB	WB	NB
HCM Control Delay, s	0	0	73.8
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	113	-	-	-
HCM Lane V/C Ratio	0.581	-	-	-
HCM Control Delay (s)	73.8	-	-	-
HCM Lane LOS	F	-	-	-
HCM 95th %tile Q(veh)	2.8	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6280	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6280	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			181			280			55		31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



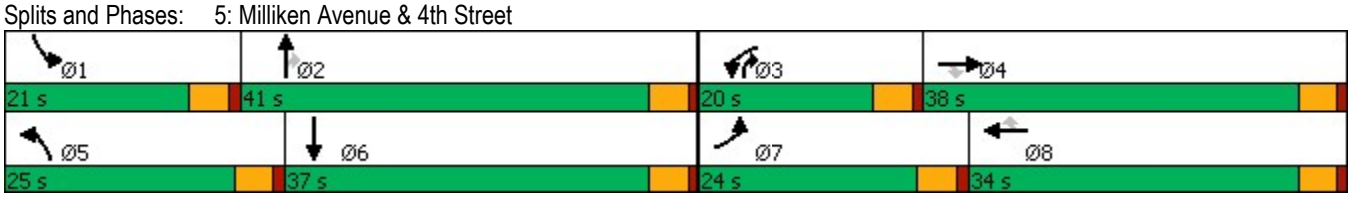
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	610	1550	288	531	1244	385	426	2108	523	605	1318	201
Future Volume (vph)	610	1550	288	531	1244	385	426	2108	523	605	1318	201
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	635	1615	300	553	1296	401	444	2196	545	630	1373	209
Shared Lane Traffic (%)												
Lane Group Flow (vph)	635	1615	300	553	1296	401	444	2196	545	630	1582	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	610	1550	288	531	1244	385	426	2108	523	605	1318
Future Volume (vph)	610	1550	288	531	1244	385	426	2108	523	605	1318
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	24.0	38.0	38.0	20.0	34.0	34.0	25.0	41.0	20.0	21.0	37.0
Total Split (%)	20.0%	31.7%	31.7%	16.7%	28.3%	28.3%	20.8%	34.2%	16.7%	17.5%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	19.5	33.5	33.5	15.5	29.5	29.5	19.9	36.5	56.5	16.5	33.1
Actuated g/C Ratio	0.16	0.28	0.28	0.13	0.25	0.25	0.17	0.30	0.47	0.14	0.28
v/c Ratio	1.27	1.14	0.52	1.40	1.04	0.67	0.87	1.13	0.70	1.49	0.90
Control Delay	178.8	111.0	17.7	232.2	79.7	18.3	67.5	103.2	28.4	270.5	49.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	178.8	111.0	17.7	232.2	79.7	18.3	67.5	103.2	28.4	270.5	49.3
LOS	F	F	B	F	E	B	E	F	C	F	D
Approach Delay		116.9			106.2			85.4			112.3
Approach LOS		F			F			F			F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.49	
Intersection Signal Delay: 103.7	Intersection LOS: F
Intersection Capacity Utilization 111.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

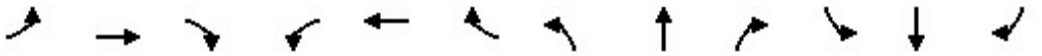


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	635	1615	300	553	1296	401	444	2196	545	630	1582
v/c Ratio	1.27	1.14	0.52	1.40	1.04	0.67	0.87	1.13	0.70	1.49	0.90
Control Delay	178.8	111.0	17.7	232.2	79.7	18.3	67.5	103.2	28.4	270.5	49.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	178.8	111.0	17.7	232.2	79.7	18.3	67.5	103.2	28.4	270.5	49.3
Queue Length 50th (ft)	~320	~534	73	~294	~395	80	173	~572	295	~347	340
Queue Length 95th (ft)	#437	#631	162	#407	#491	196	#256	#647	434	#464	#398
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	499	1419	572	396	1250	600	524	1949	774	422	1755
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.27	1.14	0.52	1.40	1.04	0.67	0.85	1.13	0.70	1.49	0.90

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

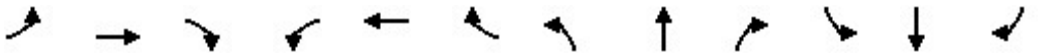
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	610	1550	288	531	1244	385	426	2108	523	605	1318	201
Future Volume (veh/h)	610	1550	288	531	1244	385	426	2108	523	605	1318	201
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	635	1615	300	553	1296	401	444	2196	545	630	1373	209
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	502	1425	442	399	1255	390	495	1957	687	425	1599	243
Arrive On Green	0.16	0.28	0.28	0.13	0.25	0.25	0.16	0.30	0.30	0.14	0.28	0.28
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	3092	6434	1585	3092	5678	862
Grp Volume(v), veh/h	635	1615	300	553	1296	401	444	2196	545	630	1166	416
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1546	1609	1585	1546	1609	1715
Q Serve(g_s), s	19.5	33.5	20.2	15.5	29.5	29.5	16.9	36.5	35.6	16.5	27.5	27.6
Cycle Q Clear(g_c), s	19.5	33.5	20.2	15.5	29.5	29.5	16.9	36.5	35.6	16.5	27.5	27.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.50
Lane Grp Cap(c), veh/h	502	1425	442	399	1255	390	495	1957	687	425	1359	483
V/C Ratio(X)	1.26	1.13	0.68	1.38	1.03	1.03	0.90	1.12	0.79	1.48	0.86	0.86
Avail Cap(c_a), veh/h	502	1425	442	399	1255	390	528	1957	687	425	1359	483
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.3	43.3	38.5	52.3	45.3	45.2	49.4	41.8	29.4	51.8	40.8	40.9
Incr Delay (d2), s/veh	133.9	69.1	4.1	188.0	34.1	53.3	17.3	62.4	6.4	229.2	5.7	14.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.8	23.1	8.3	16.4	16.3	17.3	7.7	22.7	14.5	19.9	11.5	13.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	184.2	112.4	42.6	240.3	79.4	98.5	66.8	104.1	35.7	280.9	46.6	55.5
LnGrp LOS	F	F	D	F	F	F	E	F	D	F	D	E
Approach Vol, veh/h		2550			2250			3185			2212	
Approach Delay, s/veh		122.1			122.3			87.2			115.0	
Approach LOS		F			F			F			F	

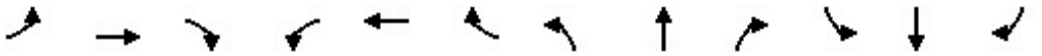
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	41.0	20.0	38.0	23.7	38.3	24.0	34.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	16.5	36.5	15.5	33.5	20.5	32.5	19.5	29.5
Max Q Clear Time (g_c+I1), s	18.5	38.5	17.5	35.5	18.9	29.6	21.5	31.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.3	2.3	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	109.7
HCM 6th LOS	F



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.925	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3136	1441
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3136	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			142			150			259		194	468
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



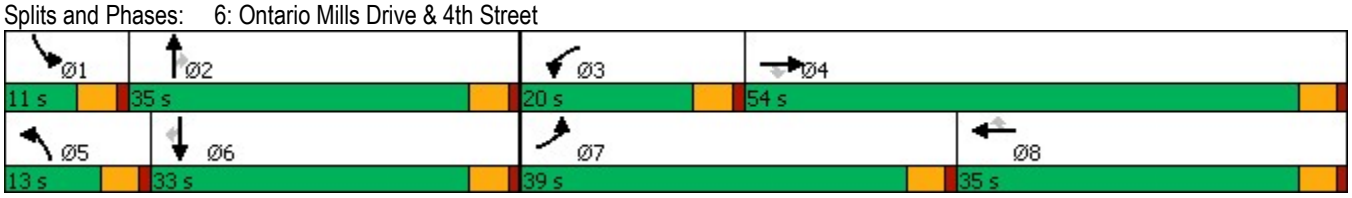
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1339	1749	168	316	1378	456	198	434	492	109	437	862
Future Volume (vph)	1339	1749	168	316	1378	456	198	434	492	109	437	862
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1455	1901	183	343	1498	496	215	472	535	118	475	937
Shared Lane Traffic (%)												50%
Lane Group Flow (vph)	1455	1901	183	343	1498	496	215	472	535	118	944	468

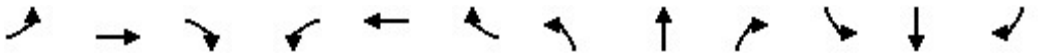
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1339	1749	168	316	1378	456	198	434	492	109	437	862
Future Volume (vph)	1339	1749	168	316	1378	456	198	434	492	109	437	862
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	39.0	54.0	54.0	20.0	35.0	35.0	13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	32.5%	45.0%	45.0%	16.7%	29.2%	29.2%	10.8%	29.2%	29.2%	9.2%	27.5%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	34.5	49.7	49.7	15.3	30.5	30.5	8.5	30.5	30.5	6.5	28.5	28.5
Actuated g/C Ratio	0.29	0.41	0.41	0.13	0.25	0.25	0.07	0.25	0.25	0.05	0.24	0.24
v/c Ratio	1.65	0.90	0.25	0.88	1.16	0.96	1.82	0.53	0.90	1.31	1.06	0.67
Control Delay	326.6	40.2	7.1	74.8	121.1	63.3	432.7	41.0	41.7	243.2	82.0	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	326.6	40.2	7.1	74.8	121.1	63.3	432.7	41.0	41.7	243.2	82.0	8.7
LOS	F	D	A	E	F	E	F	D	D	F	F	A
Approach Delay		156.2			102.1			110.2			72.0	
Approach LOS		F			F			F			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.82	
Intersection Signal Delay: 120.1	Intersection LOS: F
Intersection Capacity Utilization 117.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



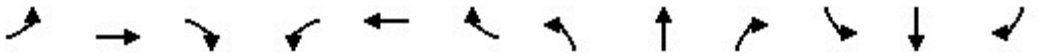


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1455	1901	183	343	1498	496	215	472	535	118	944	468
v/c Ratio	1.65	0.90	0.25	0.88	1.16	0.96	1.82	0.53	0.90	1.31	1.06	0.67
Control Delay	326.6	40.2	7.1	74.8	121.1	63.3	432.7	41.0	41.7	243.2	82.0	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	326.6	40.2	7.1	74.8	121.1	63.3	432.7	41.0	41.7	243.2	82.0	8.7
Queue Length 50th (ft)	~841	498	19	136	~502	283	~251	166	226	~117	~373	0
Queue Length 95th (ft)	#978	570	65	#216	#599	#506	#407	221	#439	#240	#513	107
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	883	2105	738	396	1292	514	118	899	595	90	892	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.65	0.90	0.25	0.87	1.16	0.96	1.82	0.53	0.90	1.31	1.06	0.67

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



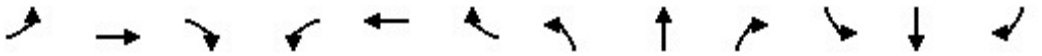
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1339	1749	168	316	1378	456	198	434	492	109	437	862
Future Volume (veh/h)	1339	1749	168	316	1378	456	198	434	492	109	437	862
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	1455	1901	183	343	1498	496	215	472	535	118	475	937
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	889	2121	659	390	1298	403	120	903	403	91	444	753
Arrive On Green	0.29	0.42	0.42	0.13	0.25	0.25	0.07	0.25	0.25	0.05	0.24	0.24
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	1688	3554	1585	1688	1870	3170
Grp Volume(v), veh/h	1455	1901	183	343	1498	496	215	472	535	118	475	937
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1688	1777	1585	1688	1870	1585
Q Serve(g_s), s	34.5	41.6	9.2	13.1	30.5	30.5	8.5	13.7	30.5	6.5	28.5	28.5
Cycle Q Clear(g_c), s	34.5	41.6	9.2	13.1	30.5	30.5	8.5	13.7	30.5	6.5	28.5	28.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	889	2121	659	390	1298	403	120	903	403	91	444	753
V/C Ratio(X)	1.64	0.90	0.28	0.88	1.15	1.23	1.80	0.52	1.33	1.29	1.07	1.24
Avail Cap(c_a), veh/h	889	2121	659	399	1298	403	120	903	403	91	444	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	32.7	23.2	51.5	44.8	44.7	55.7	38.5	44.7	56.8	45.7	45.7
Incr Delay (d2), s/veh	291.7	5.5	0.2	19.3	78.6	124.0	390.6	0.5	163.9	190.8	62.4	121.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	49.0	17.8	3.5	6.1	22.2	25.7	16.6	6.0	30.2	7.6	20.8	23.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	334.4	38.1	23.4	70.8	123.3	168.7	446.3	39.0	208.6	247.6	108.2	166.8
LnGrp LOS	F	D	C	E	F	F	F	D	F	F	F	F
Approach Vol, veh/h		3539			2337			1222			1530	
Approach Delay, s/veh		159.2			125.3			184.9			154.9	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	35.0	19.6	54.4	13.0	33.0	39.0	35.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	30.5	15.5	49.5	8.5	28.5	34.5	30.5
Max Q Clear Time (g_c+I1), s	8.5	32.5	15.1	43.6	10.5	30.5	36.5	32.5
Green Ext Time (p_c), s	0.0	0.0	0.1	5.1	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	152.9
HCM 6th LOS	F

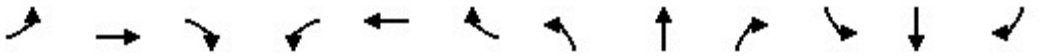
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.973			0.936				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (prot)	3072	5085	1583	1676	4948	0	1676	3313	0	1593	1738	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.982	
Satd. Flow (perm)	3072	5085	1583	1676	4948	0	1676	3313	0	1593	1738	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			107		39			85				190
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



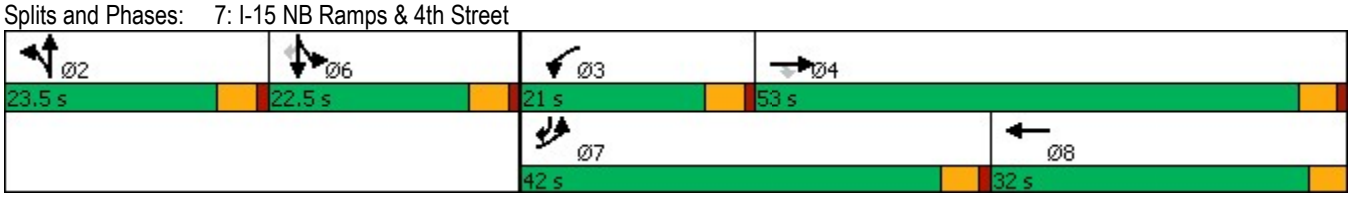
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1194	1008	135	111	1071	239	166	108	82	201	95	876
Future Volume (vph)	1194	1008	135	111	1071	239	166	108	82	201	95	876
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1244	1050	141	116	1116	249	173	113	85	209	99	913
Shared Lane Traffic (%)										27%		
Lane Group Flow (vph)	1244	1050	141	116	1365	0	173	198	0	153	155	913

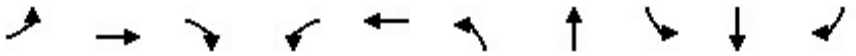
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1194	1008	135	111	1071	166	108	201	95	876
Future Volume (vph)	1194	1008	135	111	1071	166	108	201	95	876
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	42.0	53.0	53.0	21.0	32.0	23.5	23.5	22.5	22.5	42.0
Total Split (%)	35.0%	44.2%	44.2%	17.5%	26.7%	19.6%	19.6%	18.8%	18.8%	35.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	37.6	52.5	52.5	12.7	28.6	15.8	15.8	14.9	14.9	57.1
Actuated g/C Ratio	0.33	0.46	0.46	0.11	0.25	0.14	0.14	0.13	0.13	0.50
v/c Ratio	1.23	0.45	0.18	0.62	1.07	0.75	0.37	0.74	0.68	0.64
Control Delay	145.6	23.1	7.4	63.7	88.1	67.7	27.2	69.0	63.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	145.6	23.1	7.4	63.7	88.1	67.7	27.2	69.0	63.4	18.8
LOS	F	C	A	E	F	E	C	E	E	B
Approach Delay		84.8			86.2		46.1		30.8	
Approach LOS		F			F		D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 70.6	Intersection LOS: E
Intersection Capacity Utilization 96.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street



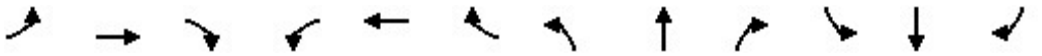


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1244	1050	141	116	1365	173	198	153	155	913
v/c Ratio	1.23	0.45	0.18	0.62	1.07	0.75	0.37	0.74	0.68	0.64
Control Delay	145.6	23.1	7.4	63.7	88.1	67.7	27.2	69.0	63.4	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	145.6	23.1	7.4	63.7	88.1	67.7	27.2	69.0	63.4	18.8
Queue Length 50th (ft)	~604	198	14	84	~419	125	40	116	116	221
Queue Length 95th (ft)	#769	264	57	147	#540	206	77	196	195	306
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1014	2342	786	243	1270	280	625	252	275	1417
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.23	0.45	0.18	0.48	1.07	0.62	0.32	0.61	0.56	0.64

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1194	1008	135	111	1071	239	166	108	82	201	95	876
Future Volume (veh/h)	1194	1008	135	111	1071	239	166	108	82	201	95	876
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1772
Adj Flow Rate, veh/h	1244	1050	141	116	1116	249	173	112	85	154	176	912
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	996	2466	765	142	1022	228	209	247	173	261	289	1432
Arrive On Green	0.32	0.48	0.48	0.08	0.24	0.24	0.12	0.12	0.12	0.15	0.15	0.15
Sat Flow, veh/h	3092	5106	1585	1688	4175	931	1688	1996	1399	1688	1870	3003
Grp Volume(v), veh/h	1244	1050	141	116	910	455	173	99	98	154	176	912
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1688	1702	1703	1688	1777	1618	1688	1870	1502
Q Serve(g_s), s	37.5	15.6	5.9	7.9	28.5	28.5	11.7	6.0	6.6	9.9	10.2	18.0
Cycle Q Clear(g_c), s	37.5	15.6	5.9	7.9	28.5	28.5	11.7	6.0	6.6	9.9	10.2	18.0
Prop In Lane	1.00		1.00	1.00		0.55	1.00		0.86	1.00		1.00
Lane Grp Cap(c), veh/h	996	2466	765	142	833	417	209	220	201	261	289	1432
V/C Ratio(X)	1.25	0.43	0.18	0.82	1.09	1.09	0.83	0.45	0.49	0.59	0.61	0.64
Avail Cap(c_a), veh/h	996	2466	765	239	833	417	275	290	264	261	289	1432
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.5	19.6	17.1	52.5	44.0	44.0	49.8	47.3	47.6	45.8	45.9	22.9
Incr Delay (d2), s/veh	120.6	0.1	0.1	11.0	59.3	71.3	14.5	1.4	1.8	3.5	3.7	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.7	6.1	2.2	3.8	18.7	20.1	5.7	2.7	2.8	4.4	5.0	9.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	160.0	19.7	17.2	63.4	103.2	115.3	64.2	48.7	49.4	49.3	49.6	23.8
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	C
Approach Vol, veh/h		2435			1481			370			1242	
Approach Delay, s/veh		91.3			103.8			56.2			30.6	
Approach LOS		F			F			E			C	

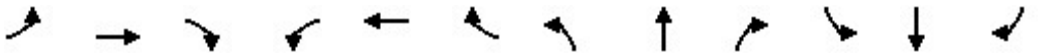
Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		18.9	14.3	60.7		22.5	42.0	33.0				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		19.0	16.5	48.5		18.0	37.5	* 29				
Max Q Clear Time (g_c+I1), s		13.7	9.9	17.6		20.0	39.5	30.5				
Green Ext Time (p_c), s		0.8	0.1	9.6		0.0	0.0	0.0				

Intersection Summary		
HCM 6th Ctrl Delay	78.7	
HCM 6th LOS	E	

Notes

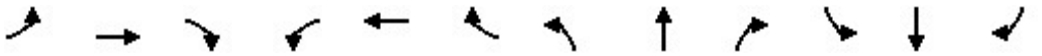
User approved volume balancing among the lanes for turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.907				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3210	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3210	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		92				149			149			149
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



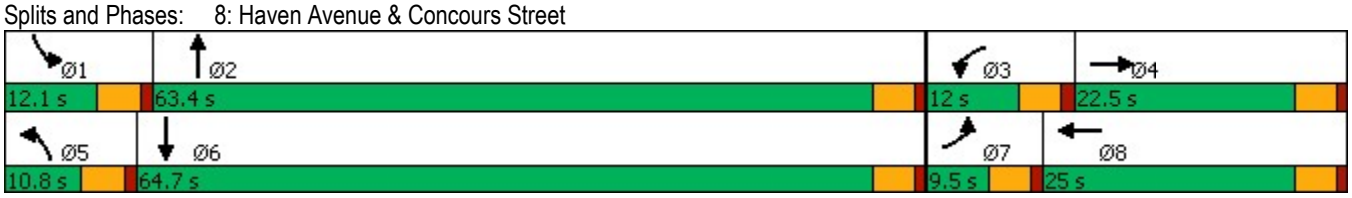
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	36	55	90	249	133	135	67	3307	286	178	2707	39
Future Volume (vph)	36	55	90	249	133	135	67	3307	286	178	2707	39
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	37	56	92	254	136	138	68	3374	292	182	2762	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	148	0	254	136	138	68	3374	292	182	2762	40

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	36	55	249	133	135	67	3307	286	178	2707	39
Future Volume (vph)	36	55	249	133	135	67	3307	286	178	2707	39
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	12.0	25.0		10.8	63.4		12.1	64.7	
Total Split (%)	8.6%	20.5%	10.9%	22.7%		9.8%	57.6%		11.0%	58.8%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	7.4	7.5	13.8	99.4	6.2	58.9	99.4	7.6	62.4	99.4
Actuated g/C Ratio	0.05	0.07	0.08	0.14	1.00	0.06	0.59	1.00	0.08	0.63	1.00
v/c Ratio	0.24	0.46	0.80	0.28	0.09	0.36	0.89	0.18	0.78	0.69	0.03
Control Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.6	0.3	68.3	14.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.6	0.3	68.3	14.0	0.0
LOS	D	C	E	D	A	D	C	A	E	B	A
Approach Delay		28.6		42.1			20.5			17.1	
Approach LOS		C		D			C			B	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 99.4	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 20.8	Intersection LOS: C
Intersection Capacity Utilization 78.6%	ICU Level of Service D
Analysis Period (min) 15	

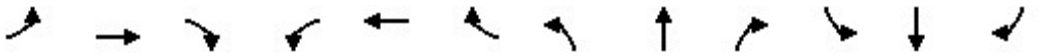
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	37	148	254	136	138	68	3374	292	182	2762	40
v/c Ratio	0.24	0.46	0.80	0.28	0.09	0.36	0.89	0.18	0.78	0.69	0.03
Control Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.6	0.3	68.3	14.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	23.2	65.3	41.5	0.1	50.7	21.6	0.3	68.3	14.0	0.0
Queue Length 50th (ft)	11	17	57	43	0	21	494	0	59	323	0
Queue Length 95th (ft)	28	48	#103	73	0	44	597	0	#118	395	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	154	656	316	729	1583	194	3796	1583	234	4022	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.23	0.80	0.19	0.09	0.35	0.89	0.18	0.78	0.69	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



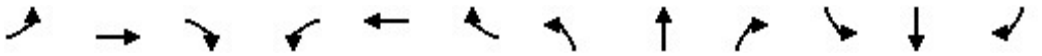
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	55	90	249	133	135	67	3307	286	178	2707	39
Future Volume (veh/h)	36	55	90	249	133	135	67	3307	286	178	2707	39
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	37	56	92	254	136	0	68	3374	0	182	2762	0
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	99	145	129	317	443		131	3779		235	3995	
Arrive On Green	0.03	0.08	0.08	0.08	0.12	0.00	0.04	0.59	0.00	0.08	0.62	0.00
Sat Flow, veh/h	3092	1777	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	37	56	92	254	136	0	68	3374	0	182	2762	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	1.2	3.0	5.7	5.9	3.5	0.0	2.2	45.5	0.0	5.8	28.5	0.0
Cycle Q Clear(g_c), s	1.2	3.0	5.7	5.9	3.5	0.0	2.2	45.5	0.0	5.8	28.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	99	145	129	317	443		131	3779		235	3995	
V/C Ratio(X)	0.37	0.39	0.71	0.80	0.31		0.52	0.89		0.77	0.69	
Avail Cap(c_a), veh/h	155	320	285	317	729		195	3790		235	3995	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	47.4	43.5	44.8	45.5	39.8	0.0	46.9	17.9	0.0	45.4	12.6	0.0
Incr Delay (d2), s/veh	2.3	1.7	7.0	13.6	0.4	0.0	3.1	3.1	0.0	14.8	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.4	2.5	2.5	1.5	0.0	0.9	16.0	0.0	2.7	9.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.7	45.2	51.8	59.1	40.2	0.0	50.0	21.0	0.0	60.2	13.1	0.0
LnGrp LOS	D	D	D	E	D		D	C		E	B	
Approach Vol, veh/h		185			390	A		3442	A		2944	A
Approach Delay, s/veh		49.4			52.5			21.6			16.0	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.1	63.2	12.0	12.7	8.7	66.6	7.7	17.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	7.6	58.9	7.5	18.0	6.3	60.2	5.0	20.5
Max Q Clear Time (g_c+I1), s	7.8	47.5	7.9	7.7	4.2	30.5	3.2	5.5
Green Ext Time (p_c), s	0.0	11.2	0.0	0.5	0.0	26.3	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	21.7
HCM 6th LOS	C

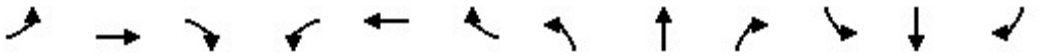
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.975			0.946						0.985	
Flt Protected	0.950	0.960			0.971		0.950			0.950		
Satd. Flow (prot)	1593	1656	0	0	1711	0	1676	5085	0	1676	5009	0
Flt Permitted	0.950	0.960					0.950			0.950		
Satd. Flow (perm)	1593	1656	0	0	1762	0	1676	5085	0	1676	5009	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			95						22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



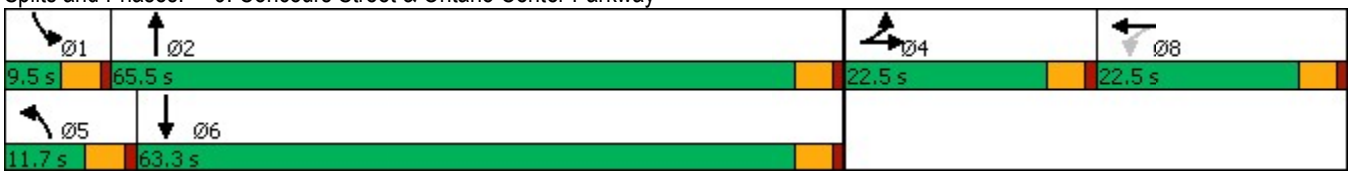
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	189	0	17	20	0	13	36	2522	7	1	1521	169
Future Volume (vph)	189	0	17	20	0	13	36	2522	7	1	1521	169
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	199	0	18	21	0	14	38	2655	7	1	1601	178
Shared Lane Traffic (%)	45%											
Lane Group Flow (vph)	109	108	0	0	35	0	38	2662	0	1	1779	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	189	0	20	0	36	2522	1	1521
Future Volume (vph)	189	0	20	0	36	2522	1	1521
Turn Type	Split	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases	4	4		8	5	2	1	6
Permitted Phases			8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	9.5	22.5	9.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	11.7	65.5	9.5	63.3
Total Split (%)	18.8%	18.8%	18.8%	18.8%	9.8%	54.6%	7.9%	52.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	12.0	12.0		5.5	6.7	66.9	5.0	61.9
Actuated g/C Ratio	0.13	0.13		0.06	0.07	0.70	0.05	0.65
v/c Ratio	0.55	0.37		0.18	0.32	0.75	0.01	0.55
Control Delay	50.2	14.6		2.1	52.3	13.1	48.0	12.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	14.6		2.1	52.3	13.1	48.0	12.3
LOS	D	B		A	D	B	D	B
Approach Delay		32.5		2.1		13.6		12.3
Approach LOS		C		A		B		B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 95.3	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 65.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	109	108	35	38	2662	1	1779
v/c Ratio	0.55	0.37	0.18	0.32	0.75	0.01	0.55
Control Delay	50.2	14.6	2.1	52.3	13.1	48.0	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	14.6	2.1	52.3	13.1	48.0	12.3
Queue Length 50th (ft)	63	7	0	21	358	1	255
Queue Length 95th (ft)	130	58	0	60	652	7	341
Internal Link Dist (ft)		319	68		111		176
Turn Bay Length (ft)	170			115		120	
Base Capacity (vph)	303	392	412	127	3567	88	3369
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.28	0.08	0.30	0.75	0.01	0.53

Intersection Summary

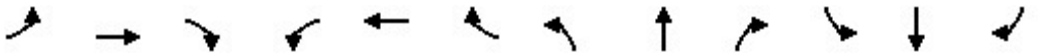
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	189	0	17	20	0	13	36	2522	7	1	1521	169
Future Volume (veh/h)	189	0	17	20	0	13	36	2522	7	1	1521	169
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	216	0	0	21	0	14	38	2655	7	1	1601	178
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	308	170	0	34	0	22	59	3484	9	2	2934	326
Arrive On Green	0.09	0.00	0.00	0.03	0.00	0.03	0.03	0.66	0.66	0.00	0.63	0.63
Sat Flow, veh/h	3375	1870	0	1018	0	679	1688	5258	14	1688	4664	518
Grp Volume(v), veh/h	216	0	0	35	0	0	38	1718	944	1	1168	611
Grp Sat Flow(s),veh/h/ln	1688	1870	0	1697	0	0	1688	1702	1868	1688	1702	1777
Q Serve(g_s), s	5.3	0.0	0.0	1.7	0.0	0.0	1.9	29.2	29.3	0.1	16.5	16.5
Cycle Q Clear(g_c), s	5.3	0.0	0.0	1.7	0.0	0.0	1.9	29.2	29.3	0.1	16.5	16.5
Prop In Lane	1.00		0.00	0.60		0.40	1.00		0.01	1.00		0.29
Lane Grp Cap(c), veh/h	308	170	0	56	0	0	59	2256	1238	2	2142	1118
V/C Ratio(X)	0.70	0.00	0.00	0.62	0.00	0.00	0.65	0.76	0.76	0.43	0.55	0.55
Avail Cap(c_a), veh/h	715	396	0	360	0	0	143	2444	1341	99	2355	1230
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.5	0.0	0.0	40.6	0.0	0.0	40.5	9.8	9.8	42.4	8.9	8.9
Incr Delay (d2), s/veh	2.9	0.0	0.0	10.8	0.0	0.0	11.3	1.3	2.4	93.4	0.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	0.0	0.9	0.0	0.0	1.0	9.2	10.5	0.1	5.3	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.4	0.0	0.0	51.3	0.0	0.0	51.8	11.1	12.2	135.8	9.1	9.3
LnGrp LOS	D	A	A	D	A	A	D	B	B	F	A	A
Approach Vol, veh/h		216			35			2700			1780	
Approach Delay, s/veh		40.4			51.3			12.1			9.3	
Approach LOS		D			D			B			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	60.8		12.2	7.5	58.0		7.3				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	61.0		18.0	7.2	58.8		18.0				
Max Q Clear Time (g_c+I1), s	2.1	31.3		7.3	3.9	18.5		3.7				
Green Ext Time (p_c), s	0.0	25.0		0.5	0.0	19.3		0.1				

Intersection Summary		
HCM 6th Ctrl Delay		12.6
HCM 6th LOS		B

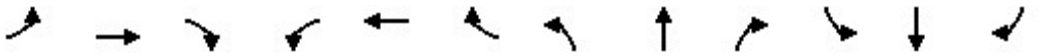
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			299			193			193			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



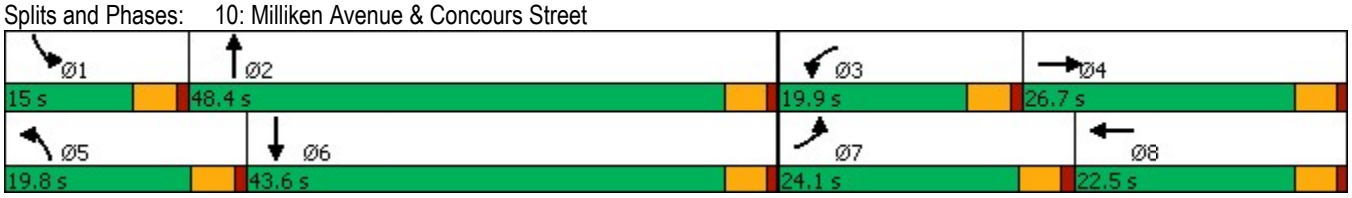
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	512	186	287	242	96	168	366	2329	182	258	1735	226
Future Volume (vph)	512	186	287	242	96	168	366	2329	182	258	1735	226
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	533	194	299	252	100	175	381	2426	190	269	1807	235
Shared Lane Traffic (%)												
Lane Group Flow (vph)	533	194	299	252	100	175	381	2426	190	269	1807	235

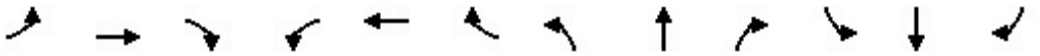
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	512	186	287	242	96	168	366	2329	182	258	1735	226
Future Volume (vph)	512	186	287	242	96	168	366	2329	182	258	1735	226
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.1	26.7		19.9	22.5		19.8	48.4		15.0	43.6	
Total Split (%)	21.9%	24.3%		18.1%	20.5%		18.0%	44.0%		13.6%	39.6%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	19.6	14.8	100.2	13.0	8.2	100.2	15.1	43.9	100.2	10.5	39.3	100.2
Actuated g/C Ratio	0.20	0.15	1.00	0.13	0.08	1.00	0.15	0.44	1.00	0.10	0.39	1.00
v/c Ratio	0.89	0.37	0.19	0.63	0.34	0.11	0.83	0.86	0.12	0.84	0.72	0.15
Control Delay	57.9	41.4	0.3	48.7	46.7	0.1	57.7	29.8	0.2	67.3	28.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	41.4	0.3	48.7	46.7	0.1	57.7	29.8	0.2	67.3	28.0	0.2
LOS	E	D	A	D	D	A	E	C	A	E	C	A
Approach Delay		38.0			32.2			31.5			29.7	
Approach LOS		D			C			C			C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 100.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 31.9	Intersection LOS: C
Intersection Capacity Utilization 77.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street

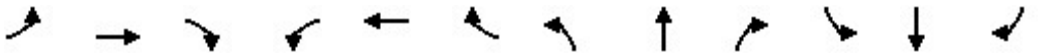




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	533	194	299	252	100	175	381	2426	190	269	1807	235
v/c Ratio	0.89	0.37	0.19	0.63	0.34	0.11	0.83	0.86	0.12	0.84	0.72	0.15
Control Delay	57.9	41.4	0.3	48.7	46.7	0.1	57.7	29.8	0.2	67.3	28.0	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	41.4	0.3	48.7	46.7	0.1	57.7	29.8	0.2	67.3	28.0	0.2
Queue Length 50th (ft)	172	60	0	79	32	0	123	397	0	88	279	0
Queue Length 95th (ft)	#273	96	0	120	58	0	#200	467	0	#160	335	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	600	784	1583	471	635	1583	468	2806	1583	321	2515	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.25	0.19	0.54	0.16	0.11	0.81	0.86	0.12	0.84	0.72	0.15

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



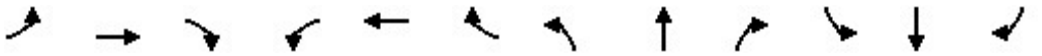
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	512	186	287	242	96	168	366	2329	182	258	1735	226
Future Volume (veh/h)	512	186	287	242	96	168	366	2329	182	258	1735	226
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	533	194	0	252	100	0	381	2426	0	269	1807	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	599	504		325	189		447	2929		330	2686	
Arrive On Green	0.19	0.14	0.00	0.11	0.05	0.00	0.14	0.46	0.00	0.11	0.42	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	533	194	0	252	100	0	381	2426	0	269	1807	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	15.8	4.7	0.0	7.5	2.6	0.0	11.3	31.0	0.0	8.0	21.4	0.0
Cycle Q Clear(g_c), s	15.8	4.7	0.0	7.5	2.6	0.0	11.3	31.0	0.0	8.0	21.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	599	504		325	189		447	2929		330	2686	
V/C Ratio(X)	0.89	0.39		0.78	0.53		0.85	0.83		0.81	0.67	
Avail Cap(c_a), veh/h	644	838		506	679		502	3000		345	2686	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.0	36.7	0.0	41.1	43.4	0.0	39.3	22.4	0.0	41.1	22.2	0.0
Incr Delay (d2), s/veh	13.9	0.5	0.0	4.0	2.3	0.0	12.2	2.0	0.0	13.5	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	2.0	0.0	3.0	1.2	0.0	5.0	11.5	0.0	3.6	7.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.9	37.2	0.0	45.0	45.7	0.0	51.4	24.4	0.0	54.7	22.9	0.0
LnGrp LOS	D	D		D	D		D	C		D	C	
Approach Vol, veh/h		727	A		352	A		2807	A		2076	A
Approach Delay, s/veh		47.2			45.2			28.1			27.0	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.6	47.4	14.4	17.8	18.1	43.8	22.7	9.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	43.9	15.4	22.2	15.3	39.1	19.6	18.0
Max Q Clear Time (g_c+I1), s	10.0	33.0	9.5	6.7	13.3	23.4	17.8	4.6
Green Ext Time (p_c), s	0.1	9.8	0.4	1.0	0.3	11.3	0.4	0.4

Intersection Summary	
HCM 6th Ctrl Delay	31.1
HCM 6th LOS	C

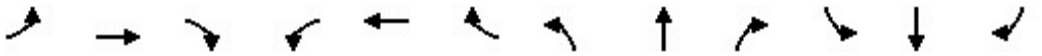
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			55			177			238			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



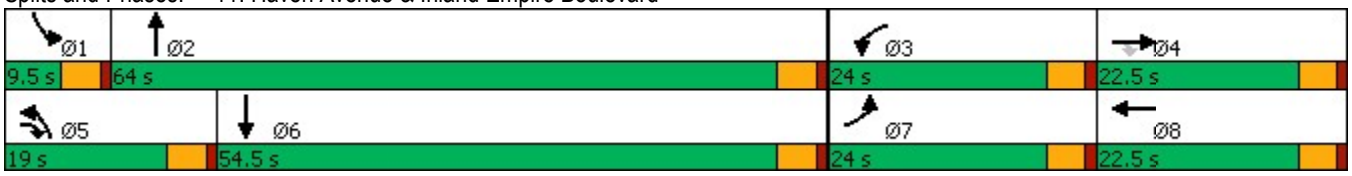
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	278	306	676	893	220	57	492	2692	609	58	3132	151
Future Volume (vph)	278	306	676	893	220	57	492	2692	609	58	3132	151
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	299	329	727	960	237	61	529	2895	655	62	3368	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	299	329	727	960	237	61	529	2895	655	62	3368	162

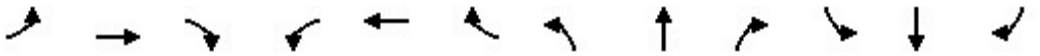
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	278	306	676	893	220	57	492	2692	609	58	3132	151
Future Volume (vph)	278	306	676	893	220	57	492	2692	609	58	3132	151
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	24.0	22.5	19.0	24.0	22.5		19.0	64.0		9.5	54.5	
Total Split (%)	20.0%	18.8%	15.8%	20.0%	18.8%		15.8%	53.3%		7.9%	45.4%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	16.3	15.6	34.6	19.5	18.9	117.7	14.5	61.5	117.7	5.0	50.0	117.7
Actuated g/C Ratio	0.14	0.13	0.29	0.17	0.16	1.00	0.12	0.52	1.00	0.04	0.42	1.00
v/c Ratio	0.71	0.70	1.44	1.38	0.42	0.04	1.40	0.86	0.41	0.48	1.24	0.10
Control Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.8	0.8	68.1	141.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.8	0.8	68.1	141.1	0.1
LOS	E	E	F	F	D	A	F	C	A	E	F	A
Approach Delay		155.5			174.7			50.8			133.5	
Approach LOS		F			F			D			F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.7	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.44	
Intersection Signal Delay: 108.7	Intersection LOS: F
Intersection Capacity Utilization 118.7%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	299	329	727	960	237	61	529	2895	655	62	3368	162
v/c Ratio	0.71	0.70	1.44	1.38	0.42	0.04	1.40	0.86	0.41	0.48	1.24	0.10
Control Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.8	0.8	68.1	141.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	57.3	240.1	217.2	47.6	0.1	233.1	28.8	0.8	68.1	141.1	0.1
Queue Length 50th (ft)	113	127	~723	~345	86	0	~278	561	0	24	~928	0
Queue Length 95th (ft)	160	177	#961	#442	131	0	#395	637	0	48	#1015	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	509	541	504	696	567	1583	378	3348	1583	130	2724	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.61	1.44	1.38	0.42	0.04	1.40	0.86	0.41	0.48	1.24	0.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

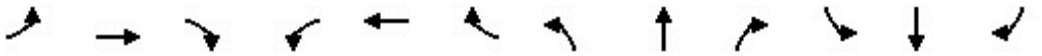
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	278	306	676	893	220	57	492	2692	609	58	3132	151
Future Volume (veh/h)	278	306	676	893	220	57	492	2692	609	58	3132	151
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	299	329	727	960	237	0	529	2895	0	62	3368	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	358	533	429	687	699		374	3224		113	2681	
Arrive On Green	0.12	0.15	0.15	0.16	0.20	0.00	0.12	0.50	0.00	0.04	0.42	0.00
Sat Flow, veh/h	3092	3554	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	299	329	727	960	237	0	529	2895	0	62	3368	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	11.4	10.4	18.0	19.5	6.9	0.0	14.5	49.0	0.0	2.4	50.0	0.0
Cycle Q Clear(g_c), s	11.4	10.4	18.0	19.5	6.9	0.0	14.5	49.0	0.0	2.4	50.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	358	533	429	687	699		374	3224		113	2681	
V/C Ratio(X)	0.83	0.62	1.69	1.40	0.34		1.42	0.90		0.55	1.26	
Avail Cap(c_a), veh/h	502	533	429	687	699		374	3224		129	2681	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.9	47.8	43.7	50.3	41.5	0.0	52.8	27.1	0.0	56.9	35.0	0.0
Incr Delay (d2), s/veh	8.3	2.1	322.0	187.3	0.3	0.0	202.3	3.8	0.0	4.2	118.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	4.8	51.0	18.8	3.1	0.0	16.1	18.9	0.0	1.0	41.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.2	49.9	365.8	237.5	41.8	0.0	255.1	31.0	0.0	61.0	153.5	0.0
LnGrp LOS	E	D	F	F	D		F	C		E	F	
Approach Vol, veh/h		1355			1197	A		3424	A		3430	A
Approach Delay, s/veh		221.7			198.7			65.6			151.9	
Approach LOS		F			F			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.9	64.6	24.0	22.5	19.0	54.5	18.4	28.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	59.5	19.5	18.0	14.5	50.0	19.5	18.0
Max Q Clear Time (g_c+I1), s	4.4	51.0	21.5	20.0	16.5	52.0	13.4	8.9
Green Ext Time (p_c), s	0.0	8.2	0.0	0.0	0.0	0.0	0.5	0.9

Intersection Summary	
HCM 6th Ctrl Delay	136.5
HCM 6th LOS	F

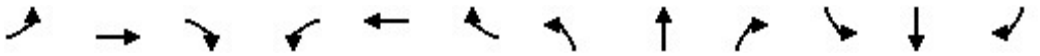
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			397			177			177			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



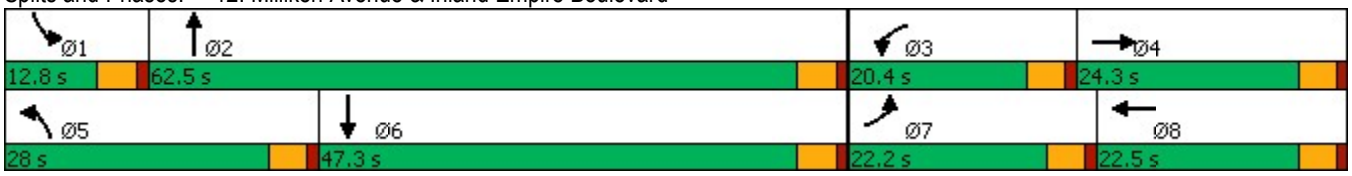
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	412	402	452	297	109	137	548	2316	511	135	2037	166
Future Volume (vph)	412	402	452	297	109	137	548	2316	511	135	2037	166
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	434	423	476	313	115	144	577	2438	538	142	2144	175
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	423	476	313	115	144	577	2438	538	142	2144	175

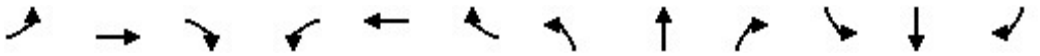
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	412	402	452	297	109	137	548	2316	511	135	2037	166
Future Volume (vph)	412	402	452	297	109	137	548	2316	511	135	2037	166
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	22.2	24.3		20.4	22.5		28.0	62.5		12.8	47.3	
Total Split (%)	18.5%	20.3%		17.0%	18.8%		23.3%	52.1%		10.7%	39.4%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	17.7	18.0	117.4	15.1	15.4	117.4	23.4	58.1	117.4	8.2	42.9	117.4
Actuated g/C Ratio	0.15	0.15	1.00	0.13	0.13	1.00	0.20	0.49	1.00	0.07	0.37	1.00
v/c Ratio	0.94	0.78	0.30	0.79	0.25	0.09	0.94	0.77	0.34	0.67	0.92	0.11
Control Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	26.6	0.6	69.6	43.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	26.6	0.6	69.6	43.3	0.1
LOS	E	E	A	E	D	A	E	C	A	E	D	A
Approach Delay		44.4			45.2			30.0			41.7	
Approach LOS		D			D			C			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.4	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 37.1	Intersection LOS: D
Intersection Capacity Utilization 82.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	434	423	476	313	115	144	577	2438	538	142	2144	175
v/c Ratio	0.94	0.78	0.30	0.79	0.25	0.09	0.94	0.77	0.34	0.67	0.92	0.11
Control Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	26.6	0.6	69.6	43.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.7	58.8	0.5	65.3	46.8	0.1	71.6	26.6	0.6	69.6	43.3	0.1
Queue Length 50th (ft)	173	165	0	121	41	0	229	442	0	56	460	0
Queue Length 95th (ft)	#276	222	0	#184	71	0	#343	492	0	#97	#525	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	463	597	1583	416	543	1583	615	3172	1583	217	2339	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.71	0.30	0.75	0.21	0.09	0.94	0.77	0.34	0.65	0.92	0.11

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	412	402	452	297	109	137	548	2316	511	135	2037	166
Future Volume (veh/h)	412	402	452	297	109	137	548	2316	511	135	2037	166
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	434	423	0	313	115	0	577	2438	0	142	2144	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	482	510		370	381		627	3312		193	2410	
Arrive On Green	0.16	0.14	0.00	0.12	0.11	0.00	0.20	0.51	0.00	0.06	0.37	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	434	423	0	313	115	0	577	2438	0	142	2144	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	15.5	13.1	0.0	11.2	3.4	0.0	20.6	33.4	0.0	5.1	35.3	0.0
Cycle Q Clear(g_c), s	15.5	13.1	0.0	11.2	3.4	0.0	20.6	33.4	0.0	5.1	35.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	482	510		370	381		627	3312		193	2410	
V/C Ratio(X)	0.90	0.83		0.85	0.30		0.92	0.74		0.73	0.89	
Avail Cap(c_a), veh/h	485	624		436	567		644	3312		228	2441	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.8	47.0	0.0	48.6	46.4	0.0	44.1	21.4	0.0	52.0	33.1	0.0
Incr Delay (d2), s/veh	19.6	7.7	0.0	12.7	0.4	0.0	18.4	0.9	0.0	9.8	4.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	6.3	0.0	5.0	1.5	0.0	9.4	12.3	0.0	2.2	14.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.4	54.7	0.0	61.3	46.9	0.0	62.4	22.3	0.0	61.7	37.6	0.0
LnGrp LOS	E	D		E	D		E	C		E	D	
Approach Vol, veh/h		857	A		428	A		3015	A		2286	A
Approach Delay, s/veh		60.6			57.4			30.0			39.1	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.6	62.6	18.0	20.7	27.4	46.7	22.1	16.6
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	8.3	58.0	15.9	19.8	23.5	42.8	17.7	18.0
Max Q Clear Time (g_c+I1), s	7.1	35.4	13.2	15.1	22.6	37.3	17.5	5.4
Green Ext Time (p_c), s	0.0	19.1	0.3	1.1	0.2	5.0	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	38.9
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.984	0.850				
Flt Protected	0.957					
Satd. Flow (prot)	3224	1441	6408	0	0	6408
Flt Permitted	0.957					
Satd. Flow (perm)	3224	1441	6408	0	0	6408
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)						
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	698	440	3167	0	0	3173
Future Volume (vph)	698	440	3167	0	0	3173
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	727	458	3299	0	0	3305
Shared Lane Traffic (%)		19%				
Lane Group Flow (vph)	814	371	3299	0	0	3305

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	698	440	3167	3173
Future Volume (vph)	698	440	3167	3173
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	41.0	41.0
Total Split (%)	36.9%	36.9%	63.1%	63.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	19.0	19.0	36.5	36.5
Actuated g/C Ratio	0.29	0.29	0.57	0.57
v/c Ratio	0.86	0.88	0.91	0.91
Control Delay	32.6	46.0	17.8	17.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.6	46.0	17.8	17.9
LOS	C	D	B	B
Approach Delay	36.8		17.8	17.9
Approach LOS	D		B	B

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 64.5	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 20.8	Intersection LOS: C
Intersection Capacity Utilization 83.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	814	371	3299	3305
v/c Ratio	0.86	0.88	0.91	0.91
Control Delay	32.6	46.0	17.8	17.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.6	46.0	17.8	17.9
Queue Length 50th (ft)	154	150	309	310
Queue Length 95th (ft)	#246	#307	#375	#378
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	975	436	3628	3628
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.83	0.85	0.91	0.91

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

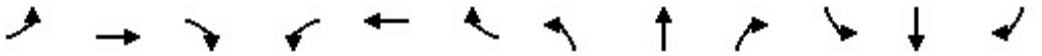
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	698	440	3167	0	0	3173
Future Volume (veh/h)	698	440	3167	0	0	3173
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1772	1870	1870	0	0	1870
Adj Flow Rate, veh/h	786	395	3299	0	0	3305
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	970	456	3677	0	0	3677
Arrive On Green	0.29	0.29	0.57	0.00	0.00	0.57
Sat Flow, veh/h	3375	1585	6958	0	0	6958
Grp Volume(v), veh/h	786	395	3299	0	0	3305
Grp Sat Flow(s),veh/h/ln	1688	1585	1609	0	0	1609
Q Serve(g_s), s	13.8	15.1	28.8	0.0	0.0	28.9
Cycle Q Clear(g_c), s	13.8	15.1	28.8	0.0	0.0	28.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	970	456	3677	0	0	3677
V/C Ratio(X)	0.81	0.87	0.90	0.00	0.00	0.90
Avail Cap(c_a), veh/h	1032	485	3683	0	0	3683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	21.1	21.6	12.0	0.0	0.0	12.0
Incr Delay (d2), s/veh	4.7	14.7	3.3	0.0	0.0	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	7.0	8.8	0.0	0.0	8.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.8	36.2	15.4	0.0	0.0	15.4
LnGrp LOS	C	D	B	A	A	B
Approach Vol, veh/h	1181		3299			3305
Approach Delay, s/veh	29.3		15.4			15.4
Approach LOS	C		B			B

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		40.9			40.9	22.8
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		36.5			36.5	19.5
Max Q Clear Time (g_c+I1), s		30.8			30.9	17.1
Green Ext Time (p_c), s		5.7			5.6	1.2

Intersection Summary	
HCM 6th Ctrl Delay	17.5
HCM 6th LOS	B

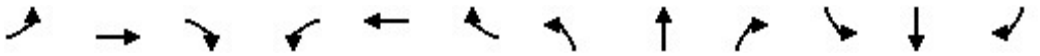
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147			136			182			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



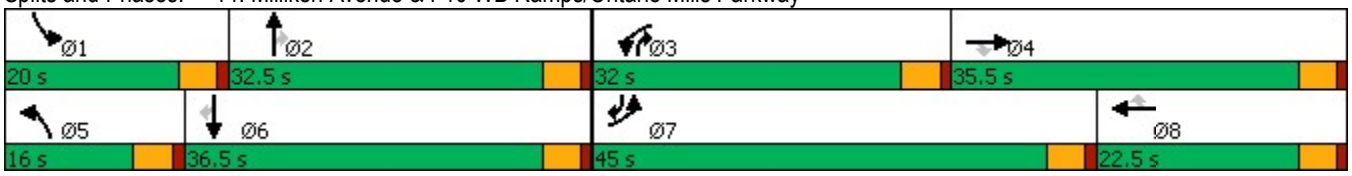
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Future Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1210	286	346	369	439	93	351	1501	660	484	1638	698
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1210	286	346	369	439	93	351	1501	660	484	1638	698

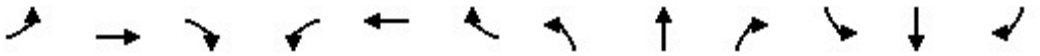
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Future Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	45.0	35.5	35.5	32.0	22.5	22.5	16.0	32.5	32.0	20.0	36.5	45.0
Total Split (%)	37.5%	29.6%	29.6%	26.7%	18.8%	18.8%	13.3%	27.1%	26.7%	16.7%	30.4%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	40.5	36.3	36.3	21.7	17.5	17.5	11.5	28.0	54.2	15.5	32.0	77.0
Actuated g/C Ratio	0.34	0.30	0.30	0.18	0.15	0.15	0.10	0.23	0.45	0.13	0.27	0.64
v/c Ratio	1.16	0.51	0.59	0.66	0.85	0.27	1.19	1.00	0.81	1.22	0.95	0.67
Control Delay	120.5	39.3	25.5	51.0	65.9	4.3	160.0	69.0	28.2	162.4	56.6	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	120.5	39.3	25.5	51.0	65.9	4.3	160.0	69.0	28.2	162.4	56.6	16.2
LOS	F	D	C	D	E	A	F	E	C	F	E	B
Approach Delay		90.0			53.5			71.0			64.8	
Approach LOS		F			D			E			E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.22	
Intersection Signal Delay: 71.2	Intersection LOS: E
Intersection Capacity Utilization 99.4%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1210	286	346	369	439	93	351	1501	660	484	1638	698
v/c Ratio	1.16	0.51	0.59	0.66	0.85	0.27	1.19	1.00	0.81	1.22	0.95	0.67
Control Delay	120.5	39.3	25.5	51.0	65.9	4.3	160.0	69.0	28.2	162.4	56.6	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	120.5	39.3	25.5	51.0	65.9	4.3	160.0	69.0	28.2	162.4	56.6	16.2
Queue Length 50th (ft)	~574	180	128	139	175	0	~169	~342	330	~237	364	292
Queue Length 95th (ft)	#708	288	249	179	#254	18	#266	#429	456	#345	#444	427
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1041	566	583	707	532	354	295	1502	885	398	1716	1039
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.16	0.51	0.59	0.52	0.83	0.26	1.19	1.00	0.75	1.22	0.95	0.67

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Future Volume (veh/h)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	1210	286	346	369	439	93	351	1501	660	484	1638	698
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1053	638	540	439	506	225	299	1515	598	403	1731	966
Arrive On Green	0.34	0.34	0.34	0.14	0.14	0.14	0.10	0.24	0.24	0.13	0.27	0.27
Sat Flow, veh/h	3092	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	1210	286	346	369	439	93	351	1501	660	484	1638	698
Grp Sat Flow(s),veh/h/ln	1546	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	40.5	14.1	21.9	13.8	14.4	6.4	11.5	27.7	28.0	15.5	29.7	32.0
Cycle Q Clear(g_c), s	40.5	14.1	21.9	13.8	14.4	6.4	11.5	27.7	28.0	15.5	29.7	32.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1053	638	540	439	506	225	299	1515	598	403	1731	966
V/C Ratio(X)	1.15	0.45	0.64	0.84	0.87	0.41	1.17	0.99	1.10	1.20	0.95	0.72
Avail Cap(c_a), veh/h	1053	638	540	715	538	240	299	1515	598	403	1731	966
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	39.2	30.5	33.0	49.7	49.9	46.5	53.7	45.3	37.0	51.7	42.6	16.2
Incr Delay (d2), s/veh	78.4	0.5	2.5	4.9	13.6	1.2	107.7	20.9	68.5	112.0	11.4	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.6	6.5	8.7	5.6	7.3	2.6	8.9	13.2	28.3	12.3	13.0	13.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	117.6	31.0	35.6	54.6	63.5	47.7	161.5	66.2	105.5	163.7	54.0	18.9
LnGrp LOS	F	C	D	D	E	D	F	E	F	F	D	B
Approach Vol, veh/h		1842			901			2512			2820	
Approach Delay, s/veh		88.7			58.2			89.8			64.1	
Approach LOS		F			E			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	32.5	21.4	45.0	16.0	36.5	45.0	21.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	15.5	28.0	27.5	31.0	11.5	32.0	40.5	18.0
Max Q Clear Time (g_c+I1), s	17.5	30.0	15.8	23.9	13.5	34.0	42.5	16.4
Green Ext Time (p_c), s	0.0	0.0	1.0	1.8	0.0	0.0	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	77.1
HCM 6th LOS	E

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.993	0.850				
Flt Protected	0.954					
Satd. Flow (prot)	3243	1441	0	6408	6408	0
Flt Permitted	0.954					
Satd. Flow (perm)	3243	1441	0	6408	6408	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	2	2				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

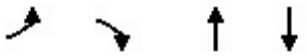
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	746	345	0	3451	2660	0
Future Volume (vph)	746	345	0	3451	2660	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	777	359	0	3595	2771	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	813	323	0	3595	2771	0

Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	746	345	3451	2660
Future Volume (vph)	746	345	3451	2660
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	26.0	26.0	54.0	54.0
Total Split (%)	32.5%	32.5%	67.5%	67.5%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	21.5	21.5	49.5	49.5
Actuated g/C Ratio	0.27	0.27	0.62	0.62
v/c Ratio	0.93	0.83	0.91	0.70
Control Delay	47.7	47.9	17.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	47.7	47.9	17.8	11.5
LOS	D	D	B	B
Approach Delay	47.7		17.8	11.5
Approach LOS	D		B	B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 83.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps



Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	813	323	3595	2771
v/c Ratio	0.93	0.83	0.91	0.70
Control Delay	47.7	47.9	17.8	11.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	47.7	47.9	17.8	11.5
Queue Length 50th (ft)	203	165	406	241
Queue Length 95th (ft)	#316	#319	472	282
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	873	388	3964	3964
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.93	0.83	0.91	0.70

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	746	345	0	3451	2660	0
Future Volume (veh/h)	746	345	0	3451	2660	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1772	1870	0	1870	1870	0
Adj Flow Rate, veh/h	777	359	0	3595	2771	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	877	412	0	4029	4029	0
Arrive On Green	0.26	0.26	0.00	0.63	0.63	0.00
Sat Flow, veh/h	3375	1585	0	6958	6958	0
Grp Volume(v), veh/h	777	359	0	3595	2771	0
Grp Sat Flow(s),veh/h/ln	1688	1585	0	1609	1609	0
Q Serve(g_s), s	17.5	17.1	0.0	37.4	22.3	0.0
Cycle Q Clear(g_c), s	17.5	17.1	0.0	37.4	22.3	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	877	412	0	4029	4029	0
V/C Ratio(X)	0.89	0.87	0.00	0.89	0.69	0.00
Avail Cap(c_a), veh/h	919	432	0	4035	4035	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.1	28.0	0.0	12.5	9.7	0.0
Incr Delay (d2), s/veh	10.1	16.9	0.0	2.9	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	8.1	0.0	11.7	6.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	38.2	44.9	0.0	15.4	10.2	0.0
LnGrp LOS	D	D	A	B	B	A
Approach Vol, veh/h	1136			3595	2771	
Approach Delay, s/veh	40.3			15.4	10.2	
Approach LOS	D			B	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		53.9		25.0		53.9
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		49.5		21.5		49.5
Max Q Clear Time (g_c+I1), s		39.4		19.5		24.3
Green Ext Time (p_c), s		10.1		1.0		22.7

Intersection Summary	
HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1700	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3072	1583	3072	6408	6408	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3072	1583	3072	6408	6408	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				28
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	718	283	456	1701	1435	847
Future Volume (vph)	718	283	456	1701	1435	847
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	740	292	470	1754	1479	873
Shared Lane Traffic (%)						
Lane Group Flow (vph)	740	292	470	1754	1479	873

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	718	283	456	1701	1435	847
Future Volume (vph)	718	283	456	1701	1435	847
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	14.9	14.9	37.5	22.6	22.5
Total Split (%)	37.5%	24.8%	24.8%	62.5%	37.7%	37.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	17.6	32.5	10.4	33.0	18.1	40.2
Actuated g/C Ratio	0.30	0.55	0.17	0.55	0.30	0.67
v/c Ratio	0.82	0.34	0.88	0.49	0.76	0.81
Control Delay	28.7	8.9	44.9	8.8	21.9	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	8.9	44.9	8.8	21.9	14.9
LOS	C	A	D	A	C	B
Approach Delay	23.1			16.4	19.3	
Approach LOS	C			B	B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 59.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 18.9	Intersection LOS: B
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	740	292	470	1754	1479	873
v/c Ratio	0.82	0.34	0.88	0.49	0.76	0.81
Control Delay	28.7	8.9	44.9	8.8	21.9	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	8.9	44.9	8.8	21.9	14.9
Queue Length 50th (ft)	125	52	86	102	139	173
Queue Length 95th (ft)	#207	95	#162	128	177	#452
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	927	863	536	3548	1946	1087
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.34	0.88	0.49	0.76	0.80

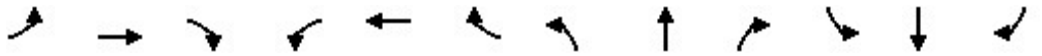
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	718	283	456	1701	1435	847
Future Volume (veh/h)	718	283	456	1701	1435	847
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1870	1673	1870	1870	1870
Adj Flow Rate, veh/h	740	292	470	1754	1479	873
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	870	728	550	3632	1992	937
Arrive On Green	0.28	0.28	0.18	0.56	0.31	0.31
Sat Flow, veh/h	3092	1585	3092	6696	6696	1585
Grp Volume(v), veh/h	740	292	470	1754	1479	873
Grp Sat Flow(s),veh/h/ln	1546	1585	1546	1609	1609	1585
Q Serve(g_s), s	13.2	7.1	8.6	9.5	12.0	18.1
Cycle Q Clear(g_c), s	13.2	7.1	8.6	9.5	12.0	18.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	870	728	550	3632	1992	937
V/C Ratio(X)	0.85	0.40	0.85	0.48	0.74	0.93
Avail Cap(c_a), veh/h	952	770	550	3632	1992	937
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.8	10.5	23.3	7.6	18.1	8.6
Incr Delay (d2), s/veh	6.9	0.4	12.5	0.1	1.5	15.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	7.4	3.8	2.5	4.2	15.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	26.8	10.8	35.7	7.7	19.6	24.1
LnGrp LOS	C	B	D	A	B	C
Approach Vol, veh/h	1032			2224	2352	
Approach Delay, s/veh	22.2			13.6	21.3	
Approach LOS	C			B	C	

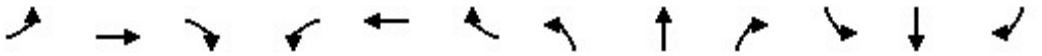
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		37.5		21.0	14.9	22.6
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		33.0		18.0	10.4	18.1
Max Q Clear Time (g_c+I1), s		11.5		15.2	10.6	20.1
Green Ext Time (p_c), s		13.8		1.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	295		235	360		185	180		0
Storage Lanes	2		0	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	0.91	0.97	0.95	1.00	0.97	0.91	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt		0.964				0.850			0.850		0.990	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	4902	0	3072	3539	1583	3072	5085	1583	3072	6344	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	4902	0	3072	3539	1583	3072	5085	1583	3072	6344	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		75				260			268		15	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1151			2626			1045			955	
Travel Time (s)		26.2			59.7			23.8			21.7	

Intersection Summary	
Area Type:	Other



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	73	787	250	371	748	266	306	1607	521	276	1562	111
Future Volume (vph)	73	787	250	371	748	266	306	1607	521	276	1562	111
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	78	837	266	395	796	283	326	1710	554	294	1662	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	1103	0	395	796	283	326	1710	554	294	1780	0

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	73	787	371	748	266	306	1607	521	276	1562
Future Volume (vph)	73	787	371	748	266	306	1607	521	276	1562
Turn Type	Prot	NA	Prot	NA	Perm	Prot	NA	Free	Prot	NA
Protected Phases	7	4	3	8		5	2		1	6
Permitted Phases					8			Free		
Detector Phase	7	4	3	8	8	5	2		1	6
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	9.5	22.5		9.5	22.5
Total Split (s)	9.5	27.6	17.0	35.1	35.1	21.0	40.4		15.0	34.4
Total Split (%)	9.5%	27.6%	17.0%	35.1%	35.1%	21.0%	40.4%		15.0%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
Recall Mode	None	None	None	None	None	None	Max		None	Max
Act Effct Green (s)	5.0	23.1	12.5	32.5	32.5	14.8	35.9	100.0	10.5	31.6
Actuated g/C Ratio	0.05	0.23	0.12	0.32	0.32	0.15	0.36	1.00	0.10	0.32
v/c Ratio	0.51	0.93	1.03	0.69	0.41	0.72	0.94	0.35	0.91	0.88
Control Delay	58.3	49.2	97.6	33.8	6.5	49.7	42.1	0.6	77.7	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	49.2	97.6	33.8	6.5	49.7	42.1	0.6	77.7	39.1
LOS	E	D	F	C	A	D	D	A	E	D
Approach Delay		49.8		45.7			34.2			44.6
Approach LOS		D		D			C			D

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 42.0	Intersection LOS: D
Intersection Capacity Utilization 87.5%	ICU Level of Service E
Analysis Period (min) 15	

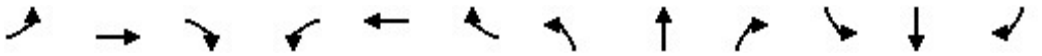
Splits and Phases: 1: Haven Avenue & 4th Street

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	78	1103	395	796	283	326	1710	554	294	1780
v/c Ratio	0.51	0.93	1.03	0.69	0.41	0.72	0.94	0.35	0.91	0.88
Control Delay	58.3	49.2	97.6	33.8	6.5	49.7	42.1	0.6	77.7	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	49.2	97.6	33.8	6.5	49.7	42.1	0.6	77.7	39.1
Queue Length 50th (ft)	25	238	~139	238	10	102	380	0	97	313
Queue Length 95th (ft)	50	#324	#234	308	71	147	#485	0	#175	#394
Internal Link Dist (ft)		1071		2546			965			875
Turn Bay Length (ft)	170		295		235	360		185	180	
Base Capacity (vph)	153	1190	384	1149	689	506	1825	1583	322	2012
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.93	1.03	0.69	0.41	0.64	0.94	0.35	0.91	0.88

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



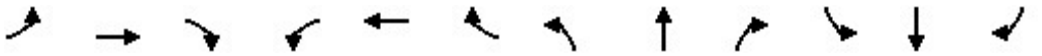
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	73	787	250	371	748	266	306	1607	521	276	1562	111
Future Volume (veh/h)	73	787	250	371	748	266	306	1607	521	276	1562	111
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	78	837	266	395	796	283	326	1710	0	294	1662	118
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	137	888	280	386	1108	494	394	1833		325	2079	148
Arrive On Green	0.04	0.23	0.23	0.13	0.31	0.31	0.13	0.36	0.00	0.10	0.34	0.34
Sat Flow, veh/h	3092	3842	1214	3092	3554	1585	3092	5106	1585	3092	6178	439
Grp Volume(v), veh/h	78	741	362	395	796	283	326	1710	0	294	1298	482
Grp Sat Flow(s),veh/h/ln	1546	1702	1652	1546	1777	1585	1546	1702	1585	1546	1609	1791
Q Serve(g_s), s	2.5	21.4	21.6	12.5	19.9	15.0	10.3	32.3	0.0	9.4	24.4	24.4
Cycle Q Clear(g_c), s	2.5	21.4	21.6	12.5	19.9	15.0	10.3	32.3	0.0	9.4	24.4	24.4
Prop In Lane	1.00		0.73	1.00		1.00	1.00		1.00	1.00		0.24
Lane Grp Cap(c), veh/h	137	786	382	386	1108	494	394	1833		325	1624	603
V/C Ratio(X)	0.57	0.94	0.95	1.02	0.72	0.57	0.83	0.93		0.91	0.80	0.80
Avail Cap(c_a), veh/h	155	786	382	386	1108	494	510	1833		325	1624	603
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.9	37.8	37.9	43.8	30.5	28.8	42.6	30.9	0.0	44.3	30.1	30.1
Incr Delay (d2), s/veh	3.8	19.4	33.0	51.5	2.3	1.6	8.5	10.2	0.0	27.5	4.2	10.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	10.9	12.1	7.5	8.7	5.8	4.4	14.5	0.0	4.8	9.8	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.7	57.2	70.9	95.2	32.8	30.4	51.1	41.1	0.0	71.8	34.3	40.8
LnGrp LOS	D	E	E	F	C	C	D	D		E	C	D
Approach Vol, veh/h		1181			1474			2036	A		2074	
Approach Delay, s/veh		61.0			49.1			42.7			41.1	
Approach LOS		E			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.0	40.4	17.0	27.6	17.2	38.2	8.9	35.7
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	35.9	12.5	23.1	16.5	29.9	5.0	30.6
Max Q Clear Time (g_c+I1), s	11.4	34.3	14.5	23.6	12.3	26.4	4.5	21.9
Green Ext Time (p_c), s	0.0	1.4	0.0	0.0	0.5	2.9	0.0	4.2

Intersection Summary	
HCM 6th Ctrl Delay	46.8
HCM 6th LOS	D

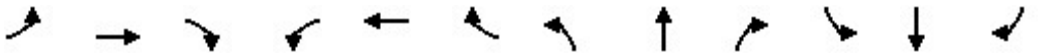
Notes

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		0	130		145	165		165	50		0
Storage Lanes	1		0	1		1	1		1	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.86	0.86	1.00	0.91	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Ped Bike Factor												
Frt		0.994				0.850			0.850		0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1765	6369	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1765	6369	0	1676	5085	1583	1676	1863	1583	1676	3008	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				172			200		264	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2626			442			349			438	
Travel Time (s)		59.7			10.0			7.9			10.0	

Intersection Summary	
Area Type:	Other



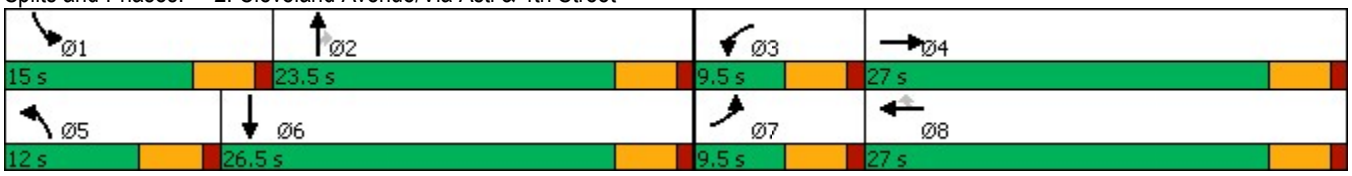
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	0	1639	66	4	1307	177	59	0	6	174	0	1
Future Volume (vph)	0	1639	66	4	1307	177	59	0	6	174	0	1
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	1690	68	4	1347	182	61	0	6	179	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1758	0	4	1347	182	61	0	6	179	1	0

Intersection Summary

Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT	Ø7
Lane Configurations									
Traffic Volume (vph)	1639	4	1307	177	59	6	174	0	
Future Volume (vph)	1639	4	1307	177	59	6	174	0	
Turn Type	NA	Prot	NA	Perm	Prot	Perm	Prot	NA	
Protected Phases	4	3	8		5		1	6	7
Permitted Phases				8		2			
Detector Phase	4	3	8	8	5	2	1	6	
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	22.5	22.5	9.5	22.5	9.5	22.5	9.5
Total Split (s)	27.0	9.5	27.0	27.0	12.0	23.5	15.0	26.5	9.5
Total Split (%)	36.0%	12.7%	36.0%	36.0%	16.0%	31.3%	20.0%	35.3%	13%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	None
Act Effct Green (s)	22.6	5.0	24.3	24.3	6.8	5.5	9.9	13.0	
Actuated g/C Ratio	0.42	0.09	0.46	0.46	0.13	0.10	0.19	0.24	
v/c Ratio	0.65	0.03	0.58	0.22	0.29	0.02	0.57	0.00	
Control Delay	14.1	24.5	11.9	2.7	25.9	0.2	29.5	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	14.1	24.5	11.9	2.7	25.9	0.2	29.5	0.0	
LOS	B	C	B	A	C	A	C	A	
Approach Delay	14.1		10.9					29.3	
Approach LOS	B		B					C	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 53.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 50.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Cleveland Avenue/Via Asti & 4th Street



Lane Group	EBT	WBL	WBT	WBR	NBL	NBR	SBL	SBT
Lane Group Flow (vph)	1758	4	1347	182	61	6	179	1
v/c Ratio	0.65	0.03	0.58	0.22	0.29	0.02	0.57	0.00
Control Delay	14.1	24.5	11.9	2.7	25.9	0.2	29.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.1	24.5	11.9	2.7	25.9	0.2	29.5	0.0
Queue Length 50th (ft)	114	1	109	2	17	0	49	0
Queue Length 95th (ft)	201	9	143	26	52	0	#135	0
Internal Link Dist (ft)	2546		362					358
Turn Bay Length (ft)		130		145	165	165	50	
Base Capacity (vph)	2709	158	2315	814	236	695	332	1402
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.03	0.58	0.22	0.26	0.01	0.54	0.00

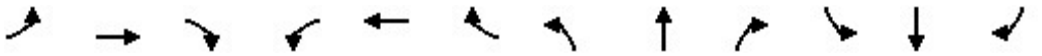
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	1639	66	4	1307	177	59	0	6	174	0	1
Future Volume (veh/h)	0	1639	66	4	1307	177	59	0	6	174	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	0	1690	68	4	1347	182	61	0	6	179	0	1
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	3	2561	103	9	2533	786	96	187	159	225	314	280
Arrive On Green	0.00	0.40	0.40	0.01	0.50	0.50	0.06	0.00	0.10	0.13	0.00	0.18
Sat Flow, veh/h	1688	6392	257	1688	5106	1585	1688	1870	1585	1688	1777	1585
Grp Volume(v), veh/h	0	1276	482	4	1347	182	61	0	6	179	0	1
Grp Sat Flow(s),veh/h/ln	1688	1609	1824	1688	1702	1585	1688	1870	1585	1688	1777	1585
Q Serve(g_s), s	0.0	10.8	10.8	0.1	9.0	3.3	1.8	0.0	0.2	5.1	0.0	0.0
Cycle Q Clear(g_c), s	0.0	10.8	10.8	0.1	9.0	3.3	1.8	0.0	0.2	5.1	0.0	0.0
Prop In Lane	1.00		0.14	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	3	1933	731	9	2533	786	96	187	159	225	314	280
V/C Ratio(X)	0.00	0.66	0.66	0.44	0.53	0.23	0.63	0.00	0.04	0.79	0.00	0.00
Avail Cap(c_a), veh/h	169	2173	822	169	2533	786	253	711	603	355	782	698
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	12.2	12.2	24.8	8.6	7.2	23.0	0.0	20.3	21.0	0.0	17.0
Incr Delay (d2), s/veh	0.0	0.6	1.7	29.8	0.2	0.1	6.7	0.0	0.1	6.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.3	3.9	0.1	2.6	0.9	0.8	0.0	0.1	2.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.8	13.9	54.6	8.8	7.3	29.7	0.0	20.4	27.4	0.0	17.0
LnGrp LOS	A	B	B	D	A	A	C	A	C	C	A	B
Approach Vol, veh/h		1758			1533			67			180	
Approach Delay, s/veh		13.1			8.8			28.9			27.3	
Approach LOS		B			A			C			C	

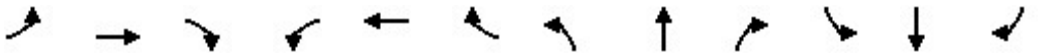
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.2	9.5	4.8	24.5	7.4	13.3	0.0	29.3
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	19.0	5.0	22.5	7.5	22.0	5.0	22.5
Max Q Clear Time (g_c+I1), s	7.1	2.2	2.1	12.8	3.8	2.0	0.0	11.0
Green Ext Time (p_c), s	0.1	0.0	0.0	7.3	0.0	0.0	0.0	7.3

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	220		0	125		0	115		115	0		110
Storage Lanes	2		0	1		0	1		1	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.86	0.86	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.999			0.992				0.850			0.850
Flt Protected	0.950			0.950			0.950				0.953	
Satd. Flow (prot)	3072	6401	0	1676	5045	0	1676	1863	1583	0	1775	1583
Flt Permitted	0.950			0.950			0.712				0.729	
Satd. Flow (perm)	3072	6401	0	1676	5045	0	1256	1863	1583	0	1358	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			15				218			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		442			508			382			458	
Travel Time (s)		10.0			11.5			8.7			10.4	

Intersection Summary	
Area Type:	Other



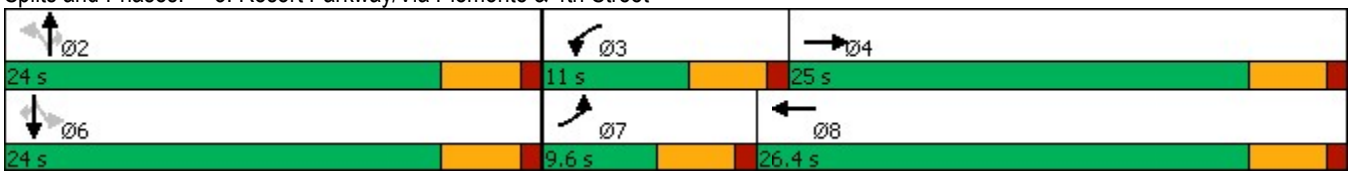
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	16	1611	12	67	1238	66	33	0	41	66	1	22
Future Volume (vph)	16	1611	12	67	1238	66	33	0	41	66	1	22
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	16	1661	12	69	1276	68	34	0	42	68	1	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	1673	0	69	1344	0	34	0	42	0	69	23

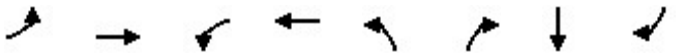
Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	16	1611	67	1238	33	41	66	1	22
Future Volume (vph)	16	1611	67	1238	33	41	66	1	22
Turn Type	Prot	NA	Prot	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	7	4	3	8				6	
Permitted Phases					2	2	6		6
Detector Phase	7	4	3	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	9.6	25.0	11.0	26.4	24.0	24.0	24.0	24.0	24.0
Total Split (%)	16.0%	41.7%	18.3%	44.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5
Lead/Lag	Lead	Lag	Lead	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min	Min
Act Effct Green (s)	5.3	20.5	6.4	24.6	7.7	7.7		7.7	7.7
Actuated g/C Ratio	0.12	0.47	0.15	0.57	0.18	0.18		0.18	0.18
v/c Ratio	0.04	0.55	0.28	0.47	0.15	0.09		0.29	0.06
Control Delay	20.7	10.3	22.5	6.9	18.7	0.4		20.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	20.7	10.3	22.5	6.9	18.7	0.4		20.6	0.3
LOS	C	B	C	A	B	A		C	A
Approach Delay		10.4		7.6				15.5	
Approach LOS		B		A				B	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 43.3	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 9.3	Intersection LOS: A
Intersection Capacity Utilization 51.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Resort Parkway/Via Piemonte & 4th Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBR	SBT	SBR
Lane Group Flow (vph)	16	1673	69	1344	34	42	69	23
v/c Ratio	0.04	0.55	0.28	0.47	0.15	0.09	0.29	0.06
Control Delay	20.7	10.3	22.5	6.9	18.7	0.4	20.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	10.3	22.5	6.9	18.7	0.4	20.6	0.3
Queue Length 50th (ft)	2	98	18	48	8	0	17	0
Queue Length 95th (ft)	9	145	49	145	27	0	45	0
Internal Link Dist (ft)		362		428			378	
Turn Bay Length (ft)	220		125		115	115		110
Base Capacity (vph)	375	3144	260	3050	586	855	634	797
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.53	0.27	0.44	0.06	0.05	0.11	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	1611	12	67	1238	66	33	0	41	66	1	22
Future Volume (veh/h)	16	1611	12	67	1238	66	33	0	41	66	1	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	16	1661	12	69	1276	68	34	0	42	68	1	23
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	63	2963	21	115	2451	131	301	246	208	364	4	208
Arrive On Green	0.02	0.45	0.45	0.07	0.49	0.49	0.13	0.00	0.13	0.13	0.13	0.13
Sat Flow, veh/h	3092	6639	48	1688	4962	264	1314	1870	1585	1342	31	1585
Grp Volume(v), veh/h	16	1207	466	69	875	469	34	0	42	69	0	23
Grp Sat Flow(s),veh/h/ln	1546	1609	1862	1688	1702	1823	1314	1870	1585	1373	0	1585
Q Serve(g_s), s	0.2	7.0	7.0	1.5	6.7	6.7	0.9	0.0	0.9	1.7	0.0	0.5
Cycle Q Clear(g_c), s	0.2	7.0	7.0	1.5	6.7	6.7	2.7	0.0	0.9	1.7	0.0	0.5
Prop In Lane	1.00		0.03	1.00		0.15	1.00		1.00	0.99		1.00
Lane Grp Cap(c), veh/h	63	2154	831	115	1681	900	301	246	208	368	0	208
V/C Ratio(X)	0.25	0.56	0.56	0.60	0.52	0.52	0.11	0.00	0.20	0.19	0.00	0.11
Avail Cap(c_a), veh/h	414	2597	1002	288	1957	1048	802	957	811	889	0	811
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.4	7.8	7.8	17.2	6.6	6.6	16.4	0.0	14.8	15.1	0.0	14.6
Incr Delay (d2), s/veh	2.1	0.2	0.6	5.0	0.3	0.5	0.2	0.0	0.5	0.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.6	2.0	0.7	1.5	1.7	0.3	0.0	0.3	0.5	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.4	8.0	8.4	22.2	6.8	7.0	16.5	0.0	15.2	15.4	0.0	14.8
LnGrp LOS	C	A	A	C	A	A	B	A	B	B	A	B
Approach Vol, veh/h		1689			1413			76			92	
Approach Delay, s/veh		8.2			7.6			15.8			15.2	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		9.5	7.1	21.5		9.5	5.3	23.3				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	4.5				
Max Green Setting (Gmax), s		19.5	6.5	20.5		19.5	5.1	21.9				
Max Q Clear Time (g_c+I1), s		4.7	3.5	9.0		3.7	2.2	8.7				
Green Ext Time (p_c), s		0.1	0.0	8.0		0.3	0.0	7.4				

Intersection Summary	
HCM 6th Ctrl Delay	8.4
HCM 6th LOS	A

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			25		25	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Ped Bike Factor						
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	5040	0	0	5085	0	1611
Flt Permitted						
Satd. Flow (perm)	5040	0	0	5085	0	1611
Link Speed (mph)	30			30	30	
Link Distance (ft)	508			1697	354	
Travel Time (s)	11.5			38.6	8.0	

Intersection Summary	
Area Type:	Other

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1613	105	0	1400	0	51
Future Volume (vph)	1613	105	0	1400	0	51
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1698	111	0	1474	0	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1809	0	0	1474	0	54

Intersection Summary

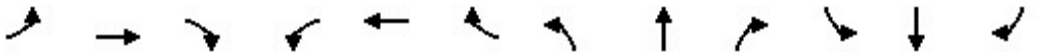
Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1613	105	0	1400	0	51
Future Vol, veh/h	1613	105	0	1400	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1698	111	0	1474	0	54

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	905
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	-	-	0	-	0	240
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	240
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

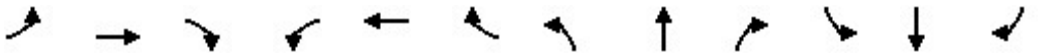
Approach	EB	WB	NB
HCM Control Delay, s	0	0	24.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	240	-	-	-
HCM Lane V/C Ratio	0.224	-	-	-
HCM Control Delay (s)	24.3	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.8	-	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	230		190	405		440	330		320	310		0
Storage Lanes	2		1	2		1	2		1	2		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	0.86
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6260	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	3072	6408	1583	3072	6260	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			245			294			95		37	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1697			3633			1030			781	
Travel Time (s)		38.6			82.6			23.4			17.8	

Intersection Summary	
Area Type:	Other



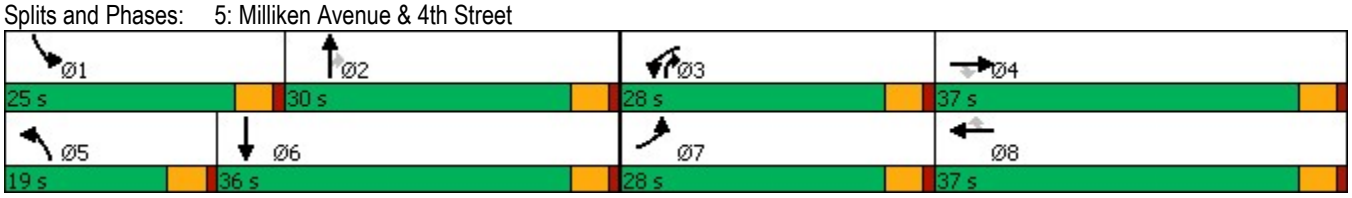
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	383	1344	403	754	987	389	328	1224	525	546	1185	213
Future Volume (vph)	383	1344	403	754	987	389	328	1224	525	546	1185	213
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	403	1415	424	794	1039	409	345	1288	553	575	1247	224
Shared Lane Traffic (%)												
Lane Group Flow (vph)	403	1415	424	794	1039	409	345	1288	553	575	1471	0

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Traffic Volume (vph)	383	1344	403	754	987	389	328	1224	525	546	1185
Future Volume (vph)	383	1344	403	754	987	389	328	1224	525	546	1185
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA
Protected Phases	7	4		3	8		5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phase	7	4	4	3	8	8	5	2	3	1	6
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5
Total Split (s)	28.0	37.0	37.0	28.0	37.0	37.0	19.0	30.0	28.0	25.0	36.0
Total Split (%)	23.3%	30.8%	30.8%	23.3%	30.8%	30.8%	15.8%	25.0%	23.3%	20.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min
Act Effct Green (s)	20.3	32.5	32.5	23.5	35.7	35.7	14.5	25.5	53.5	20.5	31.5
Actuated g/C Ratio	0.17	0.27	0.27	0.20	0.30	0.30	0.12	0.21	0.45	0.17	0.26
v/c Ratio	0.78	1.03	0.70	1.32	0.69	0.60	0.93	0.95	0.73	1.10	0.88
Control Delay	58.2	74.7	23.0	194.6	40.6	14.7	84.5	61.3	29.0	114.8	48.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.2	74.7	23.0	194.6	40.6	14.7	84.5	61.3	29.0	114.8	48.6
LOS	E	E	C	F	D	B	F	E	C	F	D
Approach Delay		61.9			90.4			56.8			67.2
Approach LOS		E			F			E			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.32	
Intersection Signal Delay: 69.2	Intersection LOS: E
Intersection Capacity Utilization 100.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Milliken Avenue & 4th Street

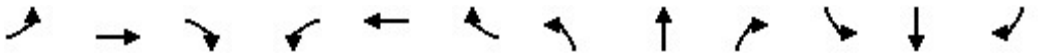


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	403	1415	424	794	1039	409	345	1288	553	575	1471
v/c Ratio	0.78	1.03	0.70	1.32	0.69	0.60	0.93	0.95	0.73	1.10	0.88
Control Delay	58.2	74.7	23.0	194.6	40.6	14.7	84.5	61.3	29.0	114.8	48.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.2	74.7	23.0	194.6	40.6	14.7	84.5	61.3	29.0	114.8	48.6
Queue Length 50th (ft)	154	~428	125	~409	262	69	138	288	290	~259	311
Queue Length 95th (ft)	205	#525	248	#533	324	185	#228	#360	435	#373	359
Internal Link Dist (ft)		1617			3553			950			701
Turn Bay Length (ft)	230		190	405		440	330		320	310	
Base Capacity (vph)	601	1377	607	601	1512	677	371	1361	758	524	1670
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	1.03	0.70	1.32	0.69	0.60	0.93	0.95	0.73	1.10	0.88

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

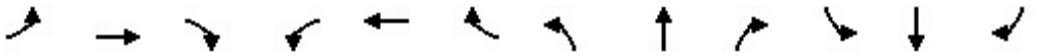
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	383	1344	403	754	987	389	328	1224	525	546	1185	213
Future Volume (veh/h)	383	1344	403	754	987	389	328	1224	525	546	1185	213
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	403	1415	424	794	1039	409	345	1288	553	575	1247	224
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	466	1383	429	606	1613	501	374	1367	647	528	1452	259
Arrive On Green	0.15	0.27	0.27	0.20	0.32	0.32	0.12	0.21	0.21	0.17	0.26	0.26
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	3092	6434	1585	3092	5530	988
Grp Volume(v), veh/h	403	1415	424	794	1039	409	345	1288	553	575	1087	384
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1546	1609	1585	1546	1609	1692
Q Serve(g_s), s	15.3	32.5	32.0	23.5	21.0	28.5	13.3	23.7	25.5	20.5	25.7	25.9
Cycle Q Clear(g_c), s	15.3	32.5	32.0	23.5	21.0	28.5	13.3	23.7	25.5	20.5	25.7	25.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	466	1383	429	606	1613	501	374	1367	647	528	1267	444
V/C Ratio(X)	0.86	1.02	0.99	1.31	0.64	0.82	0.92	0.94	0.85	1.09	0.86	0.86
Avail Cap(c_a), veh/h	606	1383	429	606	1613	501	374	1367	647	528	1267	444
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.8	43.8	43.6	48.3	35.2	37.8	52.2	46.5	32.3	49.8	42.1	42.2
Incr Delay (d2), s/veh	10.1	30.3	40.1	151.7	0.9	10.2	28.1	13.0	10.8	65.4	6.1	16.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	17.4	17.2	21.8	8.8	12.4	6.6	10.6	16.2	12.7	10.9	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.9	74.0	83.6	199.9	36.1	48.0	80.3	59.5	43.1	115.1	48.2	58.2
LnGrp LOS	E	F	F	F	D	D	F	E	D	F	D	E
Approach Vol, veh/h		2242			2242			2186			2046	
Approach Delay, s/veh		73.3			96.3			58.6			68.9	
Approach LOS		E			F			E			E	

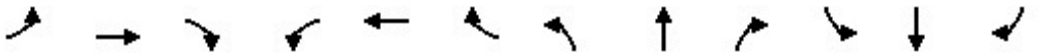
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	25.0	30.0	28.0	37.0	19.0	36.0	22.6	42.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	20.5	25.5	23.5	32.5	14.5	31.5	23.5	32.5
Max Q Clear Time (g_c+I1), s	22.5	27.5	25.5	34.5	15.3	27.9	17.3	30.5
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	2.7	0.8	1.5

Intersection Summary	
HCM 6th Ctrl Delay	74.5
HCM 6th LOS	E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	665		240	260		110	245		275	140		140
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850			0.850			0.850		0.946	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3207	1441
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	5085	1583	3072	5085	1583	1676	3539	1583	1676	3207	1441
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			128			224			354		85	397
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3633			915			558			544	
Travel Time (s)		82.6			20.8			12.7			12.4	

Intersection Summary	
Area Type:	Other



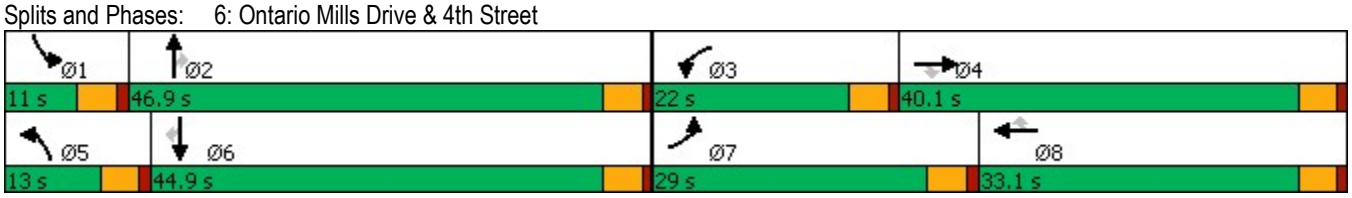
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1023	1556	219	574	1257	589	255	446	683	110	884	1122
Future Volume (vph)	1023	1556	219	574	1257	589	255	446	683	110	884	1122
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1066	1621	228	598	1309	614	266	465	711	115	921	1169
Shared Lane Traffic (%)												44%
Lane Group Flow (vph)	1066	1621	228	598	1309	614	266	465	711	115	1435	655

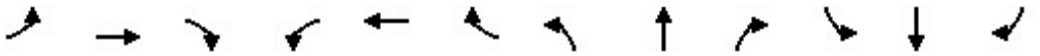
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1023	1556	219	574	1257	589	255	446	683	110	884	1122
Future Volume (vph)	1023	1556	219	574	1257	589	255	446	683	110	884	1122
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	22.5
Total Split (s)	29.0	40.1	40.1	22.0	33.1	33.1	13.0	46.9	46.9	11.0	44.9	44.9
Total Split (%)	24.2%	33.4%	33.4%	18.3%	27.6%	27.6%	10.8%	39.1%	39.1%	9.2%	37.4%	37.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	24.5	35.6	35.6	17.5	28.6	28.6	8.5	42.4	42.4	6.5	40.4	40.4
Actuated g/C Ratio	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
v/c Ratio	1.70	1.07	0.41	1.33	1.08	1.12	2.25	0.37	0.90	1.28	1.26	0.88
Control Delay	352.9	86.7	16.9	205.3	94.0	104.2	616.4	30.0	34.4	231.7	158.6	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	352.9	86.7	16.9	205.3	94.0	104.2	616.4	30.0	34.4	231.7	158.6	28.6
LOS	F	F	B	F	F	F	F	C	C	F	F	C
Approach Delay		178.6			122.9			140.3			123.8	
Approach LOS		F			F			F			F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.25	
Intersection Signal Delay: 143.7	Intersection LOS: F
Intersection Capacity Utilization 123.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 6: Ontario Mills Drive & 4th Street



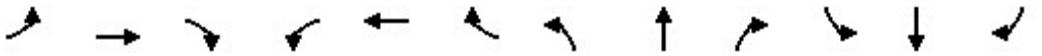


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1066	1621	228	598	1309	614	266	465	711	115	1435	655
v/c Ratio	1.70	1.07	0.41	1.33	1.08	1.12	2.25	0.37	0.90	1.28	1.26	0.88
Control Delay	352.9	86.7	16.9	205.3	94.0	104.2	616.4	30.0	34.4	231.7	158.6	28.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	352.9	86.7	16.9	205.3	94.0	104.2	616.4	30.0	34.4	231.7	158.6	28.6
Queue Length 50th (ft)	~625	~511	58	~310	~415	~408	~333	140	296	~112	~746	232
Queue Length 95th (ft)	#756	#609	131	#425	#511	#636	#504	186	#556	#235	#893	#508
Internal Link Dist (ft)		3553			835			478			464	
Turn Bay Length (ft)	665		240	260		110	245		275	140		140
Base Capacity (vph)	627	1508	559	448	1211	547	118	1250	788	90	1136	748
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.70	1.07	0.41	1.33	1.08	1.12	2.25	0.37	0.90	1.28	1.26	0.88

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



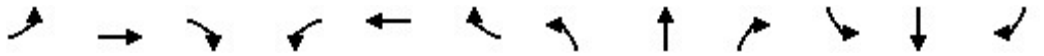
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1023	1556	219	574	1257	589	255	446	683	110	884	1122
Future Volume (veh/h)	1023	1556	219	574	1257	589	255	446	683	110	884	1122
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	1066	1621	228	598	1309	614	266	465	711	115	921	1169
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	631	1515	470	451	1217	378	120	1256	560	91	630	1067
Arrive On Green	0.20	0.30	0.30	0.15	0.24	0.24	0.07	0.35	0.35	0.05	0.34	0.34
Sat Flow, veh/h	3092	5106	1585	3092	5106	1585	1688	3554	1585	1688	1870	3170
Grp Volume(v), veh/h	1066	1621	228	598	1309	614	266	465	711	115	921	1169
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1546	1702	1585	1688	1777	1585	1688	1870	1585
Q Serve(g_s), s	24.5	35.6	14.2	17.5	28.6	28.6	8.5	11.7	42.4	6.5	40.4	40.4
Cycle Q Clear(g_c), s	24.5	35.6	14.2	17.5	28.6	28.6	8.5	11.7	42.4	6.5	40.4	40.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	631	1515	470	451	1217	378	120	1256	560	91	630	1067
V/C Ratio(X)	1.69	1.07	0.48	1.33	1.08	1.63	2.23	0.37	1.27	1.26	1.46	1.10
Avail Cap(c_a), veh/h	631	1515	470	451	1217	378	120	1256	560	91	630	1067
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.8	42.2	34.7	51.2	45.7	45.7	55.7	28.9	38.8	56.8	39.8	39.8
Incr Delay (d2), s/veh	316.7	44.4	0.8	161.5	48.7	293.3	577.5	0.2	134.9	178.6	216.9	57.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	37.1	21.0	5.6	16.9	17.5	41.9	22.8	5.0	37.1	7.3	56.2	24.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	364.5	86.6	35.4	212.8	94.4	339.0	633.2	29.1	173.7	235.3	256.7	97.2
LnGrp LOS	F	F	D	F	F	F	F	C	F	F	F	F
Approach Vol, veh/h		2915			2521			1442			2205	
Approach Delay, s/veh		184.2			182.1			211.8			171.0	
Approach LOS		F			F			F			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	46.9	22.0	40.1	13.0	44.9	29.0	33.1
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	6.5	42.4	17.5	35.6	8.5	40.4	24.5	28.6
Max Q Clear Time (g_c+I1), s	8.5	44.4	19.5	37.6	10.5	42.4	26.5	30.6
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	184.8
HCM 6th LOS	F

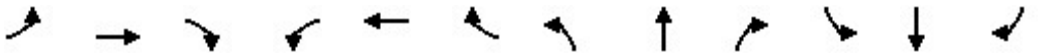
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1800
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		120	240		0	100		0	145		145
Storage Lanes	2		1	1		0	1		0	1		2
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	0.91	1.00	0.95	0.95	0.95	0.95	0.88
Ped Bike Factor												
Frt			0.850		0.982			0.939				0.850
Flt Protected	0.950			0.950			0.950			0.950	0.987	
Satd. Flow (prot)	3072	5085	1583	1676	4994	0	1676	3323	0	1593	1747	2640
Flt Permitted	0.950			0.950			0.950			0.950	0.987	
Satd. Flow (perm)	3072	5085	1583	1676	4994	0	1676	3323	0	1593	1747	2640
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			138		18			70				298
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			1496			309			544	
Travel Time (s)		20.8			34.0			7.0			12.4	

Intersection Summary	
Area Type:	Other



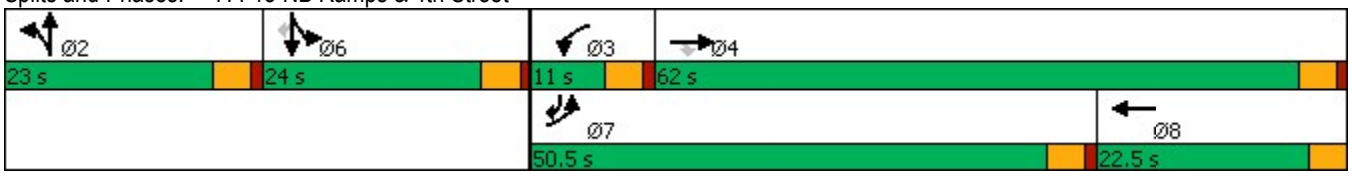
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1456	693	130	45	770	107	133	95	66	175	106	1588
Future Volume (vph)	1456	693	130	45	770	107	133	95	66	175	106	1588
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1549	737	138	48	819	114	141	101	70	186	113	1689
Shared Lane Traffic (%)										21%		
Lane Group Flow (vph)	1549	737	138	48	933	0	141	171	0	147	152	1689

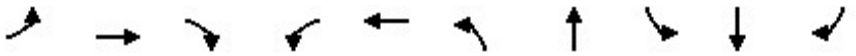
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	1456	693	130	45	770	133	95	175	106	1588
Future Volume (vph)	1456	693	130	45	770	133	95	175	106	1588
Turn Type	Prot	NA	Perm	Prot	NA	Split	NA	Split	NA	pm+ov
Protected Phases	7	4		3	8	2	2	6	6	7
Permitted Phases			4							6
Detector Phase	7	4	4	3	8	2	2	6	6	7
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5	22.5	9.5
Total Split (s)	50.5	62.0	62.0	11.0	22.5	23.0	23.0	24.0	24.0	50.5
Total Split (%)	42.1%	51.7%	51.7%	9.2%	18.8%	19.2%	19.2%	20.0%	20.0%	42.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	3.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	46.2	60.2	60.2	6.3	19.1	14.1	14.1	15.0	15.0	65.7
Actuated g/C Ratio	0.41	0.54	0.54	0.06	0.17	0.13	0.13	0.13	0.13	0.59
v/c Ratio	1.22	0.27	0.15	0.51	1.07	0.67	0.35	0.69	0.65	1.01
Control Delay	135.8	15.7	3.2	72.4	95.7	62.5	28.2	63.7	59.7	43.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	135.8	15.7	3.2	72.4	95.7	62.5	28.2	63.7	59.7	43.5
LOS	F	B	A	E	F	E	C	E	E	D
Approach Delay		91.7			94.6		43.7		46.2	
Approach LOS		F			F		D		D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.22	
Intersection Signal Delay: 73.7	Intersection LOS: E
Intersection Capacity Utilization 94.5%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: I-15 NB Ramps & 4th Street



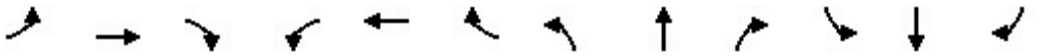


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	1549	737	138	48	933	141	171	147	152	1689
v/c Ratio	1.22	0.27	0.15	0.51	1.07	0.67	0.35	0.69	0.65	1.01
Control Delay	135.8	15.7	3.2	72.4	95.7	62.5	28.2	63.7	59.7	43.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	135.8	15.7	3.2	72.4	95.7	62.5	28.2	63.7	59.7	43.5
Queue Length 50th (ft)	~713	106	0	34	~273	98	34	107	110	~609
Queue Length 95th (ft)	#935	153	34	#86	#402	171	70	185	189	#878
Internal Link Dist (ft)		835			1416		229		464	
Turn Bay Length (ft)	200		120	240		100		145		145
Base Capacity (vph)	1273	2746	918	98	869	279	612	279	306	1678
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.22	0.27	0.15	0.49	1.07	0.51	0.28	0.53	0.50	1.01

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1456	693	130	45	770	107	133	95	66	175	106	1588
Future Volume (veh/h)	1456	693	130	45	770	107	133	95	66	175	106	1588
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1772	1870	1870	1772	1870	1870	1772	1870	1772
Adj Flow Rate, veh/h	1549	737	138	48	819	114	141	101	70	150	164	1689
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1241	2712	842	60	752	104	179	220	141	287	318	1716
Arrive On Green	0.40	0.53	0.53	0.04	0.17	0.17	0.11	0.11	0.11	0.17	0.17	0.17
Sat Flow, veh/h	3092	5106	1585	1688	4534	627	1688	2076	1332	1688	1870	3003
Grp Volume(v), veh/h	1549	737	138	48	614	319	141	85	86	150	164	1689
Grp Sat Flow(s),veh/h/ln	1546	1702	1585	1688	1702	1757	1688	1777	1631	1688	1870	1502
Q Serve(g_s), s	46.0	9.1	5.1	3.2	19.0	19.0	9.3	5.2	5.7	9.3	9.1	19.5
Cycle Q Clear(g_c), s	46.0	9.1	5.1	3.2	19.0	19.0	9.3	5.2	5.7	9.3	9.1	19.5
Prop In Lane	1.00		1.00	1.00		0.36	1.00		0.82	1.00		1.00
Lane Grp Cap(c), veh/h	1241	2712	842	60	564	291	179	188	173	287	318	1716
V/C Ratio(X)	1.25	0.27	0.16	0.79	1.09	1.10	0.79	0.45	0.50	0.52	0.52	0.98
Avail Cap(c_a), veh/h	1241	2712	842	96	564	291	272	287	263	287	318	1716
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.3	14.7	13.8	54.8	47.8	47.8	50.0	48.1	48.4	43.3	43.3	24.1
Incr Delay (d2), s/veh	118.7	0.1	0.1	20.5	63.9	81.0	8.5	1.7	2.2	1.7	1.4	18.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	37.2	3.5	1.8	1.7	13.0	14.8	4.4	2.4	2.4	4.0	4.4	25.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	153.0	14.8	13.9	75.4	111.7	128.8	58.5	49.8	50.6	45.0	44.7	42.1
LnGrp LOS	F	B	B	E	F	F	E	D	D	D	D	D
Approach Vol, veh/h		2424			981			312			2003	
Approach Delay, s/veh		103.0			115.5			53.9			42.5	
Approach LOS		F			F			D			D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.6	8.6	65.4		24.0	50.5	23.5				
Change Period (Y+Rc), s		4.5	4.5	4.5		4.5	4.5	* 4.5				
Max Green Setting (Gmax), s		18.5	6.5	57.5		19.5	46.0	* 19				
Max Q Clear Time (g_c+I1), s		11.3	5.2	11.1		21.5	48.0	21.0				
Green Ext Time (p_c), s		0.8	0.0	6.7		0.0	0.0	0.0				

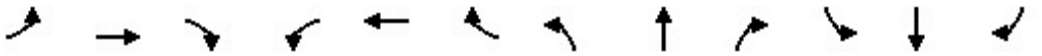
Intersection Summary		
HCM 6th Ctrl Delay		81.3
HCM 6th LOS		F

Notes

User approved volume balancing among the lanes for turning movement.

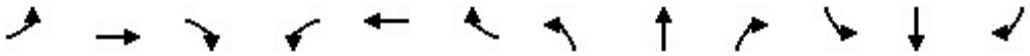
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	190		50	225		190	240		295	130		225
Storage Lanes	2		0	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	0.95	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt		0.902				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3192	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3192	0	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70				236			245			236
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		535			701			973			1045	
Travel Time (s)		12.2			15.9			22.1			23.8	

Intersection Summary	
Area Type:	Other



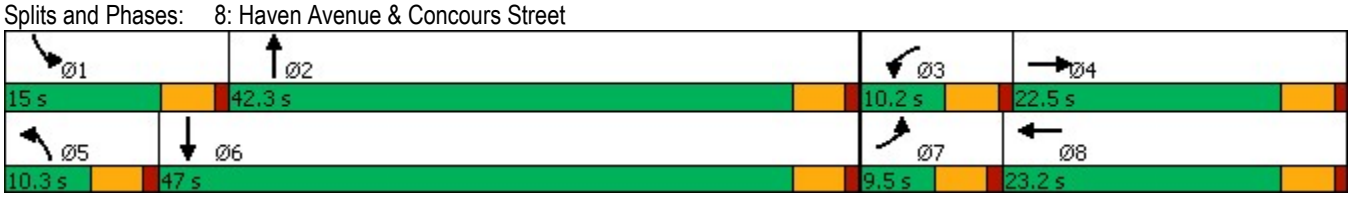
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	17	35	66	195	76	84	63	2234	310	274	2107	44
Future Volume (vph)	17	35	66	195	76	84	63	2234	310	274	2107	44
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	18	37	70	207	81	89	67	2377	330	291	2241	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	107	0	207	81	89	67	2377	330	291	2241	47

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	17	35	195	76	84	63	2234	310	274	2107	44
Future Volume (vph)	17	35	195	76	84	63	2234	310	274	2107	44
Turn Type	Prot	NA	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	3	8		5	2		1	6	
Permitted Phases					Free			Free			Free
Detector Phase	7	4	3	8		5	2		1	6	
Switch Phase											
Minimum Initial (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	9.5	22.5	10.2	23.2		10.3	42.3		15.0	47.0	
Total Split (%)	10.6%	25.0%	11.3%	25.8%		11.4%	47.0%		16.7%	52.2%	
Yellow Time (s)	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	5.0	6.6	5.7	12.7	76.3	5.8	38.0	76.3	10.2	44.8	76.3
Actuated g/C Ratio	0.07	0.09	0.07	0.17	1.00	0.08	0.50	1.00	0.13	0.59	1.00
v/c Ratio	0.09	0.32	0.66	0.14	0.06	0.29	0.75	0.21	0.71	0.60	0.03
Control Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.9	0.3	43.1	12.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.9	0.3	43.1	12.3	0.0
LOS	D	B	D	C	A	D	B	A	D	B	A
Approach Delay		20.2		31.8			16.3			15.6	
Approach LOS		C		C			B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 76.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 63.4%	ICU Level of Service B
Analysis Period (min) 15	

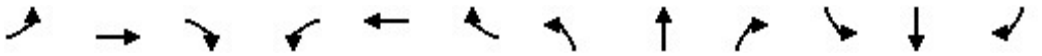
Splits and Phases: 8: Haven Avenue & Concours Street



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	18	107	207	81	89	67	2377	330	291	2241	47
v/c Ratio	0.09	0.32	0.66	0.14	0.06	0.29	0.75	0.21	0.71	0.60	0.03
Control Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.9	0.3	43.1	12.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	17.5	46.6	28.6	0.1	38.4	17.9	0.3	43.1	12.3	0.0
Queue Length 50th (ft)	4	8	35	16	0	16	263	0	71	207	0
Queue Length 95th (ft)	14	32	#68	40	0	36	329	0	#126	262	0
Internal Link Dist (ft)		455		621			893			965	
Turn Bay Length (ft)	190		225		190	240		295	130		225
Base Capacity (vph)	202	809	315	871	1583	234	3188	1583	424	3760	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.13	0.66	0.09	0.06	0.29	0.75	0.21	0.69	0.60	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



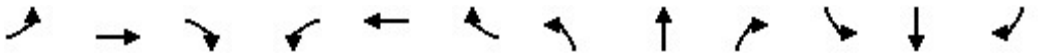
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	35	66	195	76	84	63	2234	310	274	2107	44
Future Volume (veh/h)	17	35	66	195	76	84	63	2234	310	274	2107	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	18	37	70	207	81	0	67	2377	0	291	2241	0
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	65	131	117	312	450		156	3144		373	3595	
Arrive On Green	0.02	0.07	0.07	0.07	0.13	0.00	0.05	0.49	0.00	0.12	0.56	0.00
Sat Flow, veh/h	3092	1777	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	18	37	70	207	81	0	67	2377	0	291	2241	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	0.4	1.5	3.2	3.5	1.5	0.0	1.6	22.2	0.0	6.8	17.5	0.0
Cycle Q Clear(g_c), s	0.4	1.5	3.2	3.5	1.5	0.0	1.6	22.2	0.0	6.8	17.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	65	131	117	312	450		156	3144		373	3595	
V/C Ratio(X)	0.28	0.28	0.60	0.66	0.18		0.43	0.76		0.78	0.62	
Avail Cap(c_a), veh/h	209	432	385	326	898		242	3285		439	3693	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	35.7	32.4	33.2	33.4	28.9	0.0	34.1	15.4	0.0	31.6	11.1	0.0
Incr Delay (d2), s/veh	2.3	1.2	4.8	4.7	0.2	0.0	1.9	1.0	0.0	7.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.7	1.3	1.3	0.6	0.0	0.6	7.4	0.0	2.8	5.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.0	33.6	38.0	38.1	29.1	0.0	36.0	16.3	0.0	39.1	11.4	0.0
LnGrp LOS	D	C	D	D	C		D	B		D	B	
Approach Vol, veh/h		125			288	A		2444	A		2532	A
Approach Delay, s/veh		36.7			35.6			16.9			14.6	
Approach LOS		D			D			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.4	40.7	10.0	10.0	8.2	45.9	6.0	13.9
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	10.5	37.8	5.7	18.0	5.8	42.5	5.0	18.7
Max Q Clear Time (g_c+I1), s	8.8	24.2	5.5	5.2	3.6	19.5	2.4	3.5
Green Ext Time (p_c), s	0.2	12.0	0.0	0.4	0.0	18.2	0.0	0.3

Intersection Summary	
HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

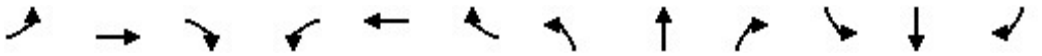
Notes

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900	1800	1900	1900	1800	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	170		0	0		0	115		0	120		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Ped Bike Factor												
Frt		0.993									0.947	
Flt Protected	0.950	0.954					0.950					
Satd. Flow (prot)	1593	1676	0	0	1863	0	1676	5085	0	1765	4816	0
Flt Permitted	0.950	0.954					0.950					
Satd. Flow (perm)	1593	1676	0	0	1863	0	1676	5085	0	1765	4816	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		143									161	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		399			148			191			256	
Travel Time (s)		9.1			3.4			4.3			5.8	

Intersection Summary	
Area Type:	Other



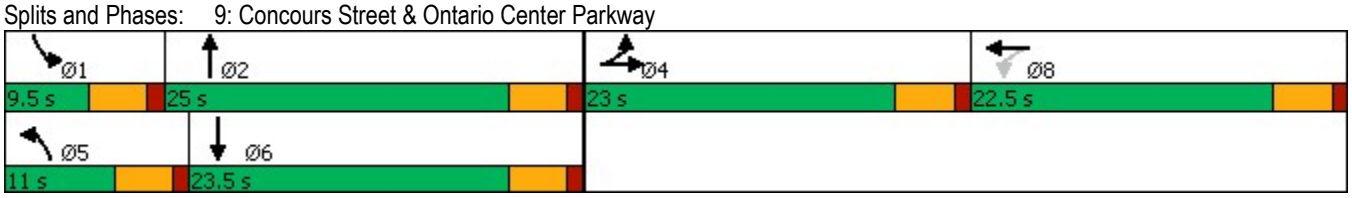
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	162	0	4	0	0	0	37	424	1	0	316	172
Future Volume (vph)	162	0	4	0	0	0	37	424	1	0	316	172
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	180	0	4	0	0	0	41	471	1	0	351	191
Shared Lane Traffic (%)	49%											
Lane Group Flow (vph)	92	92	0	0	0	0	41	472	0	0	542	0

Intersection Summary

Lane Group	EBL	EBT	NBL	NBT	SBT	Ø1	Ø8
Lane Configurations							
Traffic Volume (vph)	162	0	37	424	316		
Future Volume (vph)	162	0	37	424	316		
Turn Type	Split	NA	Prot	NA	NA		
Protected Phases	4	4	5	2	6	1	8
Permitted Phases							
Detector Phase	4	4	5	2	6		
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	9.5	22.5
Total Split (s)	23.0	23.0	11.0	25.0	23.5	9.5	22.5
Total Split (%)	28.8%	28.8%	13.8%	31.3%	29.4%	12%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		
Lead/Lag			Lead	Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	Min	Min	None	None
Act Effct Green (s)	7.8	7.8	6.3	17.2	15.7		
Actuated g/C Ratio	0.25	0.25	0.20	0.56	0.51		
v/c Ratio	0.23	0.17	0.12	0.17	0.21		
Control Delay	11.8	2.4	13.1	5.0	5.5		
Queue Delay	0.0	0.0	0.0	0.0	0.0		
Total Delay	11.8	2.4	13.1	5.0	5.5		
LOS	B	A	B	A	A		
Approach Delay		7.1		5.6	5.5		
Approach LOS		A		A	A		

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 30.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.23	
Intersection Signal Delay: 5.8	Intersection LOS: A
Intersection Capacity Utilization 30.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Concours Street & Ontario Center Parkway



Lane Group	EBL	EBT	NBL	NBT	SBT
Lane Group Flow (vph)	92	92	41	472	542
v/c Ratio	0.23	0.17	0.12	0.17	0.21
Control Delay	11.8	2.4	13.1	5.0	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.8	2.4	13.1	5.0	5.5
Queue Length 50th (ft)	9	0	4	13	11
Queue Length 95th (ft)	48	14	28	28	45
Internal Link Dist (ft)		319		111	176
Turn Bay Length (ft)	170		115		
Base Capacity (vph)	991	1097	366	3777	3372
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.08	0.11	0.12	0.16

Intersection Summary

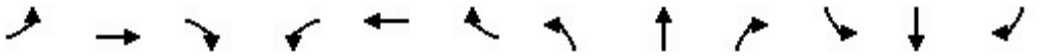
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	162	0	4	0	0	0	37	424	1	0	316	172
Future Volume (veh/h)	162	0	4	0	0	0	37	424	1	0	316	172
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1870	1870	1870	1870	1870	1772	1870	1870	1772	1870	1870
Adj Flow Rate, veh/h	184	0	0	0	0	0	41	471	1	0	351	191
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	477	264	0	0	7	0	83	2702	6	6	993	462
Arrive On Green	0.14	0.00	0.00	0.00	0.00	0.00	0.05	0.51	0.51	0.00	0.29	0.29
Sat Flow, veh/h	3375	1870	0	0	1870	0	1688	5261	11	1688	3404	1585
Grp Volume(v), veh/h	184	0	0	0	0	0	41	305	167	0	351	191
Grp Sat Flow(s),veh/h/ln	1688	1870	0	0	1870	0	1688	1702	1868	1688	1702	1585
Q Serve(g_s), s	1.3	0.0	0.0	0.0	0.0	0.0	0.6	1.2	1.2	0.0	2.1	2.5
Cycle Q Clear(g_c), s	1.3	0.0	0.0	0.0	0.0	0.0	0.6	1.2	1.2	0.0	2.1	2.5
Prop In Lane	1.00		0.00	0.00		0.00	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	477	264	0	0	7	0	83	1748	959	6	993	462
V/C Ratio(X)	0.39	0.00	0.00	0.00	0.00	0.00	0.49	0.17	0.17	0.00	0.35	0.41
Avail Cap(c_a), veh/h	2395	1327	0	0	1291	0	421	2677	1469	324	2481	1155
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	10.2	0.0	0.0	0.0	0.0	0.0	12.1	3.4	3.4	0.0	7.3	7.4
Incr Delay (d2), s/veh	0.5	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.1	0.0	0.2	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.0	0.5	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.7	0.0	0.0	0.0	0.0	0.0	16.5	3.4	3.5	0.0	7.5	8.0
LnGrp LOS	B	A	A	A	A	A	B	A	A	A	A	A
Approach Vol, veh/h		184			0			513			542	
Approach Delay, s/veh		10.7			0.0			4.5			7.7	
Approach LOS		B						A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	0.0	17.9		8.2	5.8	12.1		0.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.0	20.5		18.5	6.5	19.0		18.0				
Max Q Clear Time (g_c+I1), s	0.0	3.2		3.3	2.6	4.5		0.0				
Green Ext Time (p_c), s	0.0	2.7		0.5	0.0	3.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

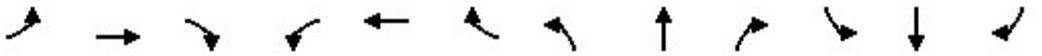
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	200		280	140		135	235		135	225		160
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			382			243			215			270
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		635			349			993			1030	
Travel Time (s)		14.4			7.9			22.6			23.4	

Intersection Summary	
Area Type:	Other



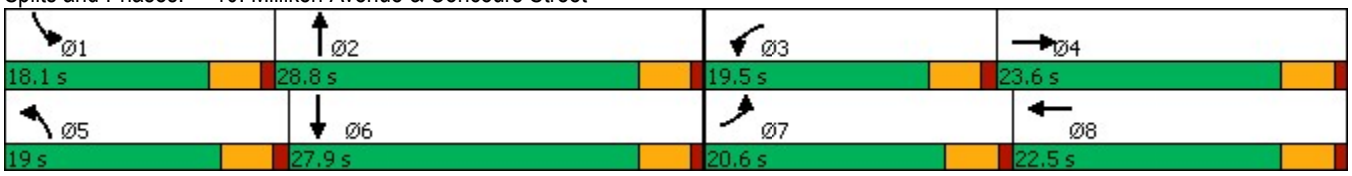
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	466	219	355	366	143	226	417	1400	341	393	1406	374
Future Volume (vph)	466	219	355	366	143	226	417	1400	341	393	1406	374
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	501	235	382	394	154	243	448	1505	367	423	1512	402
Shared Lane Traffic (%)												
Lane Group Flow (vph)	501	235	382	394	154	243	448	1505	367	423	1512	402

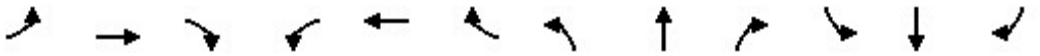
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	466	219	355	366	143	226	417	1400	341	393	1406	374
Future Volume (vph)	466	219	355	366	143	226	417	1400	341	393	1406	374
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	20.6	23.6		19.5	22.5		19.0	28.8		18.1	27.9	
Total Split (%)	22.9%	26.2%		21.7%	25.0%		21.1%	32.0%		20.1%	31.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	15.8	11.3	81.2	14.0	9.4	81.2	14.3	24.3	81.2	13.6	23.5	81.2
Actuated g/C Ratio	0.19	0.14	1.00	0.17	0.12	1.00	0.18	0.30	1.00	0.17	0.29	1.00
v/c Ratio	0.84	0.48	0.24	0.74	0.37	0.15	0.83	0.78	0.23	0.82	0.81	0.25
Control Delay	45.9	36.0	0.4	41.6	35.7	0.2	47.3	29.9	0.3	48.4	31.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.9	36.0	0.4	41.6	35.7	0.2	47.3	29.9	0.3	48.4	31.5	0.4
LOS	D	D	A	D	D	A	D	C	A	D	C	A
Approach Delay		28.3			27.7			28.5			29.2	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 28.6	Intersection LOS: C
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 10: Milliken Avenue & Concours Street

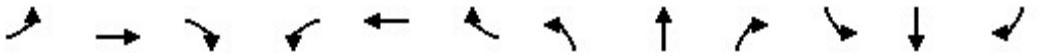




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	501	235	382	394	154	243	448	1505	367	423	1512	402
v/c Ratio	0.84	0.48	0.24	0.74	0.37	0.15	0.83	0.78	0.23	0.82	0.81	0.25
Control Delay	45.9	36.0	0.4	41.6	35.7	0.2	47.3	29.9	0.3	48.4	31.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.9	36.0	0.4	41.6	35.7	0.2	47.3	29.9	0.3	48.4	31.5	0.4
Queue Length 50th (ft)	127	60	0	97	38	0	114	203	0	108	208	0
Queue Length 95th (ft)	#216	94	0	#151	67	0	#198	259	0	#192	265	0
Internal Link Dist (ft)		555			269			913			950	
Turn Bay Length (ft)	200		280	140		135	235		135	225		160
Base Capacity (vph)	609	833	1583	567	785	1583	548	1919	1583	514	1858	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.28	0.24	0.69	0.20	0.15	0.82	0.78	0.23	0.82	0.81	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



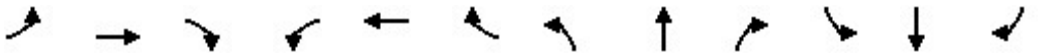
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	466	219	355	366	143	226	417	1400	341	393	1406	374
Future Volume (veh/h)	466	219	355	366	143	226	417	1400	341	393	1406	374
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	501	235	0	394	154	0	448	1505	0	423	1512	0
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	594	398		491	280		538	2016		511	1959	
Arrive On Green	0.19	0.11	0.00	0.16	0.08	0.00	0.17	0.31	0.00	0.17	0.30	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	501	235	0	394	154	0	448	1505	0	423	1512	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	11.2	4.5	0.0	8.8	3.0	0.0	10.1	15.1	0.0	9.5	15.3	0.0
Cycle Q Clear(g_c), s	11.2	4.5	0.0	8.8	3.0	0.0	10.1	15.1	0.0	9.5	15.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	594	398		491	280		538	2016		511	1959	
V/C Ratio(X)	0.84	0.59		0.80	0.55		0.83	0.75		0.83	0.77	
Avail Cap(c_a), veh/h	693	945		646	890		624	2176		585	2096	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.0	30.3	0.0	29.1	31.9	0.0	28.7	22.1	0.0	29.0	22.7	0.0
Incr Delay (d2), s/veh	8.2	1.4	0.0	5.5	1.7	0.0	8.4	1.3	0.0	8.6	1.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	1.9	0.0	3.5	1.3	0.0	4.2	5.5	0.0	4.0	5.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.2	31.7	0.0	34.6	33.6	0.0	37.0	23.5	0.0	37.6	24.4	0.0
LnGrp LOS	D	C		C	C		D	C		D	C	
Approach Vol, veh/h		736	A		548	A		1953	A		1935	A
Approach Delay, s/veh		34.8			34.3			26.6			27.3	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.4	27.0	15.9	12.6	17.0	26.4	18.3	10.2
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	13.6	24.3	15.0	19.1	14.5	23.4	16.1	18.0
Max Q Clear Time (g_c+I1), s	11.5	17.1	10.8	6.5	12.1	17.3	13.2	5.0
Green Ext Time (p_c), s	0.4	5.3	0.6	1.1	0.4	4.5	0.6	0.7

Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

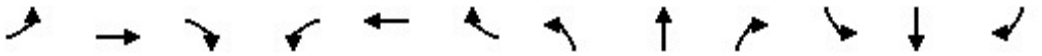
Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1600	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	130		130	290		230	490		230	145		250
Storage Lanes	2		1	3		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.94	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	4202	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			73			182			466			182
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		545			678			1034			973	
Travel Time (s)		12.4			15.4			23.5			22.1	

Intersection Summary	
Area Type:	Other



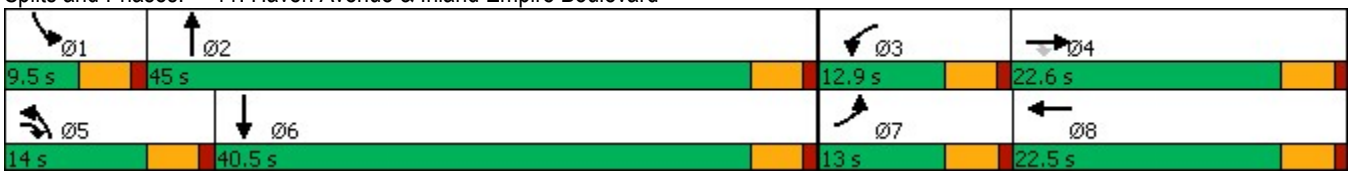
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	224	176	367	265	173	99	252	2404	798	77	2115	199
Future Volume (vph)	224	176	367	265	173	99	252	2404	798	77	2115	199
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	231	181	378	273	178	102	260	2478	823	79	2180	205
Shared Lane Traffic (%)												
Lane Group Flow (vph)	231	181	378	273	178	102	260	2478	823	79	2180	205

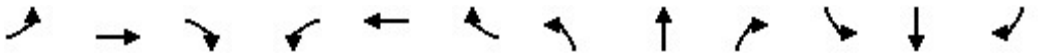
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	176	367	265	173	99	252	2404	798	77	2115	199
Future Volume (vph)	224	176	367	265	173	99	252	2404	798	77	2115	199
Turn Type	Prot	NA	pm+ov	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4			Free			Free			Free
Detector Phase	7	4	5	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	9.5	9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	13.0	22.6	14.0	12.9	22.5		14.0	45.0		9.5	40.5	
Total Split (%)	14.4%	25.1%	15.6%	14.3%	25.0%		15.6%	50.0%		10.6%	45.0%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	8.5	9.6	23.5	8.3	9.4	81.4	9.4	42.4	81.4	5.0	36.0	81.4
Actuated g/C Ratio	0.10	0.12	0.29	0.10	0.12	1.00	0.12	0.52	1.00	0.06	0.44	1.00
v/c Ratio	0.72	0.43	0.74	0.64	0.44	0.06	0.73	0.74	0.52	0.42	0.77	0.13
Control Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.7	1.2	44.5	21.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.7	1.2	44.5	21.7	0.2
LOS	D	D	C	D	D	A	D	B	A	D	C	A
Approach Delay		37.8			33.0			16.2			20.6	
Approach LOS		D			C			B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 21.2	Intersection LOS: C
Intersection Capacity Utilization 70.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 11: Haven Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	231	181	378	273	178	102	260	2478	823	79	2180	205
v/c Ratio	0.72	0.43	0.74	0.64	0.44	0.06	0.73	0.74	0.52	0.42	0.77	0.13
Control Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.7	1.2	44.5	21.7	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	36.7	30.9	42.7	36.9	0.1	48.6	17.7	1.2	44.5	21.7	0.2
Queue Length 50th (ft)	59	45	140	48	45	0	67	284	0	20	263	0
Queue Length 95th (ft)	#114	76	241	76	76	0	#124	356	0	43	328	0
Internal Link Dist (ft)		465			598			954			893	
Turn Bay Length (ft)	130		130	290		230	490		230	145		250
Base Capacity (vph)	320	787	510	434	783	1583	358	3340	1583	188	2836	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.23	0.74	0.63	0.23	0.06	0.73	0.74	0.52	0.42	0.77	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	224	176	367	265	173	99	252	2404	798	77	2115	199
Future Volume (veh/h)	224	176	367	265	173	99	252	2404	798	77	2115	199
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1575	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	231	181	378	273	178	0	260	2478	0	79	2180	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	295	729	491	366	697		324	2934		150	2571	
Arrive On Green	0.10	0.21	0.21	0.09	0.20	0.00	0.10	0.46	0.00	0.05	0.40	0.00
Sat Flow, veh/h	3092	3554	1585	4230	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	231	181	378	273	178	0	260	2478	0	79	2180	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1410	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	6.4	3.8	18.1	5.6	3.7	0.0	7.3	30.1	0.0	2.2	27.2	0.0
Cycle Q Clear(g_c), s	6.4	3.8	18.1	5.6	3.7	0.0	7.3	30.1	0.0	2.2	27.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	295	729	491	366	697		324	2934		150	2571	
V/C Ratio(X)	0.78	0.25	0.77	0.75	0.26		0.80	0.84		0.53	0.85	
Avail Cap(c_a), veh/h	298	729	491	402	725		333	2952		175	2624	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.0	29.4	27.6	39.4	30.0	0.0	38.6	21.2	0.0	41.0	24.1	0.0
Incr Delay (d2), s/veh	12.6	0.2	7.3	6.7	0.2	0.0	12.9	2.4	0.0	2.9	2.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	1.6	8.0	2.1	1.6	0.0	3.3	11.0	0.0	0.9	10.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.7	29.6	34.9	46.1	30.2	0.0	51.5	23.7	0.0	43.9	26.8	0.0
LnGrp LOS	D	C	C	D	C		D	C		D	C	
Approach Vol, veh/h		790			451	A		2738	A		2259	A
Approach Delay, s/veh		38.6			39.8			26.3			27.4	
Approach LOS		D			D			C			C	

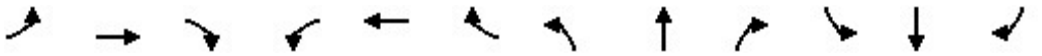
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.8	44.8	12.1	22.6	13.8	39.8	12.9	21.8
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	40.5	8.4	18.1	9.5	36.0	8.5	18.0
Max Q Clear Time (g_c+I1), s	4.2	32.1	7.6	20.1	9.3	29.2	8.4	5.7
Green Ext Time (p_c), s	0.0	7.8	0.1	0.0	0.0	6.1	0.0	0.8

Intersection Summary	
HCM 6th Ctrl Delay	29.2
HCM 6th LOS	C

Notes

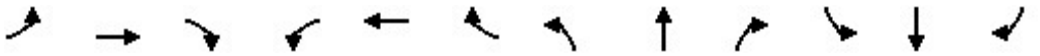
User approved changes to right turn type.

Unsignalized Delay for [NBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	125		130	255		210	330		160	200		120
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	3539	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			354			197			564			193
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		523			447			1114			993	
Travel Time (s)		11.9			10.2			25.3			22.6	

Intersection Summary	
Area Type:	Other



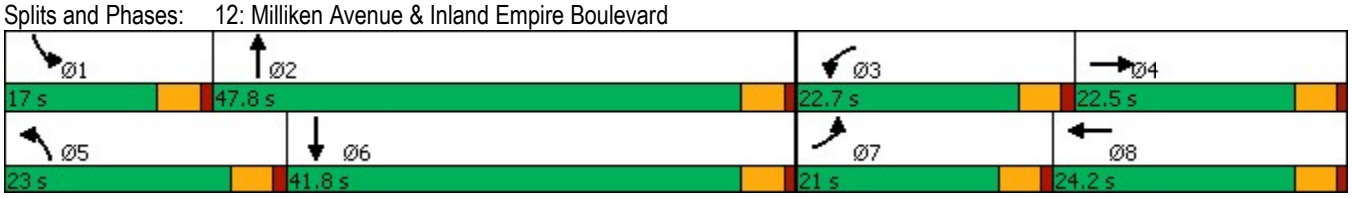
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	251	417	382	504	195	191	488	1643	1112	200	1948	157
Future Volume (vph)	251	417	382	504	195	191	488	1643	1112	200	1948	157
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	259	430	394	520	201	197	503	1694	1146	206	2008	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	430	394	520	201	197	503	1694	1146	206	2008	162

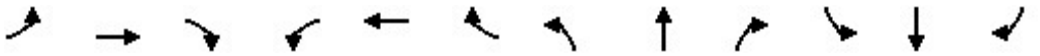
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	251	417	382	504	195	191	488	1643	1112	200	1948	157
Future Volume (vph)	251	417	382	504	195	191	488	1643	1112	200	1948	157
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			Free			Free			Free			Free
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5		9.5	22.5		9.5	22.5		9.5	22.5	
Total Split (s)	21.0	22.5		22.7	24.2		23.0	47.8		17.0	41.8	
Total Split (%)	19.1%	20.5%		20.6%	22.0%		20.9%	43.5%		15.5%	38.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	14.0	16.8	108.8	18.2	21.0	108.8	18.5	44.4	108.8	11.4	37.3	108.8
Actuated g/C Ratio	0.13	0.15	1.00	0.17	0.19	1.00	0.17	0.41	1.00	0.10	0.34	1.00
v/c Ratio	0.66	0.79	0.25	1.01	0.29	0.12	0.96	0.65	0.72	0.64	0.91	0.10
Control Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.7	2.9	56.2	42.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.7	2.9	56.2	42.0	0.1
LOS	D	E	A	F	D	A	E	C	A	E	D	A
Approach Delay		35.0			58.9			26.6			40.4	
Approach LOS		C			E			C			D	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 108.8	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 35.9	Intersection LOS: D
Intersection Capacity Utilization 86.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 12: Milliken Avenue & Inland Empire Boulevard





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	259	430	394	520	201	197	503	1694	1146	206	2008	162
v/c Ratio	0.66	0.79	0.25	1.01	0.29	0.12	0.96	0.65	0.72	0.64	0.91	0.10
Control Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.7	2.9	56.2	42.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	55.6	0.4	88.6	39.5	0.2	77.0	27.7	2.9	56.2	42.0	0.1
Queue Length 50th (ft)	90	154	0	~202	64	0	184	282	0	72	393	0
Queue Length 95th (ft)	131	210	0	#309	101	0	#292	324	0	111	#451	0
Internal Link Dist (ft)		443			367			1034			913	
Turn Bay Length (ft)	125		130	255		210	330		160	200		120
Base Capacity (vph)	465	585	1583	514	682	1583	522	2614	1583	353	2197	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.74	0.25	1.01	0.29	0.12	0.96	0.65	0.72	0.58	0.91	0.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	251	417	382	504	195	191	488	1643	1112	200	1948	157
Future Volume (veh/h)	251	417	382	504	195	191	488	1643	1112	200	1948	157
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	259	430	0	520	201	0	503	1694	0	206	2008	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	323	514		525	746		534	2778		265	2219	
Arrive On Green	0.10	0.14	0.00	0.17	0.21	0.00	0.17	0.43	0.00	0.09	0.34	0.00
Sat Flow, veh/h	3092	3554	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	259	430	0	520	201	0	503	1694	0	206	2008	0
Grp Sat Flow(s),veh/h/ln	1546	1777	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	8.8	12.6	0.0	18.0	5.1	0.0	17.2	21.8	0.0	7.0	31.8	0.0
Cycle Q Clear(g_c), s	8.8	12.6	0.0	18.0	5.1	0.0	17.2	21.8	0.0	7.0	31.8	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	323	514		525	746		534	2778		265	2219	
V/C Ratio(X)	0.80	0.84		0.99	0.27		0.94	0.61		0.78	0.90	
Avail Cap(c_a), veh/h	476	597		525	746		534	2778		361	2240	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	46.9	44.6	0.0	44.4	35.4	0.0	43.8	23.5	0.0	48.0	33.4	0.0
Incr Delay (d2), s/veh	6.0	9.0	0.0	36.6	0.2	0.0	25.3	0.4	0.0	7.2	5.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	6.2	0.0	9.5	2.2	0.0	8.4	8.1	0.0	2.9	13.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.9	53.6	0.0	81.0	35.6	0.0	69.1	23.9	0.0	55.2	39.1	0.0
LnGrp LOS	D	D		F	D		E	C		E	D	
Approach Vol, veh/h		689	A		721	A		2197	A		2214	A
Approach Delay, s/veh		53.3			68.3			34.2			40.6	
Approach LOS		D			E			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	13.7	50.8	22.7	20.0	23.0	41.4	15.7	27.0
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	12.5	43.3	18.2	18.0	18.5	37.3	16.5	19.7
Max Q Clear Time (g_c+I1), s	9.0	23.8	20.0	14.6	19.2	33.8	10.8	7.1
Green Ext Time (p_c), s	0.2	12.5	0.0	0.9	0.0	3.1	0.4	0.9

Intersection Summary	
HCM 6th Ctrl Delay	43.1
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, EBR, WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%		0%			0%
Storage Length (ft)	175	0		0	0	
Storage Lanes	2	1		0	0	
Taper Length (ft)	25				25	
Lane Util. Factor	0.97	0.91	0.86	1.00	1.00	0.86
Ped Bike Factor						
Frt	0.925	0.850				
Flt Protected	0.976					
Satd. Flow (prot)	3091	1441	6408	0	0	6408
Flt Permitted	0.976					
Satd. Flow (perm)	3091	1441	6408	0	0	6408
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30		30			30
Link Distance (ft)	592		1067			1034
Travel Time (s)	13.5		24.3			23.5

Intersection Summary	
Area Type:	Other

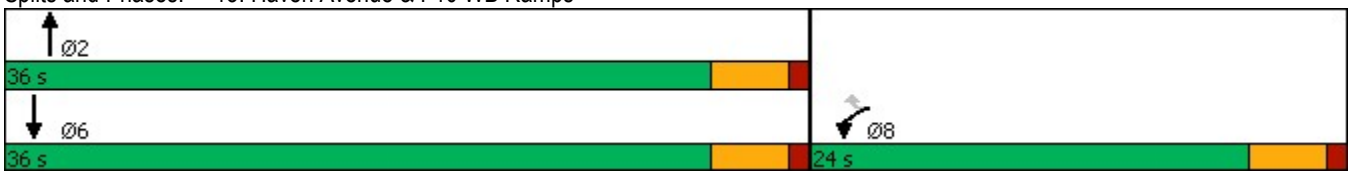
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	339	677	2709	0	0	1817
Future Volume (vph)	339	677	2709	0	0	1817
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%		0%			0%
Adj. Flow (vph)	346	691	2764	0	0	1854
Shared Lane Traffic (%)		50%				
Lane Group Flow (vph)	692	345	2764	0	0	1854

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	339	677	2709	1817
Future Volume (vph)	339	677	2709	1817
Turn Type	Prot	Perm	NA	NA
Protected Phases	8		2	6
Permitted Phases		8		
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	24.0	24.0	36.0	36.0
Total Split (%)	40.0%	40.0%	60.0%	60.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	17.5	17.5	31.6	31.6
Actuated g/C Ratio	0.30	0.30	0.54	0.54
v/c Ratio	0.74	0.79	0.79	0.53
Control Delay	23.7	34.1	13.2	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.7	34.1	13.2	9.6
LOS	C	C	B	A
Approach Delay	27.2		13.2	9.6
Approach LOS	C		B	A

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 58.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 14.6	Intersection LOS: B
Intersection Capacity Utilization 89.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 13: Haven Avenue & I-10 WB Ramps



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	692	345	2764	1854
v/c Ratio	0.74	0.79	0.79	0.53
Control Delay	23.7	34.1	13.2	9.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	23.7	34.1	13.2	9.6
Queue Length 50th (ft)	109	118	221	118
Queue Length 95th (ft)	162	#249	271	148
Internal Link Dist (ft)	512		987	954
Turn Bay Length (ft)	175			
Base Capacity (vph)	1040	485	3482	3482
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.67	0.71	0.79	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

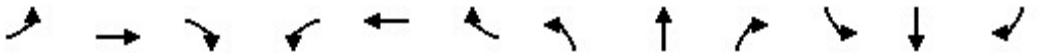
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	339	677	2709	0	0	1817
Future Volume (veh/h)	339	677	2709	0	0	1817
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1772	1870	1870	0	0	1870
Adj Flow Rate, veh/h	346	691	2764	0	0	1854
Peak Hour Factor	0.98	0.98	0.98	0.92	0.98	0.98
Percent Heavy Veh, %	2	2	2	0	0	2
Cap, veh/h	473	888	3587	0	0	3587
Arrive On Green	0.28	0.28	0.56	0.00	0.00	0.56
Sat Flow, veh/h	1688	3170	6958	0	0	6958
Grp Volume(v), veh/h	346	691	2764	0	0	1854
Grp Sat Flow(s),veh/h/ln	1688	1585	1609	0	0	1609
Q Serve(g_s), s	10.3	11.1	18.5	0.0	0.0	9.9
Cycle Q Clear(g_c), s	10.3	11.1	18.5	0.0	0.0	9.9
Prop In Lane	1.00	1.00		0.00	0.00	
Lane Grp Cap(c), veh/h	473	888	3587	0	0	3587
V/C Ratio(X)	0.73	0.78	0.77	0.00	0.00	0.52
Avail Cap(c_a), veh/h	593	1115	3655	0	0	3655
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	18.1	18.4	9.5	0.0	0.0	7.6
Incr Delay (d2), s/veh	3.5	2.8	1.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	4.0	5.0	0.0	0.0	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.6	21.2	10.5	0.0	0.0	7.7
LnGrp LOS	C	C	B	A	A	A
Approach Vol, veh/h	1037		2764			1854
Approach Delay, s/veh	21.3		10.5			7.7
Approach LOS	C		B			A

Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		35.4			35.4	20.0
Change Period (Y+Rc), s		4.5			4.5	4.5
Max Green Setting (Gmax), s		31.5			31.5	19.5
Max Q Clear Time (g_c+I1), s		20.5			11.9	13.1
Green Ext Time (p_c), s		10.4			13.6	2.4

Intersection Summary	
HCM 6th Ctrl Delay	11.6
HCM 6th LOS	B

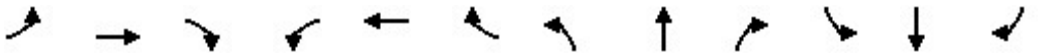
Notes

User approved volume balancing among the lanes for turning movement.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3072	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			155			125			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



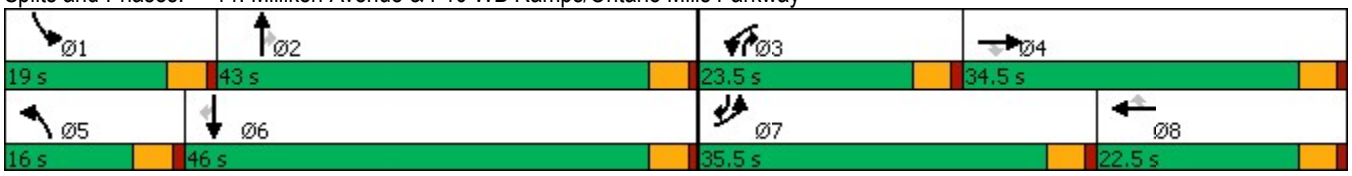
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Future Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1012	344	196	417	520	155	316	2051	633	459	1601	1201
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1012	344	196	417	520	155	316	2051	633	459	1601	1201

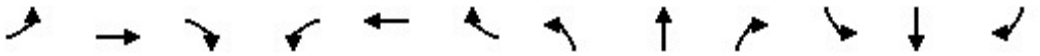
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Future Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	35.5	34.5	34.5	23.5	22.5	22.5	16.0	43.0	23.5	19.0	46.0	35.5
Total Split (%)	29.6%	28.8%	28.8%	19.6%	18.8%	18.8%	13.3%	35.8%	19.6%	15.8%	38.3%	29.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	31.0	30.3	30.3	18.7	18.0	18.0	11.5	38.5	61.7	14.5	41.5	77.0
Actuated g/C Ratio	0.26	0.25	0.25	0.16	0.15	0.15	0.10	0.32	0.51	0.12	0.35	0.64
v/c Ratio	1.28	0.73	0.42	0.87	0.98	0.42	1.07	1.00	0.72	1.24	0.72	1.16
Control Delay	171.5	51.7	22.0	68.9	85.8	10.7	124.8	60.2	23.4	171.6	36.5	105.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	171.5	51.7	22.0	68.9	85.8	10.7	124.8	60.2	23.4	171.6	36.5	105.4
LOS	F	D	C	E	F	B	F	E	C	F	D	F
Approach Delay		126.1			68.7			59.3			80.9	
Approach LOS		F			E			E			F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.28	
Intersection Signal Delay: 80.0	Intersection LOS: E
Intersection Capacity Utilization 103.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway



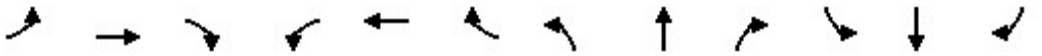


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1012	344	196	417	520	155	316	2051	633	459	1601	1201
v/c Ratio	1.28	0.73	0.42	0.87	0.98	0.42	1.07	1.00	0.72	1.24	0.72	1.16
Control Delay	171.5	51.7	22.0	68.9	85.8	10.7	124.8	60.2	23.4	171.6	36.5	105.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	171.5	51.7	22.0	68.9	85.8	10.7	124.8	60.2	23.4	171.6	36.5	105.4
Queue Length 50th (ft)	~511	246	63	163	213	0	~140	459	298	~227	312	~1089
Queue Length 95th (ft)	#641	356	134	#247	#328	60	#233	#555	449	#333	356	#1353
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	793	469	470	486	530	369	294	2055	878	371	2216	1035
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.28	0.73	0.42	0.86	0.98	0.42	1.07	1.00	0.72	1.24	0.72	1.16

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Future Volume (veh/h)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1673	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	1012	344	196	417	520	155	316	2051	633	459	1601	1201
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	799	482	408	466	533	238	296	2064	747	374	2225	958
Arrive On Green	0.26	0.26	0.26	0.15	0.15	0.15	0.10	0.32	0.32	0.12	0.35	0.35
Sat Flow, veh/h	3092	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	1012	344	196	417	520	155	316	2051	633	459	1601	1201
Grp Sat Flow(s),veh/h/ln	1546	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	31.0	20.1	12.6	15.9	17.5	11.1	11.5	38.1	38.5	14.5	26.0	41.5
Cycle Q Clear(g_c), s	31.0	20.1	12.6	15.9	17.5	11.1	11.5	38.1	38.5	14.5	26.0	41.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	799	482	408	466	533	238	296	2064	747	374	2225	958
V/C Ratio(X)	1.27	0.71	0.48	0.89	0.98	0.65	1.07	0.99	0.85	1.23	0.72	1.25
Avail Cap(c_a), veh/h	799	482	408	490	533	238	296	2064	747	374	2225	958
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	40.5	37.7	50.0	50.8	48.0	54.2	40.6	27.9	52.8	34.2	23.7
Incr Delay (d2), s/veh	130.0	5.0	0.9	18.2	32.6	6.2	71.0	18.3	9.0	124.3	1.2	123.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	26.2	9.9	5.0	7.3	10.2	4.8	7.4	17.5	17.4	12.1	10.3	57.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	174.5	45.5	38.6	68.2	83.4	54.2	125.2	58.9	36.8	177.0	35.3	146.7
LnGrp LOS	F	D	D	E	F	D	F	E	D	F	D	F
Approach Vol, veh/h		1552			1092			3000			3261	
Approach Delay, s/veh		128.8			73.5			61.2			96.3	
Approach LOS		F			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	43.0	22.6	35.4	16.0	46.0	35.5	22.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	38.5	19.0	30.0	11.5	41.5	31.0	18.0
Max Q Clear Time (g_c+I1), s	16.5	40.5	17.9	22.1	13.5	43.5	33.0	19.5
Green Ext Time (p_c), s	0.0	0.0	0.2	1.8	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	87.3
HCM 6th LOS	F

Notes

User approved changes to right turn type.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	230	0	0			0
Storage Lanes	2	1	0			0
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	0.91	1.00	0.86	0.86	1.00
Ped Bike Factor						
Frt	0.992	0.850				
Flt Protected	0.955					
Satd. Flow (prot)	3243	1441	0	6408	6408	0
Flt Permitted	0.955					
Satd. Flow (perm)	3243	1441	0	6408	6408	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	1	1				
Link Speed (mph)	30			30	30	
Link Distance (ft)	521			1400	1067	
Travel Time (s)	11.8			31.8	24.3	

Intersection Summary	
Area Type:	Other

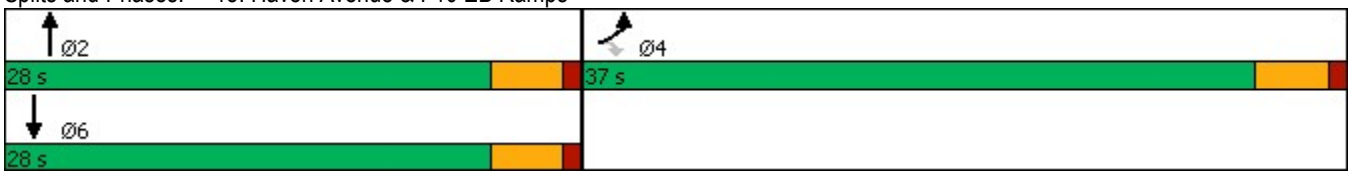
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1437	752	0	2079	1704	0
Future Volume (vph)	1437	752	0	2079	1704	0
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1481	775	0	2143	1757	0
Shared Lane Traffic (%)		10%				
Lane Group Flow (vph)	1559	697	0	2143	1757	0

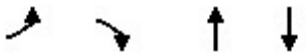
Intersection Summary

Lane Group	EBL	EBR	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	1437	752	2079	1704
Future Volume (vph)	1437	752	2079	1704
Turn Type	Prot	Perm	NA	NA
Protected Phases	4		2	6
Permitted Phases		4		
Detector Phase	4	4	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	37.0	37.0	28.0	28.0
Total Split (%)	56.9%	56.9%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Min	Min
Act Effct Green (s)	32.5	32.5	23.5	23.5
Actuated g/C Ratio	0.50	0.50	0.36	0.36
v/c Ratio	0.96	0.97	0.93	0.76
Control Delay	32.4	45.3	28.7	20.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.4	45.3	28.7	20.9
LOS	C	D	C	C
Approach Delay	36.4		28.7	20.9
Approach LOS	D		C	C

Intersection Summary	
Cycle Length: 65	
Actuated Cycle Length: 65	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 29.2	Intersection LOS: C
Intersection Capacity Utilization 89.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Haven Avenue & I-10 EB Ramps





Lane Group	EBL	EBR	NBT	SBT
Lane Group Flow (vph)	1559	697	2143	1757
v/c Ratio	0.96	0.97	0.93	0.76
Control Delay	32.4	45.3	28.7	20.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.4	45.3	28.7	20.9
Queue Length 50th (ft)	284	272	230	173
Queue Length 95th (ft)	#452	#525	#315	215
Internal Link Dist (ft)	441		1320	987
Turn Bay Length (ft)	230			
Base Capacity (vph)	1622	721	2316	2316
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.96	0.97	0.93	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1437	752	0	2079	1704	0
Future Volume (veh/h)	1437	752	0	2079	1704	0
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1772	1870	0	1870	1870	0
Adj Flow Rate, veh/h	1502	752	0	2143	1757	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	0	2	2	0
Cap, veh/h	1684	791	0	2329	2329	0
Arrive On Green	0.50	0.50	0.00	0.36	0.36	0.00
Sat Flow, veh/h	3375	1585	0	6958	6958	0
Grp Volume(v), veh/h	1502	752	0	2143	1757	0
Grp Sat Flow(s),veh/h/ln	1688	1585	0	1609	1609	0
Q Serve(g_s), s	26.0	29.3	0.0	20.6	15.5	0.0
Cycle Q Clear(g_c), s	26.0	29.3	0.0	20.6	15.5	0.0
Prop In Lane	1.00	1.00	0.00			0.00
Lane Grp Cap(c), veh/h	1684	791	0	2329	2329	0
V/C Ratio(X)	0.89	0.95	0.00	0.92	0.75	0.00
Avail Cap(c_a), veh/h	1693	795	0	2334	2334	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.6	15.5	0.0	19.8	18.1	0.0
Incr Delay (d2), s/veh	6.4	20.8	0.0	6.6	1.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	13.3	0.0	8.0	5.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.1	36.2	0.0	26.3	19.6	0.0
LnGrp LOS	C	D	A	C	B	A
Approach Vol, veh/h	2254			2143	1757	
Approach Delay, s/veh	26.1			26.3	19.6	
Approach LOS	C			C	B	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		28.0		36.8		28.0
Change Period (Y+Rc), s		4.5		4.5		4.5
Max Green Setting (Gmax), s		23.5		32.5		23.5
Max Q Clear Time (g_c+I1), s		22.6		31.3		17.5
Green Ext Time (p_c), s		0.8		1.0		4.9

Intersection Summary		
HCM 6th Ctrl Delay	24.3	
HCM 6th LOS	C	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1700	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	50	0	295			85
Storage Lanes	2	1	2			1
Taper Length (ft)	25		25			
Lane Util. Factor	0.97	1.00	0.97	0.86	0.86	1.00
Ped Bike Factor						
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	3072	1583	3072	6408	6408	1583
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	3072	1583	3072	6408	6408	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		1				51
Link Speed (mph)	30			30	30	
Link Distance (ft)	413			606	902	
Travel Time (s)	9.4			13.8	20.5	

Intersection Summary	
Area Type:	Other

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	1243	310	221	1617	1183	912
Future Volume (vph)	1243	310	221	1617	1183	912
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	1281	320	228	1667	1220	940
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1281	320	228	1667	1220	940

Intersection Summary

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1243	310	221	1617	1183	912
Future Volume (vph)	1243	310	221	1617	1183	912
Turn Type	Prot	pm+ov	Prot	NA	NA	pm+ov
Protected Phases	4	5	5	2	6	4
Permitted Phases		4				6
Detector Phase	4	5	5	2	6	4
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	9.5	9.5	22.5	22.5	22.5
Total Split (s)	39.0	12.0	12.0	36.0	24.0	39.0
Total Split (%)	52.0%	16.0%	16.0%	48.0%	32.0%	52.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	34.0	46.0	7.5	31.3	19.3	57.8
Actuated g/C Ratio	0.46	0.62	0.10	0.42	0.26	0.78
v/c Ratio	0.91	0.33	0.74	0.62	0.73	0.76
Control Delay	30.4	7.9	48.6	18.1	28.3	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	7.9	48.6	18.1	28.3	9.1
LOS	C	A	D	B	C	A
Approach Delay	25.9			21.8	20.0	
Approach LOS	C			C	B	

Intersection Summary	
Cycle Length: 75	
Actuated Cycle Length: 74.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 22.3	Intersection LOS: C
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 16: Milliken Avenue & I-10 EB Ramps

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	1281	320	228	1667	1220	940
v/c Ratio	0.91	0.33	0.74	0.62	0.73	0.76
Control Delay	30.4	7.9	48.6	18.1	28.3	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	7.9	48.6	18.1	28.3	9.1
Queue Length 50th (ft)	271	62	54	170	150	155
Queue Length 95th (ft)	#413	105	#105	206	188	296
Internal Link Dist (ft)	333			526	822	
Turn Bay Length (ft)	50		295			85
Base Capacity (vph)	1426	979	310	2716	1681	1253
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.33	0.74	0.61	0.73	0.75

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

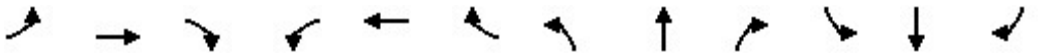
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1243	310	221	1617	1183	912
Future Volume (veh/h)	1243	310	221	1617	1183	912
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1673	1870	1673	1870	1870	1870
Adj Flow Rate, veh/h	1281	320	228	1667	1220	940
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1393	870	304	2743	1714	1137
Arrive On Green	0.45	0.45	0.10	0.43	0.27	0.27
Sat Flow, veh/h	3092	1585	3092	6696	6696	1585
Grp Volume(v), veh/h	1281	320	228	1667	1220	940
Grp Sat Flow(s),veh/h/ln	1546	1585	1546	1609	1609	1585
Q Serve(g_s), s	28.4	8.3	5.3	14.7	12.6	19.5
Cycle Q Clear(g_c), s	28.4	8.3	5.3	14.7	12.6	19.5
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	1393	870	304	2743	1714	1137
V/C Ratio(X)	0.92	0.37	0.75	0.61	0.71	0.83
Avail Cap(c_a), veh/h	1458	903	317	2770	1714	1137
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.9	9.3	32.1	16.2	24.3	5.7
Incr Delay (d2), s/veh	9.5	0.3	9.2	0.4	1.4	5.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.9	9.5	2.3	5.0	4.7	18.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.3	9.6	41.3	16.6	25.7	10.9
LnGrp LOS	C	A	D	B	C	B
Approach Vol, veh/h	1601			1895	2160	
Approach Delay, s/veh	24.6			19.6	19.2	
Approach LOS	C			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		35.7		37.5	11.7	24.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5
Max Green Setting (Gmax), s		31.5		34.5	7.5	19.5
Max Q Clear Time (g_c+I1), s		16.7		30.4	7.3	21.5
Green Ext Time (p_c), s		10.1		2.5	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	20.9
HCM 6th LOS	C

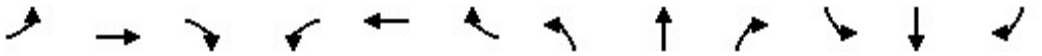
Appendix J

Intersection LOS Analysis Sheets
Horizon Year (2040) With Project Conditions
With Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	3		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.94	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	4202	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	4202	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186			205			473			162
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



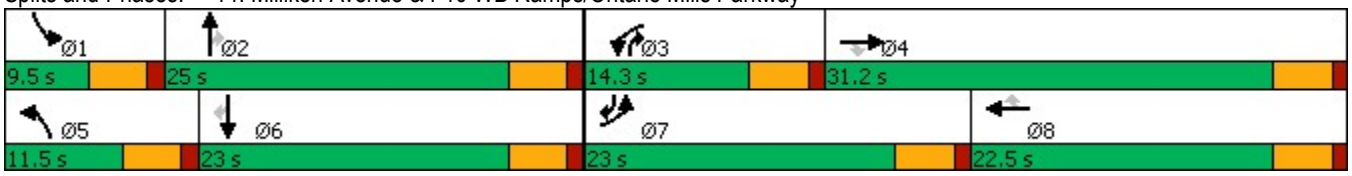
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Future Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	957	140	373	255	291	54	243	1411	473	131	938	398
Shared Lane Traffic (%)												
Lane Group Flow (vph)	957	140	373	255	291	54	243	1411	473	131	938	398

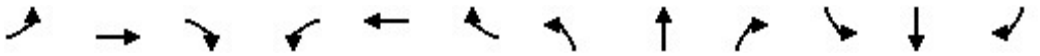
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Future Volume (vph)	852	125	332	227	259	48	216	1256	421	117	835	354
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	23.0	31.2	31.2	14.3	22.5	22.5	11.5	25.0	14.3	9.5	23.0	23.0
Total Split (%)	28.8%	39.0%	39.0%	17.9%	28.1%	28.1%	14.4%	31.3%	17.9%	11.9%	28.8%	28.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	18.5	21.0	21.0	9.5	11.9	11.9	7.0	20.5	34.5	5.0	18.5	41.6
Actuated g/C Ratio	0.25	0.28	0.28	0.13	0.16	0.16	0.09	0.28	0.47	0.07	0.25	0.56
v/c Ratio	0.91	0.27	0.64	0.65	0.51	0.13	0.84	0.79	0.48	0.63	0.58	0.41
Control Delay	41.9	21.9	16.8	40.0	31.5	0.6	59.9	29.4	3.3	49.8	26.5	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	21.9	16.8	40.0	31.5	0.6	59.9	29.4	3.3	49.8	26.5	7.2
LOS	D	C	B	D	C	A	E	C	A	D	C	A
Approach Delay		33.6			32.3			27.1			23.3	
Approach LOS		C			C			C			C	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 74	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 28.4	Intersection LOS: C
Intersection Capacity Utilization 63.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway

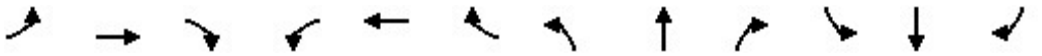




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	957	140	373	255	291	54	243	1411	473	131	938	398
v/c Ratio	0.91	0.27	0.64	0.65	0.51	0.13	0.84	0.79	0.48	0.63	0.58	0.41
Control Delay	41.9	21.9	16.8	40.0	31.5	0.6	59.9	29.4	3.3	49.8	26.5	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	21.9	16.8	40.0	31.5	0.6	59.9	29.4	3.3	49.8	26.5	7.2
Queue Length 50th (ft)	148	50	70	57	64	0	56	170	0	30	108	50
Queue Length 95th (ft)	#250	91	153	#103	98	0	#127	235	49	#72	154	124
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1052	673	691	407	862	540	291	1778	995	207	1605	960
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.21	0.54	0.63	0.34	0.10	0.84	0.79	0.48	0.63	0.58	0.41

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



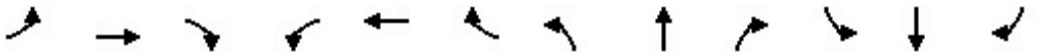
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	852	125	332	227	259	48	216	1256	421	117	835	354
Future Volume (veh/h)	852	125	332	227	259	48	216	1256	421	117	835	354
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	957	140	373	255	291	54	243	1411	473	131	938	398
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1079	512	434	342	460	205	310	1879	638	204	1659	813
Arrive On Green	0.26	0.27	0.27	0.11	0.13	0.13	0.10	0.29	0.29	0.07	0.26	0.26
Sat Flow, veh/h	4230	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	957	140	373	255	291	54	243	1411	473	131	938	398
Grp Sat Flow(s),veh/h/ln	1410	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	15.2	4.1	15.6	5.6	5.4	2.1	5.4	13.9	17.8	2.9	8.9	11.4
Cycle Q Clear(g_c), s	15.2	4.1	15.6	5.6	5.4	2.1	5.4	13.9	17.8	2.9	8.9	11.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1079	512	434	342	460	205	310	1879	638	204	1659	813
V/C Ratio(X)	0.89	0.27	0.86	0.75	0.63	0.26	0.78	0.75	0.74	0.64	0.57	0.49
Avail Cap(c_a), veh/h	1120	715	606	434	915	408	310	1888	640	221	1703	824
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.1	19.9	24.1	30.1	28.8	27.4	30.7	22.4	17.8	31.8	22.5	11.1
Incr Delay (d2), s/veh	8.6	0.3	8.8	5.2	1.4	0.7	12.4	1.7	4.6	5.5	0.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	1.7	6.5	2.2	2.3	0.8	2.5	5.1	6.7	1.2	3.2	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.7	20.2	32.9	35.4	30.3	28.1	43.1	24.1	22.4	37.4	22.9	11.5
LnGrp LOS	C	C	C	D	C	C	D	C	C	D	C	B
Approach Vol, veh/h		1470			600			2127			1467	
Approach Delay, s/veh		32.2			32.2			25.9			21.1	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.1	24.9	12.2	23.6	11.5	22.5	22.3	13.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	5.0	20.5	9.8	26.7	7.0	18.5	18.5	18.0
Max Q Clear Time (g_c+I1), s	4.9	19.8	7.6	17.6	7.4	13.4	17.2	7.4
Green Ext Time (p_c), s	0.0	0.7	0.2	1.5	0.0	3.3	0.6	1.4

Intersection Summary	
HCM 6th Ctrl Delay	27.0
HCM 6th LOS	C

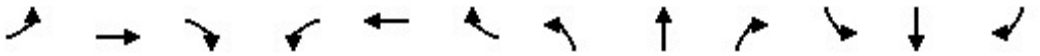
Notes

User approved changes to right turn type.



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	3		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.94	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	4202	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	4202	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			142			177			143			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



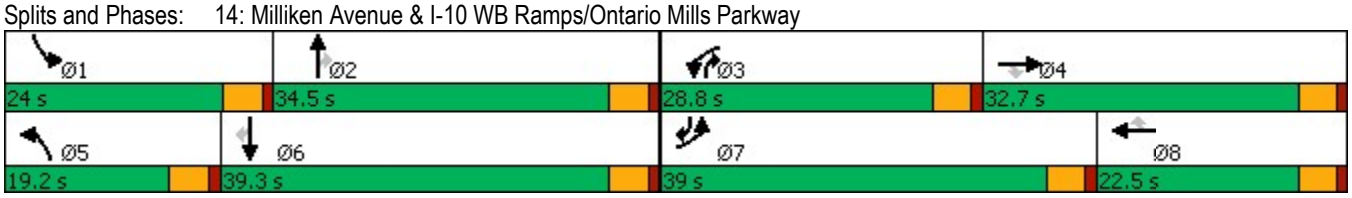
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Future Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1210	286	346	369	439	93	351	1501	660	484	1638	698
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1210	286	346	369	439	93	351	1501	660	484	1638	698

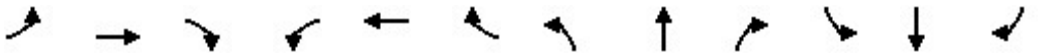
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Future Volume (vph)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	39.0	32.7	32.7	28.8	22.5	22.5	19.2	34.5	28.8	24.0	39.3	39.0
Total Split (%)	32.5%	27.3%	27.3%	24.0%	18.8%	18.8%	16.0%	28.8%	24.0%	20.0%	32.8%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	34.5	31.3	31.3	20.7	17.5	17.5	14.7	30.0	55.2	19.5	34.8	73.8
Actuated g/C Ratio	0.29	0.26	0.26	0.17	0.15	0.15	0.12	0.25	0.46	0.16	0.29	0.62
v/c Ratio	1.00	0.59	0.67	0.69	0.85	0.24	0.93	0.93	0.82	0.97	0.88	0.70
Control Delay	67.9	45.2	30.6	53.4	65.9	1.5	83.8	55.3	30.6	82.6	46.8	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	45.2	30.6	53.4	65.9	1.5	83.8	55.3	30.6	82.6	46.8	18.8
LOS	E	D	C	D	E	A	F	E	C	F	D	B
Approach Delay		57.4			54.2			52.8			46.0	
Approach LOS		E			D			D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 51.6	Intersection LOS: D
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1210	286	346	369	439	93	351	1501	660	484	1638	698
v/c Ratio	1.00	0.59	0.67	0.69	0.85	0.24	0.93	0.93	0.82	0.97	0.88	0.70
Control Delay	67.9	45.2	30.6	53.4	65.9	1.5	83.8	55.3	30.6	82.6	46.8	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	45.2	30.6	53.4	65.9	1.5	83.8	55.3	30.6	82.6	46.8	18.8
Queue Length 50th (ft)	~333	194	143	139	175	0	140	332	349	194	352	317
Queue Length 95th (ft)	#438	298	262	186	#254	0	#232	#404	500	#302	401	464
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1213	488	519	625	532	388	378	1609	851	501	1866	998
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.59	0.67	0.59	0.83	0.24	0.93	0.93	0.78	0.97	0.88	0.70

Intersection Summary

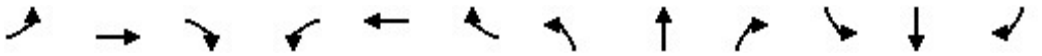
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Future Volume (veh/h)	1162	275	332	354	421	89	337	1441	634	465	1572	670
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	1210	286	346	369	439	93	351	1501	660	484	1638	698
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1227	546	462	435	506	225	382	1623	623	507	1883	924
Arrive On Green	0.29	0.29	0.29	0.14	0.14	0.14	0.12	0.25	0.25	0.16	0.29	0.29
Sat Flow, veh/h	4230	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	1210	286	346	369	439	93	351	1501	660	484	1638	698
Grp Sat Flow(s),veh/h/ln	1410	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	33.8	15.2	23.5	13.8	14.4	6.4	13.3	27.1	30.0	18.5	28.7	34.8
Cycle Q Clear(g_c), s	33.8	15.2	23.5	13.8	14.4	6.4	13.3	27.1	30.0	18.5	28.7	34.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1227	546	462	435	506	225	382	1623	623	507	1883	924
V/C Ratio(X)	0.99	0.52	0.75	0.85	0.87	0.41	0.92	0.92	1.06	0.95	0.87	0.76
Avail Cap(c_a), veh/h	1227	546	462	632	538	240	382	1623	623	507	1883	924
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.0	35.2	38.2	49.9	49.9	46.5	51.5	43.4	36.1	49.3	39.9	18.5
Incr Delay (d2), s/veh	22.3	0.9	6.6	7.3	13.6	1.2	26.7	9.4	52.9	28.8	4.7	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.1	7.1	9.9	5.8	7.3	2.6	6.6	11.7	26.7	9.1	11.9	14.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.2	36.1	44.8	57.1	63.5	47.7	78.2	52.8	89.0	78.1	44.6	22.1
LnGrp LOS	E	D	D	E	E	D	E	D	F	E	D	C
Approach Vol, veh/h		1842			901			2512			2820	
Approach Delay, s/veh		56.2			59.3			65.8			44.8	
Approach LOS		E			E			E			D	

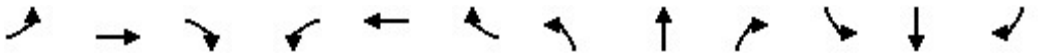
Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.0	34.5	21.2	39.2	19.2	39.3	39.0	21.4
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	19.5	30.0	24.3	28.2	14.7	34.8	34.5	18.0
Max Q Clear Time (g_c+I1), s	20.5	32.0	15.8	25.5	15.3	36.8	35.8	16.4
Green Ext Time (p_c), s	0.0	0.0	0.9	0.9	0.0	0.0	0.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	55.6
HCM 6th LOS	E



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1600	1900	1900	1700	1900	1900	1700	1900	1900	1700	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	50		50	190		235	585		150	500		50
Storage Lanes	3		1	2		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.94	1.00	1.00	0.97	0.95	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	4202	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	4202	1863	1583	3072	3539	1583	3072	6408	1583	3072	6408	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			155			125			55
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		411			496			902			1114	
Travel Time (s)		9.3			11.3			20.5			25.3	

Intersection Summary	
Area Type:	Other



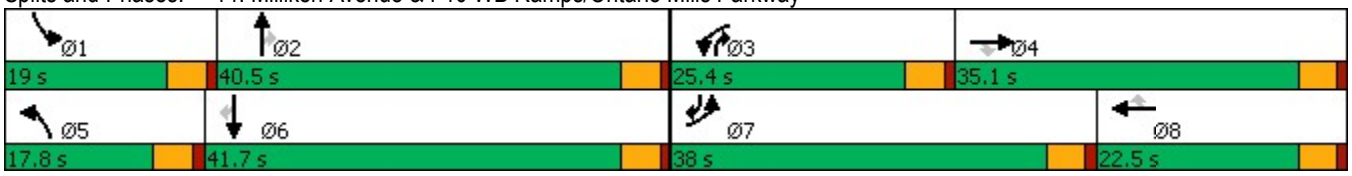
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Future Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	1012	344	196	417	520	155	316	2051	633	459	1601	1201
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1012	344	196	417	520	155	316	2051	633	459	1601	1201

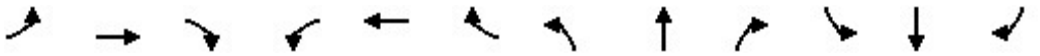
Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Future Volume (vph)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	9.5	22.5	9.5	9.5	22.5	9.5
Total Split (s)	38.0	35.1	35.1	25.4	22.5	22.5	17.8	40.5	25.4	19.0	41.7	38.0
Total Split (%)	31.7%	29.3%	29.3%	21.2%	18.8%	18.8%	14.8%	33.8%	21.2%	15.8%	34.8%	31.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	None
Act Effct Green (s)	33.5	31.5	31.5	20.0	18.0	18.0	13.3	36.0	60.5	14.5	37.2	75.2
Actuated g/C Ratio	0.28	0.26	0.26	0.17	0.15	0.15	0.11	0.30	0.50	0.12	0.31	0.63
v/c Ratio	0.86	0.70	0.40	0.81	0.98	0.42	0.93	1.07	0.74	1.24	0.81	1.19
Control Delay	49.9	49.3	21.5	61.7	85.8	10.7	87.0	81.6	24.4	171.6	41.9	117.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.9	49.3	21.5	61.7	85.8	10.7	87.0	81.6	24.4	171.6	41.9	117.1
LOS	D	D	C	E	F	B	F	F	C	F	D	F
Approach Delay		46.2			65.9			70.1			87.9	
Approach LOS		D			E			E			F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 71.9	Intersection LOS: E
Intersection Capacity Utilization 103.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 14: Milliken Avenue & I-10 WB Ramps/Ontario Mills Parkway





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	1012	344	196	417	520	155	316	2051	633	459	1601	1201
v/c Ratio	0.86	0.70	0.40	0.81	0.98	0.42	0.93	1.07	0.74	1.24	0.81	1.19
Control Delay	49.9	49.3	21.5	61.7	85.8	10.7	87.0	81.6	24.4	171.6	41.9	117.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.9	49.3	21.5	61.7	85.8	10.7	87.0	81.6	24.4	171.6	41.9	117.1
Queue Length 50th (ft)	264	245	63	160	213	0	126	~510	301	~227	330	~1108
Queue Length 95th (ft)	321	354	133	#222	#328	60	#214	#586	454	#333	378	#1372
Internal Link Dist (ft)		331			416			822			1034	
Turn Bay Length (ft)	50		50	190		235	585		150	500		50
Base Capacity (vph)	1173	489	485	535	530	369	340	1922	871	371	1986	1012
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.70	0.40	0.78	0.98	0.42	0.93	1.07	0.73	1.24	0.81	1.19

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Future Volume (veh/h)	941	320	182	388	484	144	294	1907	589	427	1489	1117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1575	1870	1870	1673	1870	1870	1673	1870	1870	1673	1870	1870
Adj Flow Rate, veh/h	1012	344	196	417	520	155	316	2051	633	459	1601	1201
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	1116	493	418	475	544	243	350	1971	729	382	2037	920
Arrive On Green	0.26	0.26	0.26	0.15	0.15	0.15	0.11	0.31	0.31	0.12	0.32	0.32
Sat Flow, veh/h	4230	1870	1585	3092	3554	1585	3092	6434	1585	3092	6434	1585
Grp Volume(v), veh/h	1012	344	196	417	520	155	316	2051	633	459	1601	1201
Grp Sat Flow(s),veh/h/ln	1410	1870	1585	1546	1777	1585	1546	1609	1585	1546	1609	1585
Q Serve(g_s), s	27.2	19.5	12.2	15.5	17.1	10.8	11.9	36.0	36.0	14.5	26.6	37.2
Cycle Q Clear(g_c), s	27.2	19.5	12.2	15.5	17.1	10.8	11.9	36.0	36.0	14.5	26.6	37.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	1116	493	418	475	544	243	350	1971	729	382	2037	920
V/C Ratio(X)	0.91	0.70	0.47	0.88	0.96	0.64	0.90	1.04	0.87	1.20	0.79	1.31
Avail Cap(c_a), veh/h	1206	493	418	550	544	243	350	1971	729	382	2037	920
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.9	39.1	36.4	48.7	49.4	46.7	51.5	40.8	28.5	51.5	36.5	24.6
Incr Delay (d2), s/veh	9.6	4.3	0.8	13.6	27.6	5.5	25.6	31.7	10.9	113.8	2.1	145.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.4	9.5	4.8	6.9	9.6	4.6	5.8	18.4	17.7	11.6	10.6	60.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.4	43.4	37.2	62.3	77.0	52.2	77.0	72.4	39.4	165.3	38.6	170.0
LnGrp LOS	D	D	D	E	E	D	E	F	D	F	D	F
Approach Vol, veh/h		1552			1092			3000			3261	
Approach Delay, s/veh		47.8			67.8			66.0			104.8	
Approach LOS		D			E			E			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	19.0	40.5	22.5	35.5	17.8	41.7	35.5	22.5
Change Period (Y+Rc), s	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Max Green Setting (Gmax), s	14.5	36.0	20.9	30.6	13.3	37.2	33.5	18.0
Max Q Clear Time (g_c+I1), s	16.5	38.0	17.5	21.5	13.9	39.2	29.2	19.1
Green Ext Time (p_c), s	0.0	0.0	0.5	1.9	0.0	0.0	1.8	0.0

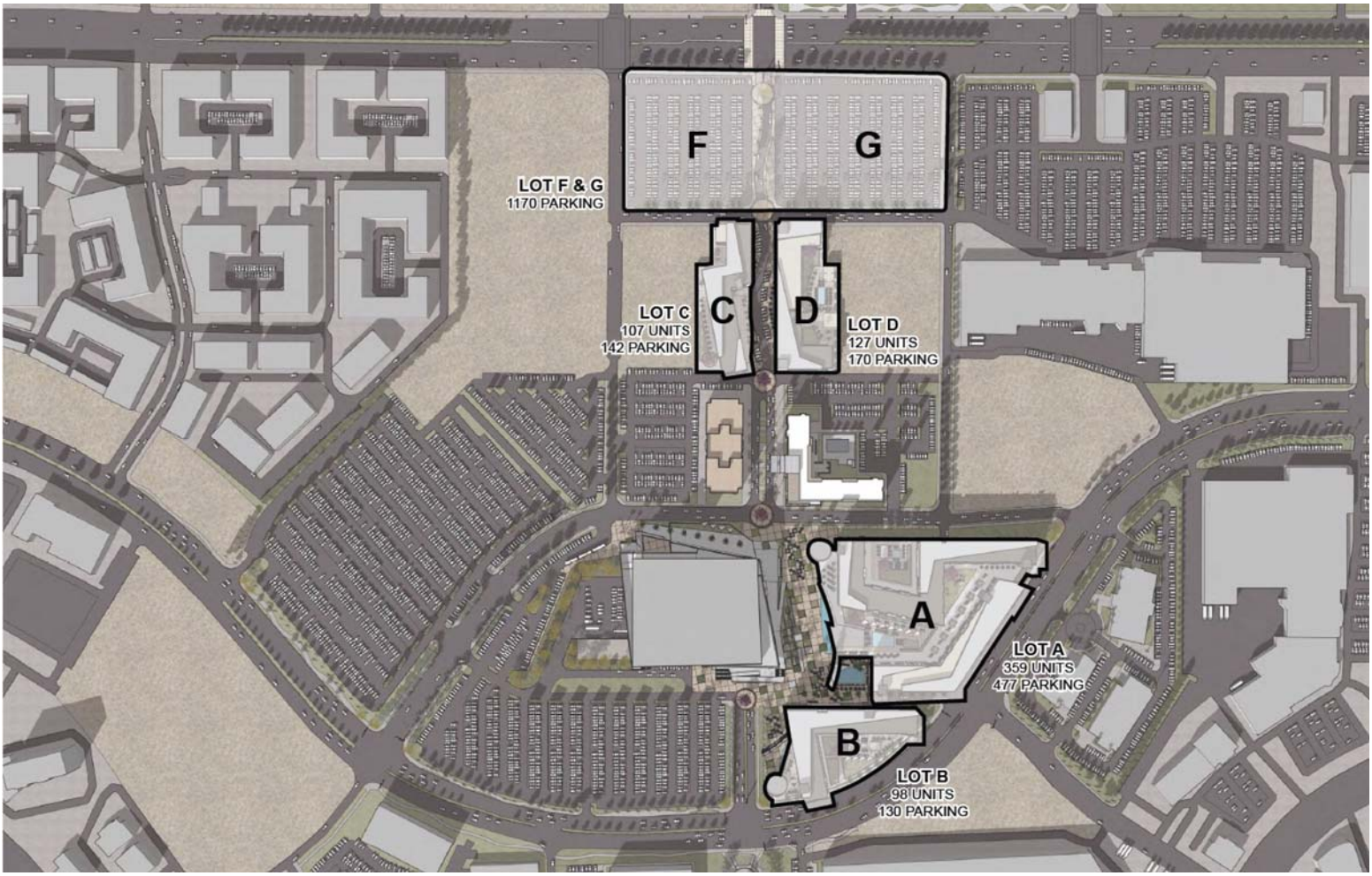
Intersection Summary	
HCM 6th Ctrl Delay	77.3
HCM 6th LOS	E

Notes

User approved changes to right turn type.

APPENDIX B
AIR QUALITY AND GREENHOUSE GAS IMPACT STUDY

TOYOTA ARENA MIXED-USE DEVELOPMENT
AIR QUALITY AND GREENHOUSE GAS IMPACT STUDY
City of Ontario



TOYOTA ARENA MIXED-USE DEVELOPMENT
AIR QUALITY AND GREENHOUSE GAS IMPACT STUDY
City of Ontario, California

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1.0 Introduction

The purpose of this air quality and greenhouse gas (GHG) impact study is to determine whether the estimated criteria air pollutants and greenhouse gas emissions generated from the construction and operation of the proposed Toyota Arena Mixed-Use Development (hereinafter referred to as project) would cause significant impacts to air resources.

This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The methodology follows the California Air Resources Board (CARB), the South Coast Air Quality Management District (SCAQMD), and City of Ontario recommendations for quantification of emissions and evaluation of potential impacts.

1.1 Site Location

The proposed project site is located adjacent to the Toyota Arena, north of Concourse Street and south of Fourth Street, in the City of Ontario.

The project site is located within the South Coast Air Basin (SCAB), the SCAQMD San Bernardino Valley General Forecast Area, and the Southwest San Bernardino Valley Air Monitoring Area-33.

The project site is located within the Ontario Center Specific Plan and zoned for Urban Commercial use. The City of Ontario General Plan land use map designates the project site as Mixed Use.

The project location map is provided in Exhibit A.

1.2 Project Description

The project consists of construction and operation of a mixed use town center development with residential and commercial/retail land use within four development lots.

The proposed project includes a total of 691 residential dwelling units, 71,200 square feet of commercial/retail uses and the demolition and relocation of approximately 1,170 surface parking spaces. The total project site area is approximately 18.73 acres.

The site plan used for this analysis, provided by the applicant, is illustrated in Exhibit B. Table 1 summarizes the land use assumptions used for this analysis.

Table 1
Land Use Summary

Lot	Dwelling Units	Retail (SF)[1]	Parking Spaces
A	359	25,256	477[2]
B	98	20,802	130[2]
C	107	11,047	142[2]
D	127	14,095	170[2]
E & F	--	--	1,170
Total	691	71,200	2,089

[1] S.F. – Square Feet
[2] Parking Structure

Construction of the project is estimated to begin in the year 2021 and last approximately 21 months. Construction activities are expected to consist of demolition, site preparation, grading, building construction, paving, and architectural coating. The project is expected to demolish an existing asphalt surface parking lot of approximately 7.48 acres within Lot A and Lot B.

The project is not expected to require the import or export of earthwork materials; preliminary grading estimates show a balanced site. The project is expected to be operational in the year 2023.

1.3 Sensitive Receptors

Sensitive receptors are considered land uses or other types of population groups that are more sensitive to air pollution exposure. Sensitive population groups include children, the elderly, the acutely and chronically ill, and those with cardio-respiratory diseases. For CEQA purposes, the SCAQMD considers a sensitive receptor to be a location where a sensitive individual could remain for 24-hours or longer, such as residences, hospitals, and schools (etc), as described in the Localized Significance Threshold Methodology (SCAQMD 2008a, page 3-2).

The nearest sensitive land uses to the project site include the following:

- Existing residential dwelling units located approximately 150 feet north of Lot G, across Fourth Street.

- Existing residential dwelling units located approximately 475 feet to the west of Lot F.

1.4 Summary of Air Quality and Greenhouse Gas Impacts

Table 2 provides a summary of the CEQA air quality impact analysis results.

Table 2
CEQA Air Quality Impact Criteria

Air Quality Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with, or obstruct implementation of, the applicable air quality plan?			**X**	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard?			X	
d) Expose sensitive receptors to substantial pollutant concentrations?			**X**	
e) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			**X**	

Table 3 provides a summary of the CEQA GHG impact criteria analysis results.

Table 3
CEQA GHG Impact Criteria

GHG Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of greenhouse gases?			X	

1.5 Recommended Design Features

This section provides a summary of the recommended design features that are expected to be included as part of the project description and design and have been identified to help reduce the project's impact from air quality and GHG emissions. The recommended project design features include several standard rules and requirements, best practices, and common project design features for reducing air quality emissions.

Construction Design Features:

DF-1 Prepare and implement a Construction Management Plan which will include Best Available Control Measures to be submitted to the City of Ontario.

DF-2 Follow the standard SCAQMD rules and requirements with regards to fugitive dust control, which includes, but are not limited to the following:

1. All active construction areas shall be watered two (2) times daily.
2. Speed on unpaved roads shall be reduced to less than 15 mph.
3. Any visible dirt deposition on any public roadway shall be swept or washed at the site access points within 30 minutes.
4. Any on-site stockpiles of debris, dirt or other dusty material shall be covered or watered twice daily.
5. All operations on any unpaved surface shall be suspended if winds exceed 15 mph.
6. Access points shall be washed or swept daily.
7. Construction sites shall be sandbagged for erosion control.

8. Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
9. Cover all trucks hauling dirt, sand, soil, or other loose materials, and maintain at least 2 feet of freeboard space in accordance with the requirements of California Vehicle Code (CVC) section 23114.
10. Pave or gravel construction access roads at least 100 feet onto the site from the main road and use gravel aprons at truck exits.
11. Replace the ground cover of disturbed areas as quickly possible.
12. A fugitive dust control plan should be prepared and submitted to SCAQMD prior to the start of construction.

DF-3 All diesel construction equipment shall have Tier 4 low emission "clean diesel" engines (OEM or retrofit) that include diesel oxidation catalysts and diesel particulate filters that meet the latest CARB best available control technology.

DF-4 Construction equipment shall be maintained in proper tune.

DF-5 All construction vehicles shall be prohibited from excessive idling. Excessive idling is defined as five (5) minutes or longer.

DF-6 Minimize the simultaneous operation of multiple construction equipment units.

DF-7 The use of heavy construction equipment and earthmoving activity shall be suspended during Air Alerts when the Air Quality Index reaches the "Unhealthy" level.

DF-8 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

DF-9 Utilize zero VOC and low VOC paints and solvents, wherever possible.

Operational Design Features:

DF-10 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

DF-11 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-12 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-13 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-14 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-15 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-16 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

DF-17 Provide electric vehicle charging stations per the requirements of CALGreen.

2.0 Air Quality Setting

The Federal Clean Air Act (§ 7602) defines air pollution as any agent or combination of such agents, including any physical, chemical, biological, or radioactive substance which is emitted into or otherwise enters the ambient air. Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution. Air pollution can cause disease, allergies and even death. It affects soil, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate. It can also cause damage to and deterioration of property, present hazards to transportation, and negatively impact the economy.

This section provides background information on criteria air pollutants, the applicable federal, state and local regulations concerning air pollution, and the existing physical setting of the project within the context of local air quality.

2.1 Description of Air Pollutants[1].

The following section describes the air pollutants of concern related to the project. Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health. The following descriptions of criteria air pollutants have been provided by the SCAQMD.

- **Carbon Monoxide (CO)** is a colorless, odorless, toxic gas produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). Sources include motor vehicle exhaust, industrial processes (metals processing and chemical manufacturing), residential wood burning, and natural sources. CO is somewhat soluble in water; therefore, rainfall and fog can suppress CO conditions. CO enters the body through the lungs, dissolves in the blood, and competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for carbon monoxide is intended to protect persons whose medical condition already compromises their circulatory system's ability to deliver oxygen. These medical conditions include certain heart ailments, chronic lung diseases, and anemia. Persons with these conditions have reduced exercise capacity even when exposed to relatively low levels of CO. Fetuses are at risk because their blood has an even greater affinity to bind with CO. Smokers are also at risk from ambient CO levels because smoking

[1] SCAQMD. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning (May 6, 2005)

increases the background level of CO in their blood. The South Coast basin has recently achieved attainment status for carbon monoxide by both USEPA and CARB.

- **Nitrogen Dioxide (NO_2)** is a byproduct of fuel combustion. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts quickly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_x. NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in young children has also been observed at concentrations below 0.3 parts per million (ppm). NO_2 absorbs blue light which results in a brownish red cast to the atmosphere and reduced visibility. Although NO_2 concentrations have not exceeded national standards since 1991 and the state hourly standard since 1993, NO_x emissions remain of concern because of their contribution to the formation of O_3 and particulate matter.

- **Ozone (O_3)** is one of several substances called photochemical oxidants that are formed when volatile organic compounds (VOC) and NO_x react in the presence of ultraviolet sunlight. O_3 concentrations in the South Coast basin are typically among the highest in the nation, and the damaging effects of photochemical smog, which is a popular name for a number of oxidants in combination, are generally related to the concentrations of O_3. Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the subgroups most susceptible to O_3 effects. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient O_3 levels and increases in daily hospital admission rates, as well as mortality, has also been reported. The South Coast Air Basin is designated by the USEPA as an extreme non-attainment area for ozone. Although O_3 concentrations have declined substantially since the early 1990s, the South Coast basin continues to have peak O_3 levels that exceed both state and federal standards.

- **Fine Particulate Matter (PM_{10})** consists of extremely small, suspended particles or droplets 10 microns or smaller in diameter that can lodge in the lungs, contributing to respiratory problems. PM_{10} arises from such sources as re-entrained road dust, diesel soot, combustion products, tire and brake abrasion, construction operations, and fires. It is also formed in the atmosphere from NO_x and SO_2 reactions with ammonia. PM_{10} scatters light and significantly reduces visibility. Inhalable particulates

pose a serious health hazard, alone or in combination with other pollutants. More than half of the smallest particles inhaled will be deposited in the lungs and can cause permanent lung damage. Inhalable particulates can also have a damaging effect on health by interfering with the body's mechanism for clearing the respiratory tract or by acting as a carrier of an absorbed toxic substance. The South Coast basin has recently achieved federal attainment status for PM_{10}, but is non-attainment based on state requirements.

- **Ultra-Fine Particulate Matter ($PM_{2.5}$)** is defined as particulate matter with a diameter less than 2.5 microns and is a subset of PM_{10}. $PM_{2.5}$ consists mostly of products from the reaction of NO_x and SO_2 with ammonia, secondary organics, finer dust particles, and the combustion of fuels, including diesel soot. $PM_{2.5}$ can cause exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease, declines in pulmonary function growth in children, and increased risk of premature death from heart or lung diseases in the elderly. Daily fluctuations in $PM_{2.5}$ levels have been related to hospital admissions for acute respiratory conditions, school absences, and increased medication use in children and adults with asthma. The South Coast basin is designated as non-attainment for $PM_{2.5}$ by both federal and state standards.

- **Sulfur dioxide (SO_2)** is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children. Individuals with asthma may experience constriction of airways with exposure to SO_2. Though SO_2 concentrations have been reduced to levels well below state and federal standards, further reductions in SO_2 emissions are needed because SO_2 is a precursor to sulfate and PM_{10}. The South Coast basin is considered a SO_2 attainment area by USEPA and CARB.

- **Lead (Pb)** is a toxic heavy metal that can be emitted into the air through some industrial processes, burning of leaded gasoline and past use of lead-based consumer products. Lead is a neurotoxin that accumulates in soft tissues and bones, damages the nervous system, and causes blood disorders. It is particularly problematic in children, in that permanent brain damage may result, even if blood levels are promptly normalized with treatment. Concentrations of lead once exceeded the state and federal air quality standards by a wide margin, but as a result of the removal of lead from motor vehicle gasoline, ambient air quality standards for lead have not been exceeded since 1982. Though special monitoring sites immediately downwind of lead sources recorded localized violations of the state standard in 1994, no violations have been recorded since. Consequently, the South Coast basin is designated as an attainment area for lead by both the USEPA and CARB. This report

does not analyze lead emissions from the project, as it is not expected to emit lead in any significant measurable quantity.

- **Volatile Organic Compounds (VOC),** although not actually a criteria air pollutant, VOCs are regulated by the SCAQMD because they cause chemical reactions which contribute to the formation of ozone. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM_{10} and lower visibility levels. Sources of VOCs include combustion engines, and evaporative emissions associated with fuel, paints and solvents, asphalt paving, and the use of household consumer products such as aerosols. Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOC. Some hydrocarbon components classified as VOC emissions are hazardous air pollutants. Benzene, for example, is a hydrocarbon component of VOC emissions that are known to be a human carcinogen. The term reactive organic gases (ROG) are often used interchangeably with VOC.

- **Toxic Air Contaminants (TACs)** are defined as air pollutants which may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health, and for which there is no concentration that does not present some risk. This contrasts with the criteria pollutants, in that there is no threshold level for TAC exposure below which adverse health impacts are not expected to occur. The majority of the estimated health risk from TACs can be attributed to a relatively few compounds, the most common being diesel particulate matter (DPM) from diesel engine exhaust. In addition to DPM, benzene and 1,3-butadiene are also significant contributors to overall ambient public health risk in California.

2.2 Federal and State Ambient Air Quality Standards

The Federal Clean Air Act, which was last amended in 1990, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for criteria pollutants considered harmful to public health and the environment. The State of California has also established additional and more stringent California Ambient Air Quality Standards (CAAQS) in addition to the seven criteria pollutants designated by the federal government.

AAQS are designed to protect the health and welfare of the populace with a reasonable margin of safety. The standards are divided into two categories, primary standards, and secondary standards. Primary standards are implemented to provide protection for the "sensitive" populations such as those with asthma, or the children and elderly. Secondary standards are to provide protection against visible pollution as well as damage to the surrounding environment, including animals, crops, and buildings.

Table 4 shows the Federal and State Ambient Air Quality Standards.

Table 4
Federal and State Ambient Air Quality Standards (AAQS)[1]

Air Pollutant	Averaging Time [2]	Federal Standard (NAAQS)[2]	California Standard (CAAQS)[2]
Ozone	1 Hour	--	0.09 ppm
	8 Hour	0.070 ppm	0.070 ppm
Carbon Monoxide (CO)	1 Hour	35 ppm	20 ppm
	8 Hour	9 ppm	9 ppm
Nitrogen Dioxide (NO_2)	1 Hour	0.100 ppm	0.18 ppm
	Annual	0.053 ppm	0.030 ppm
Sulfur Dioxide (SO_2)	1 Hour	0.075 ppm	0.25 ppm
	3 Hour	0.5 ppm[3]	--
	24 Hour	--	0.04 ppm
Particulate Matter (PM_{10})	24 Hour	150 μg/m^3	50 μg/m^3
	Mean	--	20 μg/m^3
Particulate Matter (PM2.5)	24 Hour	35 μg/m^3	--
	Annual	12 μg/m^3	12 μg/m^3
Lead	30-day	--	1.5 μg/m
	Quarter	1.5 μg/m	--
	3-month average	0.15 μg/m	--
Visibility reducing particles	8 Hour	--	0.23/km extinction coefficient. (10-mile visibility standard)
Sulfates	24 Hour	--	25 μg/m
Vinyl chloride	24 Hour	--	0.01 ppm
Hydrogen sulfide	24 Hour	--	0.03 ppm

[1] Source: USEPA: https://www.epa.gov/criteria-air-pollutants/naaqs-table and
CARB: https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards

[2] ppm = parts per million of air, by volume; µg/m3 = micrograms per cubic meter; Annual = Annual Arithmetic Mean; 30-day = 30-day average; Quarter = Calendar quarter.

[3] Secondary standards

Several pollutants listed in Table 4 are not addressed in this analysis. Lead is not included because the project is not anticipated to emit lead. Visibility-reducing particles are not explicitly addressed in this analysis because particulate matter is addressed. The project is not expected to generate or be exposed to vinyl chloride because proposed project uses do not utilize the chemical processes that create this pollutant and there are no such uses in the project vicinity. The proposed project is not expected to cause exposure to hydrogen sulfide because it would not generate hydrogen sulfide in any substantial quantity.

2.3 Attainment Status

The Clean Air Act requires states to prepare a State Implementation Plan (SIP) to ensure air quality meets the NAAQS. The California Air Resources Board (CARB) provides designations of attainment for air basins where AAQS are either met or exceeded. If the AAQS are met, the area is designated as being in "attainment", if the air pollutant concentrations exceed the AAQS, than the area is designated as being "nonattainment". If there is inadequate or inconclusive data to make a definitive attainment designation, the area is considered "unclassified."

National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the three-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard.

When a state submits a request to the EPA to re-designate a nonattainment area to attainment, the Clean Air Act (CAA) section 175A(a) requires that the state (or states, if the area is a multi-state area) submit a maintenance plan ensuring the area can maintain the air quality standard for which the area is to be re-designated for at least 10 years following the effective date of re-designation.

Table 5 lists the attainment status for the criteria pollutants in the South Coast Air Basin (SCAB).

Table 5
South Coast Air Basin Attainment Status[1]

Pollutant	State Status	National Status
Ozone	Nonattainment	Nonattainment (Extreme)[2]
Carbon monoxide	Attainment	Attainment (Maintenance)
Nitrogen dioxide	Attainment	Attainment (Maintenance)
PM_{10}	Nonattainment	Attainment (Maintenance)
$PM_{2.5}$	Nonattainment	Nonattainment
Lead	Attainment	Nonattainment (Partial)[3]

[1] Source: California Air Resources Board. http://www.arb.ca.gov/desig/adm/adm.htm
[2] 8-Hour Ozone.
[3] Partial Nonattainment designation – Los Angeles County portion of Basin only.

2.4 South Coast Air Quality Management District (SCAQMD)

The agency responsible for air pollution control for the South Coast Air Basin (SCAB) is the South Coast Air Quality Management District (SCAQMD). SCAQMD is responsible for controlling emissions primarily from stationary sources. SCAQMD maintains air quality monitoring stations throughout the SCAB. SCAQMD, in coordination with the Southern California Association of Governments, is also responsible for developing, updating, and implementing the Air Quality Management Plan (AQMP) for the SCAB. An AQMP is a plan prepared and implemented by an air pollution district for a county or region designated as nonattainment of the federal and/or California ambient air quality standards. The term nonattainment area is used to refer to an air SCAB where one or more ambient air quality standards are exceeded.

The latest version is the 2016 AQMP. The 2016 AQMP is a regional blueprint for achieving the federal air quality standards and healthful air. While air quality has dramatically improved over the years, the SCAB still exceeds federal public health standards for both ozone and particulate matter (PM) and experiences some of the worst air pollution in the nation. The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the NAAQS are not met on time.

According to the 2016 AQMP, the most significant air quality challenge in the SCAB is to reduce nitrogen oxide (NOx) emissions sufficiently to meet the upcoming ozone standard deadlines. Based on the inventory and modeling results, 522 tons per day (tpd) of total

SCAB NOx 2012 emissions are projected to drop to 255 tpd and 214 tpd in the 8-hour ozone attainment years of 2023 and 2031 respectively, due to continued implementation of already adopted regulatory actions ("baseline emissions"). The analysis suggests that total SCAB emissions of NOx must be reduced to approximately 141 tpd in 2023 and 96 tpd in 2031 to attain the 8-hour ozone standards. This represents an additional 45 percent reduction in NOx in 2023, and an additional 55 percent NOx reduction beyond 2031 levels.[2]

2.4.1 SCAQMD Rules and Regulations

The SCAQMD establishes a program of rules and regulations to obtain attainment of the state and federal standards in conjunction with the AQMP. Several of the rules and regulations that may be applicable to this project include, but are not limited to, the following:

- **SCAQMD Rule 402** prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

- **SCAQMD Rule 403** governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

- **SCAQMD Rule 445** restricts wood burning devices from being installed into any new development and is intended to reduce the emissions of particulate matter for wood burning devices.

- **SCAQMD Rule 1113** governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and

[2] SCAQMD. Final 2016 Air Quality Management Plan. http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp

solvents used during construction and operation of project must comply with Rule 1113.

- **SCAQMD Rule 1143** governs the manufacture, sale, and use of paint thinners and solvents used in thinning of coating materials, cleaning of coating application equipment, and other solvent cleaning operations by limiting their VOC content. This rule regulates the VOC content of solvents used during construction. Solvents used during the construction phase must comply with this rule.

- **SCAQMD Rule 1186** limits the presence of fugitive dust on paved and unpaved roads and sets certification protocols and requirements for street sweepers that are under contract to provide sweeping services to any federal, state, county, agency or special district such as water, air, sanitation, transit, or school district.

2.5 Local Climate and Meteorology

The project is located in the South Coast Air Basin (SCAB). Climatological data from the nearest weather station to the project site is summarized in Table 6.

Table 6
Meteorological Summary[1]

Month	Temperature (˚F)			Mean Precipitation (inches)
	Max.	Min.	Mean	
January	66.8	44.0	55.5	3.65
February	69.4	45.0	57.2	2.85
March	70.1	46.3	58.2	2.80
April	74.5	48.4	61.5	1.13
May	79.9	52.6	66.2	0.26
June	86.7	56.6	71.7	0.04
July	95.0	62.2	78.6	0.01
August	94.4	62.9	78.7	0.11
September	91.3	61.3	76.3	0.34
October	83.0	55.4	69.2	0.34
November	73.6	48.5	61.0	1.72
December	68.3	44.4	56.3	2.07
Annual	**79.4**	**52.3**	**65.9**	**15.32**

[1] Source: Western Regional Climate Center 2012. Averages derived from measurements recorded from 1951 to 1984 at Fontana Kaiser Station No. 043120.

2.6 Local Air Quality

The air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates of the existing emissions in the Basin provided in the Final 2016 Air Quality Management Plan, prepared by SCAQMD, March 2017, indicate that collectively, mobile sources account for 60 percent of the VOC, 90 percent of the NOx emissions, 95 percent of the CO emissions and 34 percent of directly emitted PM2.5, with another 13 percent of PM2.5 from road dust.

The SCAQMD has divided the SCAB into fourteen general forecasting areas and thirty eight Source Receptor Areas (SRA) for monitoring and reporting local air quality. The SCAQMD provides daily reports of the current air quality conditions in each general forecast area and SRA. The monitoring areas provide a general representation of the local meteorological, terrain, and air quality conditions within the SCAB.

The project is located within the San Bernardino Valley general forecasting area and Southwest San Bernardino Valley (SRA-33). The Southwest San Bernardino Valley has been divided into two (2) regions; I-10 Near Road and CA-60 Near Road. Due to the close proximity of the project site to the I-10 Road, published air quality monitoring data has been used from this location.

Table 7 summarizes the published air quality monitoring for the most recent 3-year period available. These pollutant levels were used to comprise a "background" for the project location and existing local air quality. For criteria pollutants not monitored near the site, data from the nearest monitoring station with a comparable setting were used.

Table 7
Local Air Quality

Air Pollutant Location	Averaging Time	Item	2017	2018	2019
Carbon Monoxide -- I-10 Near Road	1 Hour	Max 1-Hour (ppm)	4.2	1.6	1.5
		Exceeded State Standard (20 ppm)	No	No	No
		Exceeded National Standard (35 ppm)	No	No	No
	8 Hour	Max 8 Hour (ppm)	1.3	1.3	1.1
		Exceeded State Standard (9 ppm)	No	No	No
		Exceeded National Standard (9 ppm)	No	No	No
Ozone -- Central San Bernardino Valley-1	1 Hour	Max 1-Hour (ppm)	0.137	0.141	0.124
		Days > State Standard (0.09 ppm)	33	38	41
	8 Hour	Max 8 Hour (ppm)	0.118	0.116	0.114
		Days > State Standard (0.07 ppm)	49	69	67
		Days >National Standard (0.070 ppm)	49	69	67
Nitrogen Dioxide -- I-10 Near Road	1 Hour	Max 1-Hour (ppm)	0.086	0.0883	0.0863
		Exceeded State Standard (0.18 ppm)	No	No	No
	Annual	Annual Average (ppm)	0.0288	0.0272	0.0276
		Exceeded >State Standard (0.030 ppm)	No	No	No
		Exceeded >National Standard (0.053 ppm)	No	No	No
Sulfur Dioxide -- Central San Bernardino Valley-1	1 Hour	Max 1 Hour (ppm)	0.0039	0.0029	0.0024
		Exceed State Standard (0.25 ppm)	No	No	No
		Exceed National Standard (0.075 ppm)	No	No	No
Coarse Particles (PM10) -- Central San Bernardino Valley-1	24 Hour	Max 24-Hour ($\mu g/m^3$)	75	64	88
		Days > State Standard (50 $\mu g/m^3$)	2	9	12
		Days >National Standard (150 $\mu g/m^3$)	0	0	0
	Annual	Annual Average ($\mu g/m^3$)	39.3	34.1	34.8
		Exceeded State Standard (20 $\mu g/m^3$)	Yes	Yes	Yes
Fine Particulates (PM2.5) -- Central San Bernardino Valley-1	24 Hour	Max 24-Hour ($\mu g/m^3$)	39.2	29.2	46.5
		Days >National Standard (35 $\mu g/m^3$)	1	0	2
	Annual	Annual Average ($\mu g/m^3$)	12.04	11.13	10.84
		Exceeded State Standard (12 $\mu g/m^3$)	No	No	No
		Exceeded National Standard (15 $\mu g/m^3$)	No	No	No

Source : https://www.aqmd.gov/home/air-quality/historical-air-quality-data/historical-data-by-year
$\mu g/m^3$ = micrograms per cubic meter
ARB = California Air Resource Board
EPA= Environmental Protection Agency
ppm = part per million
(- -) = Data not provided

3.0 Global Climate Change Setting

Global climate change is the change in the average weather of the earth that is measured by such things as alterations in temperature, wind patterns, storms, and precipitation. Current data shows that the recent period of warming is occurring more rapidly than past geological events. The average global surface temperature has increased by approximately 1.4° Fahrenheit since the early 20th Century. 1.4° Fahrenheit may seem like a small change, but it's an unusual event in Earth's recent history, and as we are seeing, even small changes in temperature can cause enormous changes in the environment.

The planet's climate record, preserved in tree rings, ice cores, and coral reefs, shows that the global average temperature has been stable over long periods of time. For example, at the end of the last ice age, when the Northeast United States was covered by more than 3,000 feet of ice, average global temperatures were only 5° to 9° Fahrenheit cooler than today. The Intergovernmental Panel on Climate Change (IPCC), which includes more than 1,300 scientists from the United States and other countries, forecasts a temperature rise of 2.5° to 10° Fahrenheit over the next century. Therefore, significant changes to the environment are expected in the near future.

The consequences of global climate change include more frequent and severe weather, worsening air pollution by increasing ground level ozone, higher rates of plant and animal extinction, more acidic and oxygen depleted oceans, strain on food and water resources, and threats to densely populated coastal and low lying areas from sea level rise.

The impacts of climate change are already visible in the Southwest United States. In California, the consequences of climate change include;

- A rise in sea levels resulting in the displacement of coastal businesses and residencies
- A reduction in the quality and supply of water from the Sierra snowpack
- Increased risk of large wildfires
- Exacerbation of air quality problems
- Reductions in the quality and quantity of agricultural products
- An increased temperature and extreme weather events
- A decrease in the health and productivity of California's forests

3.1 Greenhouse Gases

GHGs comprise less than 0.1 percent of the total atmospheric composition, yet they play an essential role in influencing climate. Greenhouse gases include naturally occurring compounds such as carbon dioxide (CO_2), methane (CH_4), water vapor (H_2O), and nitrous oxide (N_2O), while others are synthetic. Man-made GHGs include the chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs), as well as sulfur hexafluoride (SF_6). Different GHGs have different effects on the Earth's warming. GHGs differ from each other in their ability to absorb energy (their "radiative efficiency") and how long they stay in the atmosphere, also known as the "lifetime".

The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of CO_2. The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period. The time period usually used for GWPs is 100 years. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases and allows policymakers to compare emissions reduction opportunities across sectors and gases.

Table 8 lists the 100-year GWP of GHGs from the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (AR5).

Table 8
Global Warming Potential of Greenhouse Gases[1, 2]

Gas Name	Formula	Lifetime (years)	GWP
Carbon Dioxide	CO_2		1
Methane	CH_4	12	28
Nitrous Oxide	N_2O	114	265
Sulphur Hexafluoride	SF_6	3200	23,500
Nitrogen Trifluoride	NF_3	740	16,100
Hexafluoroethane (PFC-116)	C_2F_6	10,000	11,100
Octafluoropropane (PFC-218)	C_3F_8	2,600	8,900
Octafluorocyclobutane (PFC-318)	C_4F_8	3,200	9,540
Tetrafluoromethane (PFC-14)	CF_4	50,000	6,630
Hydrofluorocarbon 125	HFC-125	29	3,170
Hydrofluorocarbon 134a	HFC-134a	14	1,300
Hydrofluorocarbon 143a	HFC-143a	52	4,800
Hydrofluorocarbon 152a	HFC-152a	1	138
Hydrofluorocarbon 227ea	HFC-227ea	34	3,350
Hydrofluorocarbon 23	HFC-23	270	12,400
Hydrofluorocarbon 236fa	HFC-236fa	240	8,060
Hydrofluorocarbon 245fa	HFC-245fa	8	858
Hydrofluorocarbon 32	HFC-32	5	677
Hydrofluorocarbon 365mfc	HFC-365mfc	9	804
Hydrofluorocarbon 43-10mee	HFC-43-10mee	16	1,650

[1] Source: IPCC Fifth Assessment Report (AR5)
https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf
[2] GWPs are used to convert GHG emission values to "carbon dioxide equivalent" (CO_2e) units

3.2 GHG Regulatory Setting – State of California

The State of California has been a leader in climate change legislation and has passed numerous bills to reduce greenhouse gas emissions across all sectors of the economy. Some of the key climate legislation in the State include the following:

- **Assembly Bill (AB) 32, California Global Warming Solutions Act of 2006.** AB 32 set the stage for the State's transition to a sustainable, low-carbon future. AB 32 was the first program in the country to take a comprehensive, long-term approach to addressing climate change.[3]

- **Senate Bill (SB) 375, Sustainable Communities & Climate Protection Act of 2008.** SB 375 requires the Air Resources Board to develop regional greenhouse gas emission reduction targets for passenger vehicles GHG reduction targets for 2020 and 2035 for each region covered by the State's 18 metropolitan planning organizations.[4]

- **Senate Bill (SB) 100, California Renewables Portfolio Standard Program.** SB 100 established a landmark policy requiring renewable energy and zero-carbon resources supply 100 percent of electric retail sales to end-use customers by 2045.[5]

3.3 GHG Emissions Inventory

Table 9 shows the latest GHG emission inventories at the national, state, regional and local levels.

Table 9
GHG Emissions Inventory[1]

United States (2018)[2]	State of California (2018)[3]	SCAG (2020)[4]	City of Ontario (2020)[5]
6,678 $MMTCO_2e$	425 $MMTCO_2e$	216.4 $MMTCO_2e$	3.12 $MMTCO_2e$

[1] $MMTCO_2e$ = Million Metric Tons of Carbon Dioxide Equivalent
[2] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks
[3] https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/ghg_inventory_trends_00-18.pdf
[4] http://www.scag.ca.gov/programs/Pages/GreenhouseGases.aspx
[5] City of Ontario Community Climate Action Plan, November 2014. Estimated value.

[3] California Air Resources Board. AB 32 Global Warming Solutions Act of 2006. https://ww2.arb.ca.gov/resources/fact-sheets/ab-32-global-warming-solutions-act-2006
[4] California Air Resources Board. Sustainable Communities and Climate Protection Program. https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-climate-protection-program/about
[5] California Energy Commission. SB 100 Joint Agency Report. https://www.energy.ca.gov/sb100

4.0 Modeling Parameters and Assumptions

The California Emissions Estimator Model Version 2020.4.0 (CalEEMod) was used to calculate criteria air pollutants and GHG emissions from the construction and operation of the project. CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify criteria air pollutant and GHG emissions.

The model quantifies direct emissions from construction and operation activities (including vehicle use), as well as indirect emissions, such as GHG emissions from off-site energy generation, solid waste disposal, vegetation planting and/or removal, and water use. The model also identifies design features to reduce criteria pollutant and GHG emissions. The model was developed for the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the California air districts.

4.1 Construction Assumptions

Construction of the project is estimated to begin in the year 2021 and last approximately 21 months. Construction activities are expected to consist of demolition, site preparation, grading, building construction, paving, and architectural coating. The project is expected to be operational in the year 2023. For purposes of this analysis, construction phases are not expected to overlap.

The project is expected to demolish an existing asphalt surface parking lot of approximately 7.48 acres within Lot A and Lot B. The project is not expected to require the import or export any earthwork material during grading phase; preliminary earthwork estimates show a balanced site.

Assumptions for off-road equipment usage, soil disturbance area, worker and vendor trips, paving, and architectural coatings utilize the CalEEMod defaults.

The project will be required to comply with several standard fugitive dust control measures, per SCAQMD Rule 403. The following key inputs are utilized in CalEEMod and are based upon data provided from SCAQMD[6]:

- Utilize soil stabilizers - 30% PM_{10} and $PM_{2.5}$ reduction.

[6] SCAQMD. Fugitive Dust Mitigation Measures. http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

- Replace ground cover - 15% PM_{10} and $PM_{2.5}$ reduction.
- Water exposed areas 2x per day.
- Unpaved road moisture content – 25%.
- Unpaved road vehicle speed – 15 mph.

4.2 Operational Assumptions

Operational emissions occur over the life of the project and are considered "long-term" sources of emissions. Operational emissions include both direct and indirect sources. This section briefly describes the operational sources of emissions analyzed for the project.

4.2.1 Mobile Source Emissions

Mobile source emissions are the largest source of long-term air pollutants from the operation of the project. Mobile sources are direct sources of project emissions that are primarily attributed to tailpipe exhaust and road dust (tire, brake, clutch, and road surface wear) from motor vehicles traveling to and from the site.

Estimates of mobile source emissions require information on four parameters: trip generation, trip length, vehicle/fleet mix, and emission factors (quantity of emission for each mile traveled or time spent idling by each vehicle).

The trip generation rates, trip length and trip percentages for this project are based on the latest version of the Toyota Arena Mixed Use Development Traffic Impact Study Scoping Agreement, by RK, May 2021 and San Bernardino County Transportation Authority (SBCTA) VMT Tool[7].

The Emission Factors (EMFAC2017) 2017 model and off-model adjustments factors to account for the SAFE Vehicle Rule is used to estimate the mobile source emissions are embedded in the CalEEMod emissions model. No adjustments have been made to default emission factors.

The project's total vehicle miles traveled estimated by CalEEMod is shown in the Table 10 for this project.

[7] SBCTA VMT Screening Tool. https://devapps.fehrandpeers.com/sbctavmt/

Table 10
Operational Vehicle Miles Traveled

Land Use	Annual Vehicle Miles Traveled (VMT)
Multifamily Mid-Rise[1]	5,682,657
Commercial/Retail Center	4,539,098
Total	**10,221,754**

[1] The VMT estimates for residential home-based trips are based on estimates from the SBCTA VMT Tool, which shows daily home-based VMT per capita for TAZ 53690101 of 7.9 VMT per population for model year 2023.

The operational vehicle fleet mix has been adjusted to reflect vehicle types used for typical residential home-based trips and the commercial/retail and office trips generated by the project. The Southern California Association of Governments (SCAG) regional travel demand model does not include heavy-duty trucks, buses or other large vehicles that would require passenger car equivalent (PCE) adjustments for residential home-based trips. The project does not consist of land uses that would typically require PCE adjustments to account for large trucks, such as warehousing.

To be conservative, the Air Quality/GHG analysis has assumed that 2% of the total residential home-based trips and commercial/retail and office trips will include trucks with a gross vehicle weight rating (GVWR) of 10,000 pound or greater. This includes LHD2, MHD, HHD, OBUS, UBUS, and SBUS vehicles. The 2% mix is also consistent with the default Highway Capacity Manual (HCM) assumptions. The adjusted vehicle mix is proportioned according to the default CalEEMod vehicle mix.

Table 11 summarizes vehicle mix used for this project.

Table 11
Vehicle Mix for Trips[1]

YUY	Vehicle Mix (%)
Light Duty Automobile (LDA)	55.05%
Light Duty Truck (LDTI)	5.72%
Light Duty Truck (LDT2)	17.64%
Medium Duty Truck (MDV)	14.23%
Light Heavy Truck (LHD1)	2.76%
Light Heavy Truck (LHD2)	0.34%
Medium Heavy Truck (MHD)	0.53%
Heavy Heavy Truck (HHD)	0.81%
Other Bus (OBUS)	0.03%
Urban Bus (UBUS)	0.01%
Motorcycle (MCY)	2.59%
School Bus (SBUS)	0.04%
Motor Home (MH)	0.24%
Total	**100.0%**

[1] Adjusted fleet mix to include 2% total trucks over 10,000 lbs GVWR. (LHD2, MHD, HHD, OBUS, UBUS, SBUS, MH)

5.0 Significance Thresholds

5.1 Air Quality Regional Significance Thresholds

The SCAQMD has established air quality emissions thresholds for criteria air pollutants for the purposes of determining whether a project may have a significant effect on the environment per Section 15002(g) of the Guidelines for implementing CEQA. By complying with the thresholds of significance, the project would be in compliance with the SCAQMD Air Quality Management Plan (AQMP) and the federal and state air quality standards.

Table 12 lists the air quality significance thresholds for the six air pollutants analyzed in this report. Lead is not included as part of this analysis as the project is not expected to emit lead in any significant measurable quantity.

Table 12
SCAQMD Regional Significance Air Quality Thresholds

Pollutant	Construction (lbs/day)	Operation (lbs/day)
NO_X	100	55
VOC	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
CO	550	550

[1] Source: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf

5.2 City of Ontario General Plan

The City of Ontario describes several goals and policies for addressing air quality and greenhouse gas in the General Plan ER4 Air Quality. The following policy goals are aimed at providing guidance and policy direction in providing better indoor and outdoor air quality for Ontario and the air basin will improve the quality of life of residents, workers and visitors, decrease health care costs and make Ontario more prosperous by making the City a more desirable place to be.

GOAL ER4: Improved indoor and outdoor air quality and reduced locally generated pollutant emissions

ER4-1 *Land Use.* We reduce GHG and other local pollutant emissions through compact, mixed use, and transit-oriented development and development that improves the regional jobs-housing balance.

ER4-2 *Sensitive Land Uses.* We prohibit the future siting of sensitive land uses, within the distances defined by the California Air Resources Board for specific source categories, without sufficient mitigation.

ER4-3 *Greenhouse Gases (GHG) Emissions Reductions.* We will reduce GHG emissions in accordance with regional, state and federal regulations.

ER4-4 *Indoor Air Quality.* We will comply with State Green Building Codes relative to indoor air quality.

ER4-5 *Transportation.* We promote mass transit and non-motorized mobility options (e.g. walking, biking) to reduce air pollutant emissions.

ER4-6 Particulate Matter. We support efforts to reduce particulate matter to meet State and Federal Clean Air Standards.

ER4-7 *Other Agency Collaboration.* We collaborate with other agencies within the South Coast Air Basin to improve regional air quality at the emission source.

5.4 City of Ontario Community Climate Action Plan

The City of Ontario has adopted the Community Climate Action Plan (CCAP) to help reduce citywide GHG emissions and align the City with the statewide Scoping Plan GHG reduction efforts.

The CCAP has established Screening Tables, which are setup similar to a checklist, with points allocated to certain elements of the project that would contribute to reduced GHG emissions. If a project garners 100 points (by including enough GHG reducing elements), then the project is consistent with Ontario City's Community Climate Action Plan for reducing emissions and the impact may be considered less than significant for purposes of CEQA.

6.0 Air Quality Impact Analysis

Consistent with CEQA and the State CEQA Guidelines, a significant impact related to air quality would occur if the proposed project is determined to:

a) Conflict with or obstruct implementation of the applicable air quality plan.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard.

c) Expose sensitive receptors to substantial pollutant concentrations.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

6.1 Short Term Air Quality Impacts - Construction

6.1.1 Daily Emissions - Construction

Daily air quality emissions include both on-site and off-site emissions associated with construction of the project. Regional daily emissions of criteria pollutants are compared to the SCAQMD thresholds of significance.

As shown in Table 13, daily emissions of criteria pollutants are expected to be below the allowable thresholds of significance.

CalEEMod daily emissions outputs are provided in Appendix A.

Table 13
Daily Construction Emissions

Maximum Daily Emissions (lbs/day)[1, 2]						
Activity	**VOC**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Demolition	0.91	14.16	26.89	0.09	7.84	1.56
Site Preparation	0.55	2.08	21.68	0.04	7.78	3.98
Grading	0.85	3.36	33.90	0.06	3.85	1.56
Building Construction	4.86	17.12	60.88	0.16	11.46	3.28
Paving	1.29	1.25	17.86	0.02	0.21	0.08
Architectural Coating	70.26	0.56	8.39	0.02	1.96	0.53
Maximum[1]	**70.26**	**17.12**	**60.88**	**0.16**	**11.46**	**3.98**
SCAQMD Threshold	75	100	550	150	150	55
Exceeds Threshold (?)	**No**	**No**	**No**	**No**	**No**	**No**

[1] Maximum daily emission during summer or winter; includes both on-site and off-site project emissions.
[2] Includes fugitive dust control measures and Tier 4 engine requirements.

The project must follow mandatory SCAQMD rules and requirements with regards to fugitive dust control, as described in Section 6.1.3. Compliance with the standard dust control measures is considered to be part of the conditions of approval for the project and built into the design features.

Table 13 shows that, the project's daily construction emissions will be below the applicable SCAQMD air quality standards and thresholds of significance. As a result, the project would not contribute substantially to an existing or projected air quality violation.

Furthermore, by complying with the SCAQMD standards, the project would not contribute to a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

The project's short-term construction impact on regional air resources is less than significant.

6.1.2 Fugitive Dust - Construction

The Project is required to comply with regional rules that assist in reducing short-term air pollutant emissions associated with suspended particulate matter, also known as fugitive dust. Fugitive dust emissions are commonly associated with land clearing activities, cut-and-fill grading operations, and exposure of soils to the air and wind. SCAQMD Rule 403 requires that fugitive dust is controlled with best-available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rules 402 and 403 require implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site.

The following recommendations are listed to ensure full compliance with the applicable dust control standards.

DF-1 Prepare and implement a Construction Management Plan which will include Best Available Control Measures to be submitted to the City of Ontario.

DF-2 Follow the standard SCAQMD rules and requirements with regards to fugitive dust control, which includes, but are not limited to the following:

1. All active construction areas shall be watered two (2) times daily.
2. Speed on unpaved roads shall be reduced to less than 15 mph.
3. Any visible dirt deposition on any public roadway shall be swept or washed at the site access points within 30 minutes.
4. Any on-site stockpiles of debris, dirt or other dusty material shall be covered or watered twice daily.
5. All operations on any unpaved surface shall be suspended if winds exceed 15 mph.
6. Access points shall be washed or swept daily.
7. Construction sites shall be sandbagged for erosion control.
8. Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
9. Cover all trucks hauling dirt, sand, soil, or other loose materials, and maintain at least 2 feet of freeboard space in accordance with the requirements of California Vehicle Code (CVC) section 23114.
10. Pave or gravel construction access roads at least 100 feet onto the site from the main road and use gravel aprons at truck exits.
11. Replace the ground cover of disturbed areas as quickly possible.

12. A fugitive dust control plan should be prepared and submitted to SCAQMD prior to the start of construction.

6.1.3 Odors - Construction

Heavy-duty equipment in the project area during construction will emit odors; however, the construction activity would cease to occur after individual construction is completed. The project is required to comply with Rule 402 during construction, which states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. No other sources of objectionable odors have been identified for the proposed Project.

Therefore, the project impact from odor emissions is less than significant.

6.1.4 Asbestos - Construction

Asbestos is a carcinogen and is categorized as a hazardous air pollutant by the Environmental Protection Agency (EPA). Asbestos fibers imbedded within construction materials become a health hazard once they are disturbed and rendered airborne, such as through physical contact like building renovation and demolition activities. Asbestos is regulated through the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and SCAQMD is the local enforcement authority for asbestos.

The project is not expected to require the demolition of existing building or structures. Therefore, the potential risk from exposure to asbestos during construction is small.

Asbestos also occurs naturally in serpentine and ultramafic rock. Based on the California Division of Mines and Geology General Location Guide for Ultramafic Rocks in California - Areas More Likely to Contain Naturally Occurring Asbestos, naturally occurring asbestos has not been shown to occur within in the vicinity of the project site. Therefore, the potential risk for naturally occurring asbestos (NOA) during project construction is small.

In the event asbestos is found on the site, the project will be required to comply with SCAQMD and NESHAP standards and protocols. SCAQMD Rule 1403 establishes the survey requirements, notification, and work practice requirements to prevent asbestos emissions

during construction activities. By following the required asbestos abatement protocols, the project impact from asbestos would be less than significant.

6.1.5 Diesel Particulate Matter - Construction

The greatest potential for toxic air contaminant emissions from the project would be related to diesel particulate matter (DPM) emissions associated with heavy diesel equipment used during construction. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of "individual cancer risk". "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

The proposed project's construction activity is not expected to be a long-term (i.e., 30 years) source of toxic air contaminant emissions, thus the individual cancer risk is greatly reduced.

However, given the close proximity of the project to nearest sensitive receptors (residential homes to the north), several measures are provided to help ensure the potential health risk associated with DPM during construction is reduced to the maximum extent feasible. This includes a requirement for Tier 4 engines on all diesel-powered construction equipment. Tier 4 engines, along with the latest national fuel standards, have been shown to yield PM reductions of over 95% from the typical Tier 2 and Tier 3 engines[8].

It is presumed that with the recommended design features and Tier 4 engines in place that the potential short term construction health risks will be adequately reduced to be less than significant. It should be noted however, that a quantified diesel health risk assessment (HRA) has not been prepared as part of the scope of this analysis.

The following design features are recommended to help ensure the project does not expose receptors to substantial pollution concentrations during construction:

DF-3 All diesel construction equipment shall have Tier 4 low emission "clean diesel" engines (OEM or retrofit) that include diesel oxidation catalysts and diesel particulate filters that meet the latest CARB best available control technology.

[8] EPA. Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel; Final Rule. (40 CFR Parts 9, 69, et al.)

DF-4 Construction equipment shall be maintained in proper tune.

DF-5 All construction vehicles shall be prohibited from excessive idling. Excessive idling is defined as five (5) minutes or longer.

DF-6 Minimize the simultaneous operation of multiple construction equipment units.

DF-7 The use of heavy construction equipment and earthmoving activity shall be suspended during Air Alerts when the Air Quality Index reaches the "Unhealthy" level.

DF-8 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

DF-9 Utilize zero VOC and low VOC paints and solvents, wherever possible.

6.2 Long Term Air Quality Impacts - Operation

6.2.1 Daily Emissions - Operation

Long-term operational air pollutant impacts from the project are shown in Table 14. The project is not expected to exceed any of the allowable daily emissions thresholds for criteria pollutants at the regional level. CalEEMod daily emissions outputs are provided in Appendix A.

The project's daily operational emissions will be below the applicable SCAQMD air quality thresholds of significance and the project would not contribute substantially to an existing or projected air quality violation. Furthermore, by complying with the SCAQMD standards, the project would not contribute to a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

The project related long-term air quality impacts are less than significant.

Table 14
Daily Operational Emissions

Maximum Daily Emissions (lbs/day)[1]						
Activity	**VOC**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Mobile Sources	17.27	14.68	127.09	0.24	23.87	6.46
Energy Sources	0.30	2.55	1.10	0.02	0.21	0.21
Area Sources	19.70	10.40	61.39	0.07	1.10	1.10
Total	**37.26**	**27.64**	**189.58**	**0.32**	**25.18**	**7.77**
SCAQMD Threshold	55	55	550	150	150	55
Exceeds Threshold (?)	No	No	No	No	No	No

[1] Maximum daily emission during summer or winter; includes both on-site and off-site project emissions.
[2] Daily emissions reports are provided in Appendix A.

6.2.2 Odors - Operation

Land uses that commonly receive odor complaints include agricultural uses (farming and livestock), chemical plants, composting operations, dairies, fiberglass molding facilities, food processing plants, landfills, refineries, rail yards, and wastewater treatment plants. The proposed project does not contain land uses that would typically be associated with significant odor emissions.

The project will be required to comply with standard building code requirements related to exhaust ventilation, as well as comply with SCAQMD Rule 402. Rule 402 requires that a person may not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. Project related odors are not expected to meet the criteria of being a nuisance. **The project's operation would result in less than significant odor impacts.**

6.2.3 Toxic Air Contaminants - Operations

The project would consist of commercial/retail and residential land uses. These types of projects do not include major sources of toxic air contaminants (TAC) emissions that would result in significant exposure of sensitive receptors to substantial pollutant concentrations. Therefore, **the project impact is considered less than significant.**

7.0 Greenhouse Gas Impact Analysis

Consistent with CEQA Guidelines, a significant impact related to greenhouse gas would occur if the proposed project is determined to:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of greenhouse gases.

For purposes of this project, the City of Ontario CCAP establishes the requirements for determining whether a project would have a significant impact to GHG emissions under CEQA.

The CCAP uses Screening Tables, which are setup similar to a checklist, with points allocated to certain elements of the project to reduce GHG emissions. If a project garners 100 points (by including enough GHG reducing elements), then the project is consistent with CCAP and the impact may be considered less than significant for purposes of CEQA.

The proposed project is expected to comply with the CCAP by implementing the Screening Table requirements into the project design. To help ensure the project adheres to the CCAP requirements, the following project design feature is provided:

DF-10 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

As described in Appendix B of the CCAP, for mixed use projects, both the residential and non-residential screening tables shall be completed. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City's CAP and are considered less than significant for GHG emissions.

Therefore, with the implementation of the CCAP Screening Tables, the project is not expected to generate GHG emissions, either directly or indirectly, that would cause a significant impact on the environment. Also, by complying with the CCAP, the project will not conflict with an applicable plan, policy or regulation for the purpose of reducing the emissions of greenhouse gases and the impact is considered less than significant.

Furthermore, since the purpose of the City's CCAP is to ensure compliance with the state's climate initiatives for reducing GHG emissions, by complying with the CCAP, the project will also be in compliant with the broader statewide goals for combating climate change; such as those required in the CARB Scoping Plan and AB 32.

The mixed use project is also located within close proximity to high quality transit, located in a low VMT zone, and offers high-density residential development near commercial uses. The project will include pedestrian friendly and walkable design that will encourage fewer auto-based trips. The following project design features will be provided to further help reduce GHG emissions:

DF-11 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-12 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-13 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-14 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-15 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-16 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb

extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

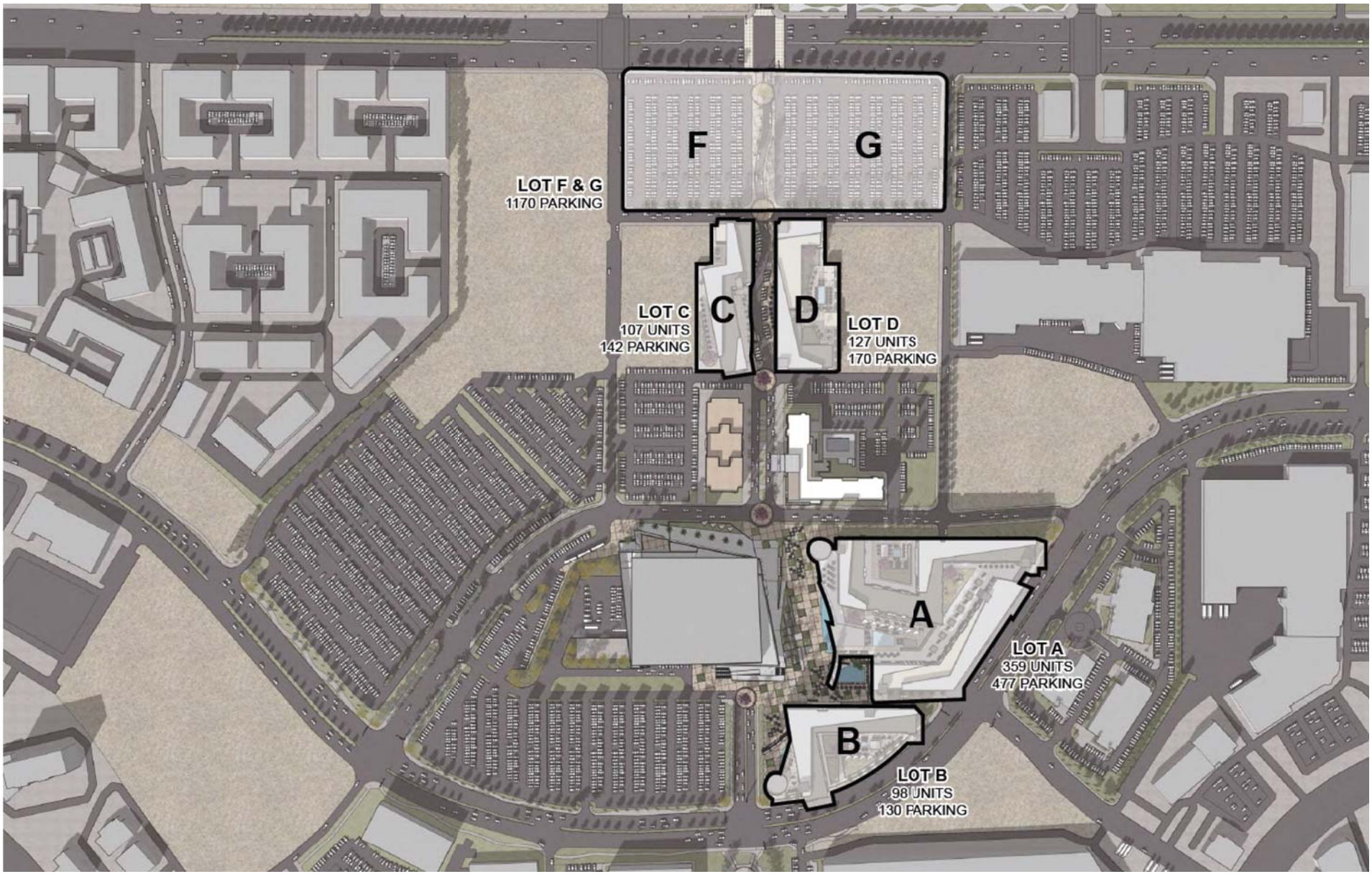
DF-17 Provide electric vehicle charging stations per the requirements of CALGreen.

Exhibits

Location Map

N

Exhibit B
Site Plan



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Appendices

Appendix A

Daily Emissions Calculations Output
(CalEEMod)

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Toyota Arena Mixed Use Development

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	691.00	Dwelling Unit	11.47	691,000.00	1976
Enclosed Parking with Elevator	919.00	Space	0.00	367,600.00	0
Parking Lot	1,170.00	Space	7.26	468,000.00	0
Regional Shopping Center	71.20	1000sqft	0.00	71,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	531.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The proposed project consists of a mixed-use town center development with 691 multifamily DU and 71,200 square feet of commercial/retail land uses on approximately 18.73 acres.

Construction Phase - The project's architectural coating phase will be extended to 75 days.

Demolition - The project is proposing to demolish approximetely 326,026 square feet of surface asphalt parking lot.

Vehicle Trips - The trip generation rates have been updated to reflect Toyota Arena TIA Scoping Agreement, by RK, May 25, 2021 and Traffic Impact Study and SANBAG VMT Model.

Fleet Mix - Operational fleet mix adjusted to equal 2% trucks with GVWR > 10,000 lbs.

Woodstoves - SCAQMD Rule 445 restricts wood burning hearths/fireplaces from being installed in new development.

Construction Off-road Equipment Mitigation - Project will be required to comply with SCAQMD Rule 403 regarding fugitive dust control.

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	75.00
tblConstructionPhase	PhaseEndDate	4/13/2023	6/29/2023
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberWood	34.55	0.00
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	LHD2	0.00	7.1960e-003

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LHD2	0.00	7.1960e-003
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	UBUS	0.00	1.1900e-004
tblFleetMix	UBUS	0.00	2.5400e-004
tblFleetMix	UBUS	0.00	2.5400e-004

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	UBUS	0.00	1.1900e-004
tblLandUse	LotAcreage	18.18	11.47
tblLandUse	LotAcreage	8.27	0.00
tblLandUse	LotAcreage	10.53	7.26
tblLandUse	LotAcreage	1.63	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	4.37
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	4.37
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	4.37
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.91	5.17
tblVehicleTrips	ST_TR	46.12	36.38
tblVehicleTrips	SU_TR	4.09	5.17
tblVehicleTrips	WD_TR	5.44	5.17
tblVehicleTrips	WD_TR	37.75	29.77
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.4347	46.4611	59.9899	0.1622	19.8582	2.0456	21.9038	10.1558	1.8819	12.0378	0.0000	16,507.4778	16,507.4778	1.9489	0.9233	16,807.9157
2022	5.7820	27.6734	55.8128	0.1582	11.1581	0.9758	12.1338	2.9915	0.9189	3.9104	0.0000	16,137.5984	16,137.5984	0.9697	0.8848	16,425.5012
2023	70.4209	24.2267	52.3577	0.1536	11.1580	0.8064	11.9644	2.9915	0.7587	3.7502	0.0000	15,714.5265	15,714.5265	0.9318	0.8384	15,987.6709
Maximum	**70.4209**	**46.4611**	**59.9899**	**0.1622**	**19.8582**	**2.0456**	**21.9038**	**10.1558**	**1.8819**	**12.0378**	**0.0000**	**16,507.4778**	**16,507.4778**	**1.9489**	**0.9233**	**16,807.9157**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.8616	16.4282	60.8749	0.1622	11.1581	0.2990	11.4571	3.9176	0.2858	3.9807	0.0000	16,507.4778	16,507.4778	1.9489	0.9233	16,807.9157
2022	4.4036	14.2925	56.9096	0.1582	11.1581	0.2076	11.3656	2.9915	0.1985	3.1900	0.0000	16,137.5984	16,137.5984	0.9697	0.8848	16,425.5012
2023	70.2589	12.0766	53.5740	0.1536	11.1580	0.1474	11.3054	2.9915	0.1410	3.1326	0.0000	15,714.5265	15,714.5265	0.9318	0.8384	15,987.6709
Maximum	**70.2589**	**16.4282**	**60.8749**	**0.1622**	**11.1581**	**0.2990**	**11.4571**	**3.9176**	**0.2858**	**3.9807**	**0.0000**	**16,507.4778**	**16,507.4778**	**1.9489**	**0.9233**	**16,807.9157**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	3.77	56.49	-1.90	0.00	20.63	82.92	25.81	38.65	82.43	47.69	0.00	0.00	0.00	0.00	0.00	0.00

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618
Total	**37.2623**	**26.7575**	**189.5821**	**0.3178**	**23.6977**	**1.4792**	**25.1768**	**6.3029**	**1.4675**	**7.7704**	**0.0000**	**40,050.4429**	**40,050.4429**	**1.9954**	**1.3931**	**40,515.4682**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618
Total	**37.2623**	**26.7575**	**189.5821**	**0.3178**	**23.6977**	**1.4792**	**25.1768**	**6.3029**	**1.4675**	**7.7704**	**0.0000**	**40,050.4429**	**40,050.4429**	**1.9954**	**1.3931**	**40,515.4682**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2021	10/28/2021	5	20	
2	Site Preparation	Site Preparation	10/29/2021	11/11/2021	5	10	
3	Grading	Grading	11/12/2021	12/23/2021	5	30	
4	Building Construction	Building Construction	12/24/2021	2/16/2023	5	300	
5	Paving	Paving	2/17/2023	3/16/2023	5	20	
6	Architectural Coating	Architectural Coating	3/17/2023	6/29/2023	5	75	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 7.26

Residential Indoor: 1,399,275; Residential Outdoor: 466,425; Non-Residential Indoor: 106,800; Non-Residential Outdoor: 35,600; Striped Parking Area: 50,136 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,483.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	871.00	222.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	174.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.0493	0.0000	16.0493	2.4300	0.0000	2.4300			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**16.0493**	**1.5513**	**17.6006**	**2.4300**	**1.4411**	**3.8711**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3825	11.5481	2.9311	0.0448	1.2986	0.1738	1.4724	0.3561	0.1663	0.5224		4,874.0609	4,874.0609	0.2123	0.7723	5,109.5096
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0689	0.0459	0.6786	1.6000e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		161.8483	161.8483	4.5800e-003	4.2800e-003	163.2380
Total	**0.4515**	**11.5940**	**3.6097**	**0.0464**	**1.4662**	**0.1748**	**1.6410**	**0.4006**	**0.1672**	**0.5677**		**5,035.9092**	**5,035.9092**	**0.2169**	**0.7766**	**5,272.7476**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1388	0.0000	6.1388	0.9295	0.0000	0.9295			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		0.0616	0.0616		0.0616	0.0616	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**6.1388**	**0.0616**	**6.2005**	**0.9295**	**0.0616**	**0.9911**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3825	11.5481	2.9311	0.0448	1.2986	0.1738	1.4724	0.3561	0.1663	0.5224		4,874.0609	4,874.0609	0.2123	0.7723	5,109.5096
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0689	0.0459	0.6786	1.6000e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		161.8483	161.8483	4.5800e-003	4.2800e-003	163.2380
Total	**0.4515**	**11.5940**	**3.6097**	**0.0464**	**1.4662**	**0.1748**	**1.6410**	**0.4006**	**0.1672**	**0.5677**		**5,035.9092**	**5,035.9092**	**0.2169**	**0.7766**	**5,272.7476**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.6570**	**2.0445**	**21.7015**	**10.1025**	**1.8809**	**11.9834**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0827	0.0551	0.8143	1.9200e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		194.2180	194.2180	5.5000e-003	5.1300e-003	195.8856
Total	**0.0827**	**0.0551**	**0.8143**	**1.9200e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**194.2180**	**194.2180**	**5.5000e-003**	**5.1300e-003**	**195.8856**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.5188	0.0000	7.5188	3.8642	0.0000	3.8642			0.0000			0.0000
Off-Road	0.4656	2.0175	20.8690	0.0380		0.0621	0.0621		0.0621	0.0621	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**0.4656**	**2.0175**	**20.8690**	**0.0380**	**7.5188**	**0.0621**	**7.5809**	**3.8642**	**0.0621**	**3.9263**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0827	0.0551	0.8143	1.9200e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		194.2180	194.2180	5.5000e-003	5.1300e-003	195.8856
Total	**0.0827**	**0.0551**	**0.8143**	**1.9200e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**194.2180**	**194.2180**	**5.5000e-003**	**5.1300e-003**	**195.8856**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**9.2036**	**1.9853**	**11.1889**	**3.6538**	**1.8265**	**5.4803**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0919	0.0612	0.9048	2.1300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		215.7978	215.7978	6.1100e-003	5.7000e-003	217.6506
Total	**0.0919**	**0.0612**	**0.9048**	**2.1300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**215.7978**	**215.7978**	**6.1100e-003**	**5.7000e-003**	**217.6506**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.5204	0.0000	3.5204	1.3976	0.0000	1.3976			0.0000			0.0000
Off-Road	0.7616	3.3000	32.9991	0.0620		0.1015	0.1015		0.1015	0.1015	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**0.7616**	**3.3000**	**32.9991**	**0.0620**	**3.5204**	**0.1015**	**3.6219**	**1.3976**	**0.1015**	**1.4991**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0919	0.0612	0.9048	2.1300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		215.7978	215.7978	6.1100e-003	5.7000e-003	217.6506
Total	**0.0919**	**0.0612**	**0.9048**	**2.1300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**215.7978**	**215.7978**	**6.1100e-003**	**5.7000e-003**	**217.6506**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5310	11.5275	4.0099	0.0425	1.4223	0.2037	1.6261	0.4096	0.1949	0.6045		4,556.1208	4,556.1208	0.1292	0.6749	4,760.4663
Worker	4.0029	2.6661	39.4047	0.0928	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		9,397.9931	9,397.9931	0.2662	0.2485	9,478.6851
Total	**4.5338**	**14.1935**	**43.4147**	**0.1353**	**11.1581**	**0.2582**	**11.4163**	**2.9915**	**0.2451**	**3.2366**		**13,954.1139**	**13,954.1139**	**0.3954**	**0.9233**	**14,239.1514**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5310	11.5275	4.0099	0.0425	1.4223	0.2037	1.6261	0.4096	0.1949	0.6045		4,556.1208	4,556.1208	0.1292	0.6749	4,760.4663
Worker	4.0029	2.6661	39.4047	0.0928	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		9,397.9931	9,397.9931	0.2662	0.2485	9,478.6851
Total	**4.5338**	**14.1935**	**43.4147**	**0.1353**	**11.1581**	**0.2582**	**11.4163**	**2.9915**	**0.2451**	**3.2366**		**13,954.1139**	**13,954.1139**	**0.3954**	**0.9233**	**14,239.1514**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3869	9.7214	3.5677	0.0414	1.4223	0.1157	1.5380	0.4096	0.1107	0.5202		4,441.5281	4,441.5281	0.1200	0.6573	4,640.3962
Worker	3.6889	2.3364	35.8817	0.0899	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		9,141.7367	9,141.7367	0.2377	0.2275	9,215.4729
Total	**4.0757**	**12.0578**	**39.4494**	**0.1313**	**11.1581**	**0.1668**	**11.3248**	**2.9915**	**0.1577**	**3.1492**		**13,583.2648**	**13,583.2648**	**0.3577**	**0.8848**	**13,855.8690**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3869	9.7214	3.5677	0.0414	1.4223	0.1157	1.5380	0.4096	0.1107	0.5202		4,441.5281	4,441.5281	0.1200	0.6573	4,640.3962
Worker	3.6889	2.3364	35.8817	0.0899	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		9,141.7367	9,141.7367	0.2377	0.2275	9,215.4729
Total	**4.0757**	**12.0578**	**39.4494**	**0.1313**	**11.1581**	**0.1668**	**11.3248**	**2.9915**	**0.1577**	**3.1492**		**13,583.2648**	**13,583.2648**	**0.3577**	**0.8848**	**13,855.8690**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2599	7.7868	3.2674	0.0397	1.4223	0.0585	1.4808	0.4096	0.0560	0.4655		4,260.5836	4,260.5836	0.1114	0.6292	4,450.8606
Worker	3.4058	2.0551	32.8463	0.0870	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,898.7330	8,898.7330	0.2126	0.2093	8,966.4042
Total	**3.6656**	**9.8419**	**36.1137**	**0.1267**	**11.1580**	**0.1066**	**11.2647**	**2.9915**	**0.1003**	**3.0918**		**13,159.3166**	**13,159.3166**	**0.3239**	**0.8384**	**13,417.2648**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2599	7.7868	3.2674	0.0397	1.4223	0.0585	1.4808	0.4096	0.0560	0.4655		4,260.5836	4,260.5836	0.1114	0.6292	4,450.8606
Worker	3.4058	2.0551	32.8463	0.0870	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,898.7330	8,898.7330	0.2126	0.2093	8,966.4042
Total	**3.6656**	**9.8419**	**36.1137**	**0.1267**	**11.1580**	**0.1066**	**11.2647**	**2.9915**	**0.1003**	**3.0918**		**13,159.3166**	**13,159.3166**	**0.3239**	**0.8384**	**13,417.2648**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9838**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0587	0.0354	0.5657	1.5000e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		153.2503	153.2503	3.6600e-003	3.6000e-003	154.4157
Total	**0.0587**	**0.0354**	**0.5657**	**1.5000e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**153.2503**	**153.2503**	**3.6600e-003**	**3.6000e-003**	**154.4157**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2805	1.2154	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2315**	**1.2154**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0587	0.0354	0.5657	1.5000e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		153.2503	153.2503	3.6600e-003	3.6000e-003	154.4157
Total	**0.0587**	**0.0354**	**0.5657**	**1.5000e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**153.2503**	**153.2503**	**3.6600e-003**	**3.6000e-003**	**154.4157**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**69.7405**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6804	0.4105	6.5617	0.0174	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,777.7033	1,777.7033	0.0425	0.0418	1,791.2220
Total	**0.6804**	**0.4105**	**6.5617**	**0.0174**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,777.7033**	**1,777.7033**	**0.0425**	**0.0418**	**1,791.2220**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**69.5786**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6804	0.4105	6.5617	0.0174	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,777.7033	1,777.7033	0.0425	0.0418	1,791.2220
Total	**0.6804**	**0.4105**	**6.5617**	**0.0174**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,777.7033**	**1,777.7033**	**0.0425**	**0.0418**	**1,791.2220**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618
Unmitigated	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	3,572.47	3,572.47	3572.47	5,682,657	5,682,657
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	2,119.62	2,590.26	1502.32	4,539,098	4,539,098
Total	5,692.09	6,162.73	5,074.79	10,221,754	10,221,754

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	4.37	4.37	4.37	100.00	0.00	0.00	100	0	0
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11

4.4 Fleet Mix

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375
Enclosed Parking with Elevator	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Parking Lot	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Regional Shopping Center	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
NaturalGas Unmitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27227.6	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	429.151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27.2276	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	0.429151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

6.0 Area Detail

6.1 Mitigation Measures Area

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Unmitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Toyota Arena Mixed Use Development

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	691.00	Dwelling Unit	11.47	691,000.00	1976
Enclosed Parking with Elevator	919.00	Space	0.00	367,600.00	0
Parking Lot	1,170.00	Space	7.26	468,000.00	0
Regional Shopping Center	71.20	1000sqft	0.00	71,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	531.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The proposed project consists of a mixed-use town center development with 691 multifamily DU and 71,200 square feet of commercial/retail land uses on approximately 18.73 acres.

Construction Phase - The project's architectural coating phase will be extended to 75 days.

Demolition - The project is proposing to demolish approximetely 326,026 square feet of surface asphalt parking lot.

Vehicle Trips - The trip generation rates have been updated to reflect Toyota Arena TIA Scoping Agreement, by RK, May 25, 2021 and Traffic Impact Study and SANBAG VMT Model.

Fleet Mix - Operational fleet mix adjusted to equal 2% trucks with GVWR > 10,000 lbs.

Woodstoves - SCAQMD Rule 445 restricts wood burning hearths/fireplaces from being installed in new development.

Construction Off-road Equipment Mitigation - Project will be required to comply with SCAQMD Rule 403 regarding fugitive dust control.

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	75.00
tblConstructionPhase	PhaseEndDate	4/13/2023	6/29/2023
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberWood	34.55	0.00
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	LHD2	0.00	7.1960e-003

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LHD2	0.00	7.1960e-003
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	UBUS	0.00	1.1900e-004
tblFleetMix	UBUS	0.00	2.5400e-004
tblFleetMix	UBUS	0.00	2.5400e-004

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	UBUS	0.00	1.1900e-004
tblLandUse	LotAcreage	18.18	11.47
tblLandUse	LotAcreage	8.27	0.00
tblLandUse	LotAcreage	10.53	7.26
tblLandUse	LotAcreage	1.63	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	4.37
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	4.37
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	4.37
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.91	5.17
tblVehicleTrips	ST_TR	46.12	36.38
tblVehicleTrips	SU_TR	4.09	5.17
tblVehicleTrips	WD_TR	5.44	5.17
tblVehicleTrips	WD_TR	37.75	29.77
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.2538	46.4642	53.0187	0.1535	19.8582	2.0456	21.9038	10.1558	1.8819	12.0378	0.0000	15,621.5062	15,621.5062	1.9489	0.9324	15,924.5846
2022	5.6217	28.2785	49.5312	0.1498	11.1581	0.9761	12.1342	2.9915	0.9192	3.9107	0.0000	15,280.3911	15,280.3911	0.9684	0.8933	15,570.8009
2023	70.3959	24.7705	46.6465	0.1455	11.1580	0.8066	11.9646	2.9915	0.7589	3.7504	0.0000	14,888.1518	14,888.1518	0.9311	0.8471	15,163.8676
Maximum	**70.3959**	**46.4642**	**53.0187**	**0.1535**	**19.8582**	**2.0456**	**21.9038**	**10.1558**	**1.8819**	**12.0378**	**0.0000**	**15,621.5062**	**15,621.5062**	**1.9489**	**0.9324**	**15,924.5846**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.6807	17.1150	53.9038	0.1535	11.1581	0.2995	11.4576	3.9176	0.2863	3.9807	0.0000	15,621.5062	15,621.5062	1.9489	0.9324	15,924.5846
2022	4.2433	14.8976	50.6281	0.1498	11.1581	0.2079	11.3660	2.9915	0.1988	3.1904	0.0000	15,280.3911	15,280.3911	0.9684	0.8933	15,570.8009
2023	70.2340	12.6203	47.8627	0.1455	11.1580	0.1477	11.3057	2.9915	0.1413	3.1328	0.0000	14,888.1518	14,888.1518	0.9311	0.8471	15,163.8676
Maximum	**70.2340**	**17.1150**	**53.9038**	**0.1535**	**11.1581**	**0.2995**	**11.4576**	**3.9176**	**0.2863**	**3.9807**	**0.0000**	**15,621.5062**	**15,621.5062**	**1.9489**	**0.9324**	**15,924.5846**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	3.78	55.15	-2.14	0.00	20.63	82.89	25.81	38.65	82.40	47.69	0.00	0.00	0.00	0.00	0.00	0.00

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089
Total	**34.6199**	**27.6361**	**179.2364**	**0.2996**	**23.6977**	**1.4793**	**25.1769**	**6.3029**	**1.4676**	**7.7705**	**0.0000**	**38,191.6001**	**38,191.6001**	**2.0809**	**1.4292**	**38,669.5153**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089
Total	**34.6199**	**27.6361**	**179.2364**	**0.2996**	**23.6977**	**1.4793**	**25.1769**	**6.3029**	**1.4676**	**7.7705**	**0.0000**	**38,191.6001**	**38,191.6001**	**2.0809**	**1.4292**	**38,669.5153**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2021	10/28/2021	5	20	
2	Site Preparation	Site Preparation	10/29/2021	11/11/2021	5	10	
3	Grading	Grading	11/12/2021	12/23/2021	5	30	
4	Building Construction	Building Construction	12/24/2021	2/16/2023	5	300	
5	Paving	Paving	2/17/2023	3/16/2023	5	20	
6	Architectural Coating	Architectural Coating	3/17/2023	6/29/2023	5	75	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 7.26

Residential Indoor: 1,399,275; Residential Outdoor: 466,425; Non-Residential Indoor: 106,800; Non-Residential Outdoor: 35,600; Striped Parking Area: 50,136 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,483.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	871.00	222.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	174.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.0493	0.0000	16.0493	2.4300	0.0000	2.4300			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**16.0493**	**1.5513**	**17.6006**	**2.4300**	**1.4411**	**3.8711**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3721	12.1085	2.9946	0.0448	1.2986	0.1740	1.4726	0.3561	0.1665	0.5226		4,876.6311	4,876.6311	0.2118	0.7727	5,112.1890
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0661	0.0483	0.5563	1.4500e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		146.5366	146.5366	4.5600e-003	4.4200e-003	147.9673
Total	**0.4382**	**12.1568**	**3.5508**	**0.0463**	**1.4662**	**0.1750**	**1.6412**	**0.4006**	**0.1674**	**0.5679**		**5,023.1677**	**5,023.1677**	**0.2163**	**0.7771**	**5,260.1563**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1388	0.0000	6.1388	0.9295	0.0000	0.9295			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		0.0616	0.0616		0.0616	0.0616	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**6.1388**	**0.0616**	**6.2005**	**0.9295**	**0.0616**	**0.9911**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3721	12.1085	2.9946	0.0448	1.2986	0.1740	1.4726	0.3561	0.1665	0.5226		4,876.6311	4,876.6311	0.2118	0.7727	5,112.1890
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0661	0.0483	0.5563	1.4500e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		146.5366	146.5366	4.5600e-003	4.4200e-003	147.9673
Total	**0.4382**	**12.1568**	**3.5508**	**0.0463**	**1.4662**	**0.1750**	**1.6412**	**0.4006**	**0.1674**	**0.5679**		**5,023.1677**	**5,023.1677**	**0.2163**	**0.7771**	**5,260.1563**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.6570**	**2.0445**	**21.7015**	**10.1025**	**1.8809**	**11.9834**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0793	0.0580	0.6675	1.7400e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		175.8439	175.8439	5.4700e-003	5.3000e-003	177.5607
Total	**0.0793**	**0.0580**	**0.6675**	**1.7400e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**175.8439**	**175.8439**	**5.4700e-003**	**5.3000e-003**	**177.5607**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.5188	0.0000	7.5188	3.8642	0.0000	3.8642			0.0000			0.0000
Off-Road	0.4656	2.0175	20.8690	0.0380		0.0621	0.0621		0.0621	0.0621	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**0.4656**	**2.0175**	**20.8690**	**0.0380**	**7.5188**	**0.0621**	**7.5809**	**3.8642**	**0.0621**	**3.9263**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0793	0.0580	0.6675	1.7400e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		175.8439	175.8439	5.4700e-003	5.3000e-003	177.5607
Total	**0.0793**	**0.0580**	**0.6675**	**1.7400e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**175.8439**	**175.8439**	**5.4700e-003**	**5.3000e-003**	**177.5607**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**9.2036**	**1.9853**	**11.1889**	**3.6538**	**1.8265**	**5.4803**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0881	0.0644	0.7417	1.9300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		195.3821	195.3821	6.0800e-003	5.8900e-003	197.2897
Total	**0.0881**	**0.0644**	**0.7417**	**1.9300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**195.3821**	**195.3821**	**6.0800e-003**	**5.8900e-003**	**197.2897**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.5204	0.0000	3.5204	1.3976	0.0000	1.3976			0.0000			0.0000
Off-Road	0.7616	3.3000	32.9991	0.0620		0.1015	0.1015		0.1015	0.1015	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**0.7616**	**3.3000**	**32.9991**	**0.0620**	**3.5204**	**0.1015**	**3.6219**	**1.3976**	**0.1015**	**1.4991**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0881	0.0644	0.7417	1.9300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		195.3821	195.3821	6.0800e-003	5.8900e-003	197.2897
Total	**0.0881**	**0.0644**	**0.7417**	**1.9300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**195.3821**	**195.3821**	**6.0800e-003**	**5.8900e-003**	**197.2897**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5177	12.0752	4.1438	0.0425	1.4223	0.2042	1.6266	0.4096	0.1954	0.6050		4,559.2529	4,559.2529	0.1286	0.6758	4,763.8543
Worker	3.8352	2.8050	32.2997	0.0840	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		8,508.8894	8,508.8894	0.2646	0.2566	8,591.9661
Total	**4.3529**	**14.8803**	**36.4435**	**0.1265**	**11.1581**	**0.2587**	**11.4168**	**2.9915**	**0.2456**	**3.2371**		**13,068.1423**	**13,068.1423**	**0.3932**	**0.9324**	**13,355.8204**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5177	12.0752	4.1438	0.0425	1.4223	0.2042	1.6266	0.4096	0.1954	0.6050		4,559.2529	4,559.2529	0.1286	0.6758	4,763.8543
Worker	3.8352	2.8050	32.2997	0.0840	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		8,508.8894	8,508.8894	0.2646	0.2566	8,591.9661
Total	**4.3529**	**14.8803**	**36.4435**	**0.1265**	**11.1581**	**0.2587**	**11.4168**	**2.9915**	**0.2456**	**3.2371**		**13,068.1423**	**13,068.1423**	**0.3932**	**0.9324**	**13,355.8204**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3718	10.2054	3.6933	0.0415	1.4223	0.1160	1.5383	0.4096	0.1110	0.5206		4,446.4272	4,446.4272	0.1193	0.6584	4,645.6165
Worker	3.5437	2.4575	29.4745	0.0814	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		8,279.6303	8,279.6303	0.2371	0.2349	8,355.5522
Total	**3.9155**	**12.6629**	**33.1678**	**0.1229**	**11.1581**	**0.1671**	**11.3252**	**2.9915**	**0.1580**	**3.1496**		**12,726.0575**	**12,726.0575**	**0.3564**	**0.8933**	**13,001.1687**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3718	10.2054	3.6933	0.0415	1.4223	0.1160	1.5383	0.4096	0.1110	0.5206		4,446.4272	4,446.4272	0.1193	0.6584	4,645.6165
Worker	3.5437	2.4575	29.4745	0.0814	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		8,279.6303	8,279.6303	0.2371	0.2349	8,355.5522
Total	**3.9155**	**12.6629**	**33.1678**	**0.1229**	**11.1581**	**0.1671**	**11.3252**	**2.9915**	**0.1580**	**3.1496**		**12,726.0575**	**12,726.0575**	**0.3564**	**0.8933**	**13,001.1687**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2418	8.2248	3.3683	0.0398	1.4223	0.0588	1.4811	0.4096	0.0562	0.4658		4,270.9160	4,270.9160	0.1105	0.6311	4,461.7532
Worker	3.2807	2.1608	27.0342	0.0788	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,062.0259	8,062.0259	0.2128	0.2160	8,131.7084
Total	**3.5225**	**10.3856**	**30.4025**	**0.1186**	**11.1580**	**0.1069**	**11.2649**	**2.9915**	**0.1005**	**3.0920**		**12,332.9419**	**12,332.9419**	**0.3233**	**0.8471**	**12,593.4615**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2418	8.2248	3.3683	0.0398	1.4223	0.0588	1.4811	0.4096	0.0562	0.4658		4,270.9160	4,270.9160	0.1105	0.6311	4,461.7532
Worker	3.2807	2.1608	27.0342	0.0788	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,062.0259	8,062.0259	0.2128	0.2160	8,131.7084
Total	**3.5225**	**10.3856**	**30.4025**	**0.1186**	**11.1580**	**0.1069**	**11.2649**	**2.9915**	**0.1005**	**3.0920**		**12,332.9419**	**12,332.9419**	**0.3233**	**0.8471**	**12,593.4615**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9838**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0565	0.0372	0.4656	1.3600e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		138.8409	138.8409	3.6600e-003	3.7200e-003	140.0409
Total	**0.0565**	**0.0372**	**0.4656**	**1.3600e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**138.8409**	**138.8409**	**3.6600e-003**	**3.7200e-003**	**140.0409**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2805	1.2154	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2315**	**1.2154**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0565	0.0372	0.4656	1.3600e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		138.8409	138.8409	3.6600e-003	3.7200e-003	140.0409
Total	**0.0565**	**0.0372**	**0.4656**	**1.3600e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**138.8409**	**138.8409**	**3.6600e-003**	**3.7200e-003**	**140.0409**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**69.7405**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6554	0.4317	5.4006	0.0157	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,610.5540	1,610.5540	0.0425	0.0432	1,624.4745
Total	**0.6554**	**0.4317**	**5.4006**	**0.0157**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,610.5540**	**1,610.5540**	**0.0425**	**0.0432**	**1,624.4745**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**69.5786**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6554	0.4317	5.4006	0.0157	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,610.5540	1,610.5540	0.0425	0.0432	1,624.4745
Total	**0.6554**	**0.4317**	**5.4006**	**0.0157**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,610.5540**	**1,610.5540**	**0.0425**	**0.0432**	**1,624.4745**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089
Unmitigated	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	3,572.47	3,572.47	3572.47	5,682,657	5,682,657
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	2,119.62	2,590.26	1502.32	4,539,098	4,539,098
Total	5,692.09	6,162.73	5,074.79	10,221,754	10,221,754

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	4.37	4.37	4.37	100.00	0.00	0.00	100	0	0
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11

4.4 Fleet Mix

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375
Enclosed Parking with Elevator	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Parking Lot	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Regional Shopping Center	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
NaturalGas Unmitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27227.6	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	429.151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27.2276	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	0.429151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

6.0 Area Detail

6.1 Mitigation Measures Area

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Unmitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

City of Ontario
Community Climate Action Plan Screening Table

Instructions for Residential, Commercial, or Industrial Projects

The Screening Table assigns points for each option incorporated into a project as mitigation or a project design feature (collectively referred to as "feature"). The point values correspond to the minimum emissions reduction expected from each feature. The menu of features allows maximum flexibility and options for how development projects can implement the GHG reduction measures. The point levels are based upon improvements compared to 2008 emission levels of efficiency. Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the City's CAP. As such, those projects that garner a total of 100 points or greater would not require quantification of project specific GHG emissions. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

Instructions for Mixed Use Projects

Mixed use projects provide additional opportunities to reduce emissions by combining complimentary land uses in a manner that can reduce vehicle trips. Mixed use projects also have the potential to complement energy efficient infrastructure in a way that reduces emissions. For mixed use projects, fill out both Screening Table 1 and Table 2, but proportion the points identical to the proportioning of the mix of uses. As an example, a mixed use project that is 50% commercial uses and 50% residential uses will show ½ point for each assigned point value in Table 1 and Table 2. Add the points from both tables. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City's CAP and are considered less than significant for GHG emissions.

Those projects that do not garnish 100 points using the screening tables will need to provide additional analysis to determine the significance of GHG emissions. Nothing in this guidance shall be construed as limiting the City's authority to adopt a statement of overriding consideration for projects with significant GHG impacts. The following tables provides a menu of performance standards/options related to GHG mitigation measures and design features that can be used to demonstrate consistency with the reduction measures and GHG reduction quantities in the CAP.

Table 1: Screening Table for Implementation of GHG Reduction Measures for Residential Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS E1: Residential Energy Efficiency			
Building Envelope			
Insulation	2008 Baseline (walls R-13:, roof/attic: R-30)	0 points	12
	Modestly Enhanced Insulation (walls R-13:, roof/attic: R-38)	12 points	
	Enhanced Insulation (rigid wall insulation R-13, roof/attic: R-38)	15 points	
	Greatly Enhanced Insulation (spray foam wall insulated walls R-15 or higher, roof/attic R-38 or higher)	18 points	
Windows	2008 Baseline Windows (0.57 U-factor, 0.4 solar heat gain coefficient (SHGC)	0 points	06
	Modestly Enhanced Window Insulation (0.4 U-Factor, 0.32 SHGC)	6 points	
	Enhanced Window Insulation (0.32 U-Factor, 0.25 SHGC)	7 points	
	Greatly Enhanced Window Insulation (0.28 or less U-Factor, 0.22 or less SHGC)	9 points	
Cool Roof	Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance)	10 points	10
	Enhanced Cool Roof(CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	12 points	
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	14 points	
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.		10
	Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	10 points	
	Blower Door HERS Verified Envelope Leakage or equivalent	8 points	
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		
	Modest Thermal Mass (10% of floor or 10% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	2 points	
	Enhanced Thermal Mass (20% of floor or 20% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	4 points	

Feature	Description	Assigned Point Values	Project Points
Indoor Space Efficiencies			
Heating/ Cooling Distribution System	Minimum Duct Insulation (R-4.2 required)	0 points	07
	Modest Duct insulation (R-6)	7 points	
	Enhanced Duct Insulation (R-8)	8 points	
	Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	12 points	
Space Heating/ Cooling Equipment	2008 Minimum HVAC Efficiency (SEER 13/60% AFUE or 7.7 HSPF)	0 points	04
	Improved Efficiency HVAC (SEER 14/65% AFUE or 8 HSPF)	4 points	
	High Efficiency HVAC (SEER 15/72% AFUE or 8.5 HSPF)	7 points	
	Very High Efficiency HVAC (SEER 16/80% AFUE or 9 HSPF)	9 points	
Water Heaters	2008 Minimum Efficiency (0.57 Energy Factor)	0 points	12
	Improved Efficiency Water Heater (0.675 Energy Factor)	12 points	
	High Efficiency Water Heater (0.72 Energy Factor)	15 points	
	Very High Efficiency Water Heater (0.92 Energy Factor)	18 points	
	Solar Pre-heat System (0.2 Net Solar Fraction)	4 points	
	Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	8 points	
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours.		01
	All peripheral rooms within the living space have at least one window (required)	0 points	
	All rooms within the living space have daylight (through use of windows, solar tubes, skylights, etc.)	1 points	
	All rooms daylighted	2 points	
Artificial Lighting	2008 Minimum (required)	0 points	08
	Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt)	8 points	
	High Efficiency Lights (50% of in-unit fixtures are high efficacy)	10 points	
	Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	12 points	
Appliances	Energy Star Refrigerator (new)	1 points	01
	Energy Star Dish Washer (new)	1 points	01
	Energy Star Washing Machine (new)	1 points	01

Feature	Description	Assigned Point Values	Project Points
Miscellaneous Residential Building Efficiencies			
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes natural heating, cooling, and lighting.	5 point	
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	4 Points	
Energy Star Homes	EPA Energy Star for Homes (version 3 or above)	25 points	
Independent Energy Efficiency Calculations	Provide point values based upon energy efficiency modeling of the Project. Note that engineering data will be required documenting the energy efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
Existing Residential Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing residential dwelling units to further the point value of their project. Retrofitting existing residential dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Ontario Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, but not limited to the following; Will the energy efficiency retrofit project benefit low income or disadvantaged residents? Does the energy efficiency retrofit project fit within the overall assumptions in reduction measures associated with existing residential retrofits? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.	TBD	
Reduction Measure PS E2: Residential Renewable Energy Generation			
Photovoltaic	Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments:		
	Solar Ready Homes (sturdy roof and solar ready service panel)	2 points	
	10 percent of the power needs of the project	10 points	
	20 percent of the power needs of the project	15 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	28 points	
	50 percent of the power needs of the project	35 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	42 points	
	80 percent of the power needs of the project	46 points	

Feature	Description	Assigned Point Values	Project Points
	90 percent of the power needs of the project	52 points	
	100 percent of the power needs of the project	58 points	
Wind turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the area's capability to support wind turbines should be evaluated prior to choosing this feature. Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments:		
	10 percent of the power needs of the project	10 points	
	20 percent of the power needs of the project	15 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	28 points	
	50 percent of the power needs of the project	35 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	42 points	
	80 percent of the power needs of the project	46 points	
	90 percent of the power needs of the project	52 points	
	100 percent of the power needs of the project	58 points	
Off-site renewable energy project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing homes that will help implement renewable energy within the City. These off-site renewable energy retrofit project proposals will be determined on a case by case basis and must be accompanied by a detailed plan that documents the quantity of renewable energy the proposal will generate. Point values will be determined based upon the energy generated by the proposal.	TBD	
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure PS W1: Residential Water Conservation			
Irrigation and Landscaping			
Water Efficient Landscaping	Limit conventional turf to < 50% of required landscape area	0 points	08
	Limit conventional turf to < 25% of required landscape area	4 points	
	No conventional turf (warm season turf to < 50% of required landscape area and/or low water using plants are allowed)	6 points	
	Only California Native Plants that requires no irrigation or some supplemental irrigation	8 points	

Feature	Description	Assigned Point Values	Project Points
Water Efficient irrigation systems	Low precipitation spray heads < .75"/hr or drip irrigation Weather based irrigation control systems or moisture sensors (demonstrate 20% reduced water use)	2 point 3 points	02
Recycled Water	Recycled connections (purple pipe) to irrigation system on site	6 points	
Water Reuse	Gray water Reuse System collects Gray water from clothes washers, showers and faucets for irrigation use,	12 points	
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	As required by LID
Potable Water			
Showers	Water Efficient Showerheads (2.0 gpm)	3 points	03
Toilets	Water Efficient Toilets (1.5 gpm)	3 points	03
Faucets	Water Efficient faucets (1.28 gpm)	3 points	03
Dishwasher	Water Efficient Dishwasher (6 gallons per cycle or less)	1	01
Washing Machine	Water Efficient Washing Machine (Water factor <5.5)	1	01
WaterSense	EPA WaterSense Certification	12 points	
Reduction Measure PS T1: Land Use Based Trips and VMT Reduction			
Mixed Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon a Transportation Impact Analysis (TIA) demonstrating trip reductions and/or reductions in vehicle miles traveled. Suggested ranges: Diversity of land uses complementing each other (2-28 points) Increased destination accessibility other than transit (1-18 points) Increased transit accessibility (1-25 points) Infill location that reduces vehicle trips or VMT beyond the measures described above (points TBD based on traffic data).	TBD	
Residential Near Local Retail (Residential only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT)	TBD	

Feature	Description	Assigned Point Values	Project Points
Other Trip Reduction Measures	Other trip or VMT reduction measures not listed above with TIA and/or other traffic data supporting the trip and/or VMT for the project.	TBD	
Reduction Measure PS T2: Bicycle Master Plan			
Bicycle Infrastructure	Ontario's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways. Provide bicycle paths within project boundaries. Provide bicycle path linkages between residential and other land uses. Provide bicycle path linkages between residential and transit.	TBD 2 points 5 points	
Reduction Measure PS T3: Neighborhood Electric Vehicle Infrastructure			
Electric Vehicle Recharging	Provide circuit and capacity in garages of residential units for use by an electric vehicle. Charging stations are for on-road electric vehicles legally able to drive on all roadways including Interstate Highways and freeways. Install electric vehicle charging stations in the garages of residential units	1 point 8 points	08
Total Points Earned by Residential Project:			102

Without VMT or Mixed Use

Table 2: Screening Table for Implementation of GHG Reduction Measures for Commercial/Industrial Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS E3: Commercial/Industrial Energy Efficiency Development			
Building Envelope			
Insulation	2008 baseline (walls R-13; roof/attic R-30)	0 points	18
	Modestly Enhanced Insulation (walls R-13, roof/attic R-38))	15 points	
	Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38)	18 points	
	Greatly Enhanced Insulation (spray foam insulated walls R-15 or higher, roof/attic R-38 or higher) *(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)*	20 points	
Windows	2008 Baseline Windows (0.57 U-factor, 0.4 solar heat gain coefficient [SHGC])	0 points	07
	Modestly Enhanced Window Insulation (0.4 U-factor, 0.32 SHGC)	7 points	
	Enhanced Window Insulation (0.32 U-factor, 0.25 SHGC)	8 points	
	Greatly Enhanced Window Insulation (0.28 or less U-factor, 0.22 or less SHGC) *(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)*	12 points	
Cool Roof	Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance)	12 points	12
	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	14 points	
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	16 points	
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.		12
	Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	12 points	
	Blower Door HERS Verified Envelope Leakage or equivalent *(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)*	10 points	
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		

Feature	Description	Assigned Point Values	Project Points
	Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	4 points	04
	Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	6 points	
	Enhanced Thermal Mass (80% of floor or 80% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	24 points	
Indoor Space Efficiencies			
Heating/ Cooling Distribution System	Minimum Duct Insulation (R-4.2 required)	0 points	08
	Modest Duct insulation (R-6)	8 points	
	Enhanced Duct Insulation (R-8)	10 points	
	Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent) *(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)*	14 points	
Space Heating/ Cooling Equipment	2008 Minimum HVAC Efficiency (EER 13/60% AFUE or 7.7 HSPF)	0 points	07
	Improved Efficiency HVAC (EER 14/65% AFUE or 8 HSPF)	7 points	
	High Efficiency HVAC (EER 15/72% AFUE or 8.5 HSPF)	8 points	
	Very High Efficiency HVAC (EER 16/80% AFUE or 9 HSPF) *(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)*	12 points	
Commercial Heat Recovery Systems	Heat recovery strategies employed with commercial laundry, cooking equipment, and other commercial heat sources for reuse in HVAC air intake or other appropriate heat recovery technology. Point values for these types of systems will be determined based upon design and engineering data documenting the energy savings.	TBD	
Water Heaters	2008 Minimum Efficiency (0.57 Energy Factor)	0 points	14
	Improved Efficiency Water Heater (0.675 Energy Factor)	14 points	
	High Efficiency Water Heater (0.72 Energy Factor)	16 points	
	Very High Efficiency Water Heater (0.92 Energy Factor)	19 points	
	Solar Pre-heat System (0.2 Net Solar Fraction)	4 points	
	Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	8 points	
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours.		

Feature	Description	Assigned Point Values	Project Points
	All peripheral rooms within building have at least one window or skylight	1 points	05
	All rooms within building have daylight (through use of windows, solar tubes, skylights, etc.)	5 points	
	All rooms daylighted	7 points	
Artificial Lighting	2008 Minimum (required)	0 points	09
	Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt)	9 points	
	High Efficiency Lights (50% of in-unit fixtures are high efficacy)	12 points	
	Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	14 points	
Appliances	Energy Star Commercial Refrigerator (new)	4 points	12
	Energy Star Commercial Dish Washer (new)	4 points	
	Energy Star Commercial Cloths Washing	4 points	
Miscellaneous Commercial/Industrial Building Efficiencies			
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes conditions for natural heating, cooling, and lighting.	6 point	
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on June 21st.	6 Points	
Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
Existing Commercial building Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing commercial buildings to further the point value of their project. Retrofitting existing commercial buildings within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Ontario Planning Department. The decision to allow applicants the ability to participate in this program will be evaluated based upon, but not limited to the following:	TBD	

Feature	Description	Assigned Point Values	Project Points
	Will the energy efficiency retrofit project benefit low income or disadvantaged communities? Does the energy efficiency retrofit project fit within the overall assumptions in the reduction measure associated with commercial building energy efficiency retrofits? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.		
Reduction Measure PS E4: Commercial/Industrial Renewable Energy			
Photovoltaic	Solar Photovoltaic panels installed on commercial buildings or in collective arrangements within a commercial development such that the total power provided augments:		
	Solar Ready Roofs (sturdy roof and electric hookups)	2 points	
	10 percent of the power needs of the project	8 points	
	20 percent of the power needs of the project	14 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	26 points	
	50 percent of the power needs of the project	32 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	44 points	
	80 percent of the power needs of the project	50 points	
	90 percent of the power needs of the project	56 points	
	100 percent of the power needs of the project	60 points	
Wind turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the areas capability to support wind turbines should be evaluated prior to choosing this feature. Wind turbines as part of the commercial development such that the total power provided augments:		
	10 percent of the power needs of the project	8 points	
	20 percent of the power needs of the project	14 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	26 points	
	50 percent of the power needs of the project	32 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	44 points	

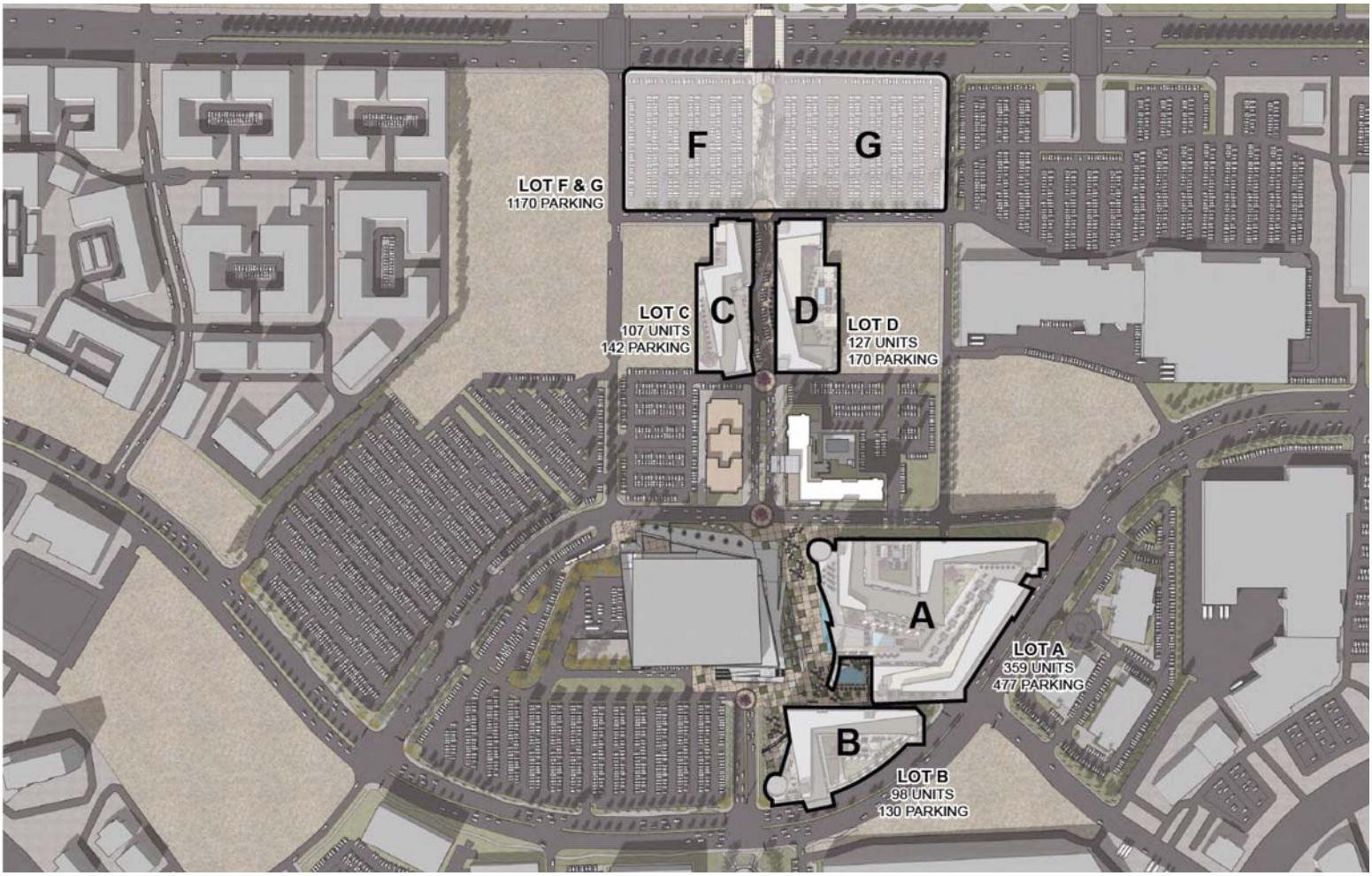
Feature	Description	Assigned Point Values	Project Points
	80 percent of the power needs of the project	50 points	
	90 percent of the power needs of the project	56 points	
	100 percent of the power needs of the project	60 points	
Off-site renewable energy project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing commercial/industrial that will help implement reduction measures associated with existing buildings. These off-site renewable energy retrofit project proposals will be determined on a case by case basis accompanied by a detailed plan documenting the quantity of renewable energy the proposal will generate. Point values will be based upon the energy generated by the proposal.	TBD	
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure PS W2: Commercial/Industrial Water Conservation			
Irrigation and Landscaping			
Water Efficient Landscaping	Eliminate conventional turf from landscaping	0 points	08
	Only moderate water using plants	3 points	
	Only low water using plants	4 points	
	Only California Native landscape that requires no or only supplemental irrigation	8 points	
Trees	Increase tree planting in parking areas 50% beyond City Code requirements	TBD	
Water Efficient irrigation systems	Low precipitation spray heads< .75"/hr or drip irrigation	1 point	01
	Weather based irrigation control systems combined with drip irrigation (demonstrate 20 reduced water use)	5 points	
Recycled Water	Recycled water connection (purple pipe)to irrigation system on site	5 points	
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	

Feature	Description	Assigned Point Values	Project Points
Potable Water			
Showers	Water Efficient Showerheads (2.0 gpm)	3 points	
Toilets	Water Efficient Toilets/Urinals (1.5gpm) Waterless Urinals (note that commercial buildings having both waterless urinals and high efficiency toilets will have a combined point value of 6 points)	3 points 4 points	07
Faucets	Water Efficient faucets (1.28gpm)	3 points	03
Commercial Dishwashers	Water Efficient dishwashers (20% water savings)	4 points	04
Commercial Laundry Washers	Water Efficient laundry (15% water savings) High Efficiency laundry Equipment that captures and reuses rinse water (30% water savings)	3 points 6 points	
Commercial Water Operations Program	Establish an operational program to reduce water loss from pools, water features, etc., by covering pools, adjusting fountain operational hours, and using water treatment to reduce draw down and replacement of water. Point values for these types of plans will be determined based upon design and engineering data documenting the water savings.	TBD	
Reduction Measure PS T1: Land Use Based Trips and VMT Reduction			
Mixed Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled	TBD	
Local Retail Near Residential (Commercial only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled	TBD	
Reduction Measure PS T2: Bicycle Master Plan			
Bicycle Infrastructure	Ontario's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways. Provide bicycle paths within project boundaries. Provide bicycle path linkages between project site and other land uses. Provide bicycle path linkages between project site and transit.	TBD TBD 2 points 5 points	

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS T3: Electric Vehicle Infrastructure			
Electric Vehicles	Provide public charging station for use by an electric vehicle. *(ten points for each charging station within the facility)*	10 points	10
Reduction Measure PS T4: Employee Based Trip &VMT Reduction Policy			
Compressed Work Week	Reduce the number of days per week that employees need to be on site will reduce the number of vehicle trips associated with commercial/industrial development. Compressed work week such that full time employees are on site: 5 days per week 4 days per week on site 3 days per week on site	TBD	
Car/Vanpools	Car/vanpool program Car/vanpool program with preferred parking Car/vanpool with guaranteed ride home program Subsidized employee incentive car/vanpool program Combination of all the above	TBD	
Employee Bicycle/ Pedestrian Programs	Complete sidewalk to residential within ½ mile Complete bike path to residential within 3 miles Bike lockers and secure racks Showers and changing facilities Subsidized employee walk/bike program (Note combine all applicable points for total value)	TBD	
Shuttle/Transit Programs	Local transit within ¼ mile Light rail transit within ½ mile Shuttle service to light rail transit station Guaranteed ride home program Subsidized Transit passes Note combine all applicable points for total value	TBD	
CRT	Employer based Commute Trip Reduction (CRT). CRTs apply to commercial, offices, or industrial projects that include a reduction of vehicle trip or VMT goal using a variety of employee commutes trip reduction methods. The point value will be determined based upon a TIA that demonstrates the trip/VMT reductions. Suggested point ranges: Incentive based CRT Programs (1-8 points) Mandatory CRT programs (5-20 points)	TBD	
Other Trip Reductions	Other trip or VMT reduction measures not listed above with TIA and/or other traffic data supporting the trip and/or VMT for the project.	TBD	
Total Points from Commercial/Industrial Project:			141

APPENDIX C
NOISE IMPACT STUDY

TOYOTA ARENA MIXED-USE DEVELOPMENT
NOISE IMPACT STUDY
City of Ontario



TOYOTA ARENA MIXED-USE DEVELOPMENT
NOISE IMPACT STUDY
City of Ontario, California

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May 28, 2021

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

The purpose of this report is to evaluate the potential noise impacts from the proposed Toyota Arena Mixed-Use Development (project) and provide recommendations, if necessary, to minimize any project noise impacts. The assessment was conducted within the context of the California Environmental Quality Act (CEQA) and utilizes the noise standards set forth by the applicable Federal, State, and local agencies.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- Identification of the regulatory setting and applicable noise standards
- Analysis of the existing noise environment
- Analysis of the project's operational noise impact to adjacent receptors
- Analysis of the project's construction noise and vibration impact to adjacent sensitive receptors
- Summary of recommended mitigation measures and project design features to reduce noise level impacts.

1.2 Site Location

The proposed Toyota Arena Mixed-Use Development project site is located adjacent to the Toyota Arena, north of Concourse Street and south of Fourth Street, in the City of Ontario. The project site is located approximately 1,013 feet above sea level and the topography is relatively flat.

The project site location map is provided in Exhibit A.

The project site is located within the Ontario Center Specific Plan and zoned for Urban Commercial use. The City of Ontario General Plan land use map designates the project site as Mixed Use.

1.3 Project Description

The project consists of construction and operation of a mixed use town center development with residential and commercial/retail land use within four development lots.

The proposed project includes a total of 691 residential dwelling units, 71,200 square feet of commercial/retail uses and the demolition and relocation of approximately 1,170 surface parking spaces. The total project site area is approximately 18.73 acres.

The site plan used for this analysis, provided by the applicant, is illustrated in Exhibit B. Table 1 summarizes the proposed project land uses.

Table 1
Land Use Summary

Lot	Dwelling Units	Retail (SF)[1]	Parking Spaces
A	359	25,256	477[2]
B	98	20,802	130[2]
C	107	11,047	142[2]
D	127	14,095	170[2]
F & G	--	--	1,170
Total	691	71,200	2,089

[1] S.F. – Square Feet
[2] Parking Structure

This report analyzes long-term and short-term noise impacts associated with the day-to-day operation of the project. The primary sources of long-term noise impacts would be on-site circulation and parking lot noise and HVAC units.

1.4 Summary of Analysis Results

Table 2 provides a summary of the noise analysis results, per the CEQA impact criteria checklist. With the implementation of the recommended mitigation measures, the project is not expected to result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Table 2
CEQA Noise Impact Criteria

Noise Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact
Would the project result in?				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?			X	

1.5 Recommended Project Design Features

The following recommended project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design. Design features are not typically considered mitigation under CEQA.

Operational Design Features

DF-1 Prior to the issuance of building permits, the project shall prepare a final acoustical study that demonstrates building construction will achieve the minimum interior noise standard of 45 dBA CNEL for all residential units located along arterial roadways and/or adjacent to industrial uses, per the California Building Standards Code. The following noise control measures may be required for dwelling units located near adjacent roadways and industrial uses:

- Install sound barriers between residences and noise sources.
- Install double-paned or similar sound rated windows.

- Provide sound insulating exterior walls and roofing systems.
- Locate and/or design attic vents to minimize sound propagation into each home.
- Provide forced-air ventilation systems.
- Place dwellings as far as practical from the noise source

DF-2 The project shall comply with California Title 24 building insulation requirements for exterior walls, roofs and common separating assemblies (e.g. floor/ceiling assemblies and demising walls).

DF-3 For proper acoustical performance, all exterior windows, doors, and sliding glass doors should have a positive seal and leaks/cracks must be kept to a minimum.

DF-4 The final building plans shall ensure that HVAC units are not located within an area of the project site that would contribute to a noise level exceedance at any adjacent property line, per the City of Ontario Municipal Code requirements. To meet the City's noise standards the following measures should be followed:

- All HVAC equipment shall be shielded or enclosed from the line of sight of adjacent residential uses.

Construction Design Features

DF-5 Prepare a construction management plan and obtain a construction work permit from the City of Ontario prior to starting construction. The construction management plan shall ensure all contractors implement construction best management practices to reduce construction noise levels. Best management practices shall include the following:

- All construction equipment shall be equipped with muffles and other suitable noise attenuation devices (e.g., engine shields).

- Grading and construction contractors shall use quieter equipment as opposed to noisier equipment (such as rubber-tired equipment rather than track equipment), to the maximum extent feasible.

- If feasible, electric hook-ups shall be provided to avoid the use of generators. If electric service is determined to be infeasible for the site, only whisper-quiet generators shall be used (i.e., inverter generators capable of providing variable load.

- Use electric air compressors and similar power tools rather than diesel equipment, where feasible.

- Locate staging area, generators and stationary construction equipment as far from the adjacent residential homes as feasible.

- Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 5 minutes.

- Provide notifications and signage in readily visible locations along the perimeter of construction sites that indicate the dates and duration of construction activities, as well as provide a telephone number where neighbors can enquire about the construction process and register complaints to a designated construction noise disturbance coordinator.

- Construction activities shall not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays and Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

DF-6 No impact pile driving or blasting activities shall be permitted on the project site during construction. If impact pile driving or blasting is required, a follow-up noise and vibration impact assessment shall be conducted prior to start of any activity.

2.0 Fundamentals of Noise

This section of the report provides basic information about noise and vibration and presents some of the terms used in the report.

2.1 Sound, Noise, and Acoustics

The sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. The sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting out at 20 Hz all the way to the high pitch of 20,000 Hz.

2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases, as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (μPa). One μPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels and abbreviated as dB.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two (2) sounds of equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3dB increase.

If two (2) sounds differ by approximately 10 dB the higher sound level is the predominant sound.

2.5 Human Response to Changes in Noise Levels[1]

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighing is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive the change in the noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway), would result in a barely perceptible change in sound level.

2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant, while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels. Following are the most commonly used noise descriptors along with brief definitions.

A-Weighted Sound Level

The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level

The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

[1] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

Community Noise Equivalent Level (CNEL)

The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB)

A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A)

A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ)

The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room

Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

L(n)

The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly, L50, L90, and L99, etc.

Noise

Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Percent Noise Levels

See L(n).

Sound Level (Noise Level)

The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

Sound Level Meter

An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL)

The dBA level which, if it lasted for one (1) second, would produce the same A-weighted sound energy as the actual event.

2.7 Sound Propagation

As sound propagates from a source it spreads geometrically. The sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

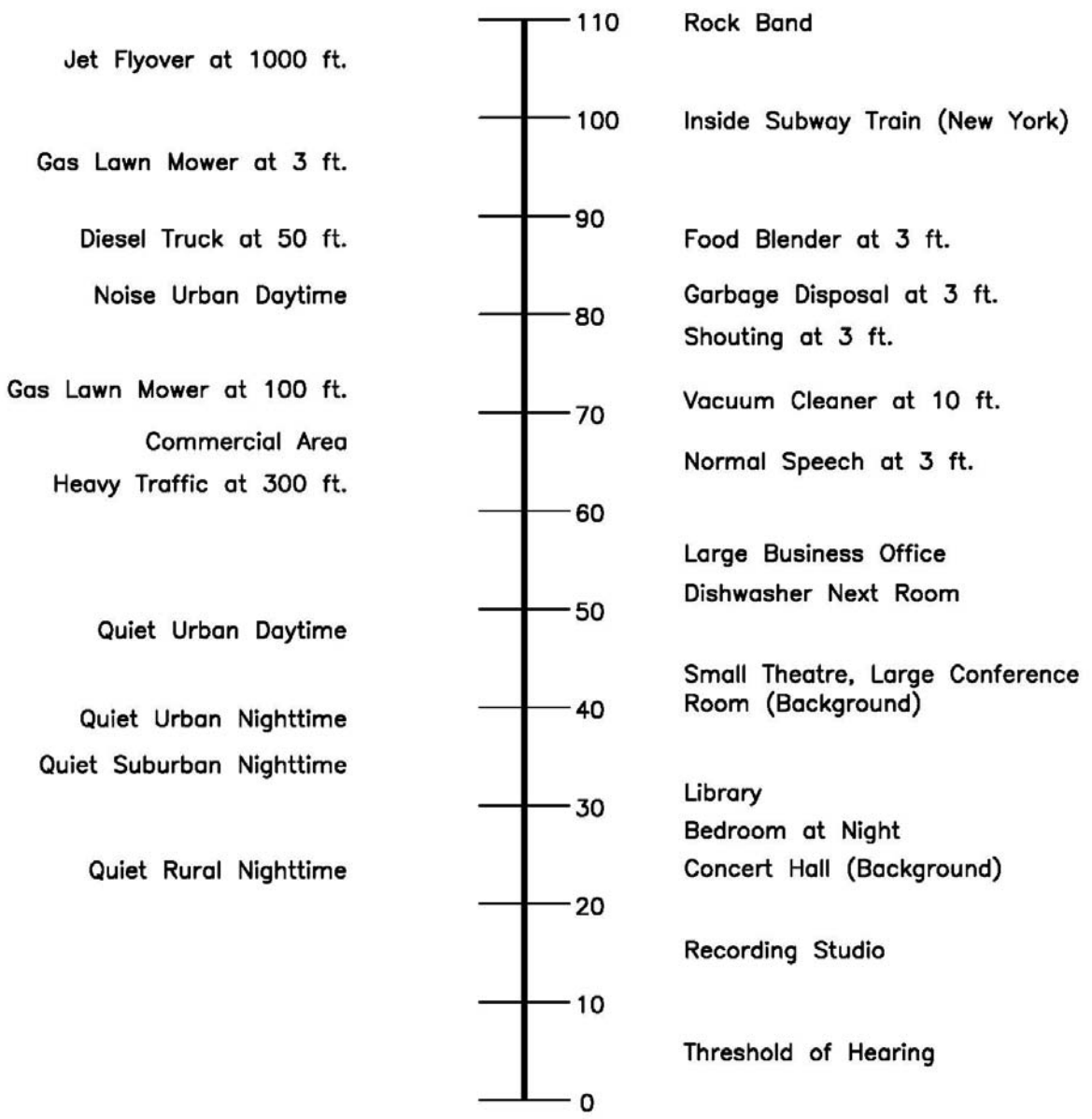
As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use the hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt or landscaping attenuate noise at an additional rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 6.0 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet and greater from a noise source. Wind, temperature, air humidity, and turbulence can further impact how far sound can travel.

Figure 1 shows typical sound levels from indoor and outdoor noise sources.

Figure 1[2]

TYPICAL SOUND LEVELS FROM
INDOOR AND OUTDOOR NOISE SOURCES



[2] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

2.8 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV

Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS

Known as the root mean squared (RMS) can be used to denote vibration amplitude.

VdB

A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

2.9 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts.

2.10 Vibration Propagation

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

2.11 Construction Related Vibration Level Prediction[3]

Operational activities are separated into two different categories. The vibration can be transient or continuous in nature. Each category can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the project area site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. The thresholds from Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, in the table below provide general guidelines as to the maximum vibration limits for when vibration becomes potentially annoying.

[3] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020

Table 3
Vibration Annoyance Potential Criteria

Human Response	PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts. The table below provides general vibration damage potential thresholds:

Table 4
Vibration Damage Potential Threshold Criteria

Structure and Condition	PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings ruin ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Soil conditions have an impact on how vibration propagates through the ground. The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides suggested "n" values based on soil class. The table below outlines the manual's suggested values and description.

Table 5
Suggested "n" Values Based on Soil Classes

Soil Class	Description of Soil Material	Suggested Value of "n"
I	Weak or soft soils: loose soils, dry or partially saturated peat and muck, mud, loose beach sand, and dune sand.	1.4
II	Most sands, sandy clays, silty clays, gravel, silts, weathered rock.	1.3
III	Hard soils: densely compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock.	1.1
IV	Hard, component rock: bedrock, freshly exposed hard rock.	1.0

3.0 Regulatory Setting

The proposed project is located in the City of Ontario and noise regulations are addressed through the various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

3.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three (3) purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was originally tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible to regulate noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible to regulate noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

The Federal government and the State advocate that local jurisdiction use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being constructed adjacent to a highway or, or alternatively that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the Federal government and the State have preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

3.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix." The matrix allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Noise insulation design standards for residences have been established by the State of California Uniform Building Code (UBC) Chapter 12, Division II and by the Title 24 noise insulation standards of the California Administrative Code. The City is required by the State Housing Law to adopt these State codes as minimum performance standards. The City may enact stricter noise standards throughout the city or on a case-by-case basis if deemed necessary. In brief, the Title 24 noise standards require the following for multi-family dwellings:

1. Party wall and floor-ceiling assembly designs must provide a minimum STC of 50, based on lab tests. Field tested assemblies must provide a minimum noise isolation class (NIC) of 45.

2. Floor-ceiling assembly designs must provide for a minimum impact insulation class (IIC) of 50, based on lab tests. Field tested assemblies must provide a minimum FIIC of 45.

3. Entry doors from interior corridors must provide an STC of 26 or more.

4. Penetrations or openings in sound rated assemblies must be treated to maintain required ratings.

5. Interior noise levels due to exterior sources must not exceed a community noise equivalent level (CNEL) or a day-night level (LDN) of 45 dBA, in any habitable room.

Thus, the interior limit is 45 dBA CNEL between dwelling units and from exterior noise sources to interior living spaces.

3.3 City of Ontario Noise Regulations

The project is required to comply with the noise standards and thresholds established within the City of Ontario Municipal Code and the Ontario Plan. The noise standards from the Municipal Code and the Ontario Plan are provided in Appendix A.

3.3.1 City of Ontario Municipal Code Noise Standards

The City of Ontario Municipal Code, Chapter 29: Noise, requires that a project shall not create loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness.

Exterior Noise Standards:

Noise standards are defined in Section 5-29.04, Exterior Noise Standards of the Noise chapter of the Municipal Code and are applicable to the project site and surrounding noise sensitive uses.

Table 6 shows the exterior noise standards from the City of Ontario Municipal Code Chapter 29: Noise Exterior Noise Standards for the project site and surrounding residential land uses.

Table 6
City of Ontario Municipal Code Exterior Noise Standards

Land Use	7:00 AM – 10:00 PM	10:00 PM – 7:00 AM
	Leq (dBA)	Leq (dBA)
Multi-Family Residential	65	50
Residential Portion of Mixed Use	70	70
Commercial Property	65	60

[1]Applies to that portion of residential property falling within 100 feet of a commercial property use, if the noise originates from that commercial property use.

Interior Noise Standards:

Noise standards are defined in Section 5-29.05 Interior Noise Standards of the Noise chapter of the Municipal Code and are applicable to the project site and surrounding noise sensitive uses.

Table 7 shows the exterior noise standards from the City of Ontario Municipal Code Chapter 29: Noise Interior Noise Standards for the project land uses.

Table 7
City of Ontario Municipal Code Interior Noise Standards

Land Use	7:00 AM – 10:00 PM	10:00 PM – 7:00 AM
	Leq (dBA)	Leq (dBA)
Multi-Family Residential	45	40
Residential Portion of Mixed Use[1]	45	40

[1]Applies to that portion of residential property falling within 100 feet of a commercial property use, if the noise originates from that commercial property use.

Construction Noise Regulations

Chapter 29: Noise, Section 5-29.06 of the City's municipal code states that the following activities shall be exempted from the provisions of the noise code;

- Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the following provisions of § 5-29.09;

  i. No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

  ii. No landowner, construction company owner, contractor, subcontractor, or employer shall permit or allow any person or persons working under their

direction and control to operate any tool, equipment or machine in violation of the provisions of this section.

3.3.2 City of Ontario General Plan (The Ontario Plan)

The Ontario Plan establishes planning criteria for determining a development's noise/land use compatibility based on the community noise equivalent level (CNEL). CNEL noise levels are typically used to evaluate mobile source noise impacts such as from roadways, airports and rail lines.

Table 8 summarizes the City's Noise/Land Use Compatibility guidelines for the project and surrounding land uses.

Table 8
Noise/Land Use Compatibility Guidelines

Land Use	Noise Limit (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Multiple Family	<60	60-65	65-75	>75
Commercial – Retail	<70	70-75	75-80	>80

Clearly Acceptable: No special noise insulation required, assuming buildings of normal conventional construction.

Normally Acceptable: Acoustical reports will be required for major new residential construction. Conventional construction with closed windows and fresh air supply systems of air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included.

Clearly Unacceptable: No new construction should be permitted.

4.0 Study Method and Procedures

The following section describes the measurement procedures, measurement locations, and noise modeling procedures and assumptions used in the noise analysis.

4.1 Measurement Procedures and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

RK conducted the sound level measurements in accordance with Caltrans technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4: Specification of Sound Level Meters, 1983).

A Piccolo-II Type 2 integrating-averaging level meter was used to conduct long-term (24-hour) noise measurements at the project site and property boundaries.

The Leq, Lmin, Lmax, L2, L8, L25, and L50 statistical data were recorded over the measurement time period intervals and the information was utilized to define the noise characteristics for the project. The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed five (5) feet above the ground for long-term noise measurements
- Sound level meters were calibrated before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Temperature and sky conditions were observed and documented

Appendix B includes photos, field sheets, and measured noise data.

4.2 Stationary Noise Modeling

The stationary noise was projected using a computer program that replicates the FHWA Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the reference energy noise level. For stationary source, the following noise level was applied to the model. The model outputs the projected noise level based on the following key parameters:

- Referenced noise level – (e.g. how loud a source is at a specific distance)
- Vertical and horizontal distances (sensitive receptor distance from noise source)
- Noise barrier vertical and horizontal distances (noise barrier distance from sound source and receptor).
- Typical noise source spectra
- Topography

Table 9 indicates the referenced noise level used in this analysis.

Table 9
Stationary Source Noise Level

Source	Distance from Source (feet)	Noise Levels (dBA)
		Leq
HVAC Condenser Unit	3.0	77.0
Parking Lot	6.0	63.8

To estimate the future noise levels during typical conditions, RK adjusted the reference noise levels from noise source to the nearest receptors. Adjusted noise levels are based on the distance of the receptor location relative to the noise source and local topography. The noise levels assume that the stationary sources are operating continuously when in reality not all noise sources will operate continuously throughout the day and night.

4.3 Construction Noise Modeling

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model, together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, and baseline

parameters for the project site. This study evaluates the potential exterior noise impacts during each phase of construction. Noise levels were projected at an average distance of 160 feet to the nearest residential (to the north of Log F and Lot G) sensitive receptor of equipment operating over an 8-hour period from to the nearest sensitive receptor property line

- Construction phasing and equipment usage assumptions are referenced from the Toyota Arena Mixed Use Development AQ & GHG Study, by RK Engineering, June 2021.

4.4 Interior Noise Modeling

The interior noise level is the difference between the projected exterior noise level at the structure's façade and the noise reduction provided by the structure itself. Typical building construction will provide a conservative 12 dBA noise level reduction with a "windows open" condition and a very conservative 20 dBA noise level reduction with "windows closed". RK estimated the interior noise level by subtracting the building shell design from the estimated exterior noise level.

The interior noise analysis is based on industry standards for building noise reduction established by the Federal Highway Administration (FHWA), the 2013 Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (TeNS), the California Office of Noise Control Catalog of STC and IIC Ratings for Wall and Floor/Ceiling Assemblies, and the California Building Standards Code, Title 24.

The TeNS manual shows that the noise reduction due to building exteriors with ordinary sash windows (windows closed) is at least 20 decibels. By providing upgraded STC rated windows, the project design is considered adequate to meet interior noise standards. The building's exterior walls will be constructed per the latest building code insulation requirements and provide occupants with the most protection from exterior noise. Insulated exterior walls, designed per the latest California Building Standards, would provide a minimum of STC 35-40. Windows, on the other hand, are one of the acoustically weakest parts of the structure. Therefore, for a conservative estimate of preliminary interior noise, the building's noise reduction potential is limited to the STC of the windows.

4.5 Construction Vibration Modeling

The construction vibration assessment is based on the methodology set-forth within the Caltrans Transportation and Construction Induced Vibration Guidance Manual. The

vibration impacts from vibratory rollers and compactors, heavy truck loading and bulldozer activity is analyzed. All vibratory activity is analyzed as a continuous and/or frequent event and is required to comply with the applicable guidance thresholds criteria. It is expected that vibration levels will be highest during paving phase. No impact pile driving is expected as part of this project.

Vibratory impacts were calculated from the site area property line to the closest sensitive receptors and structures using the reference vibration levels, soil conditions and the reference equation *PPV= PPV ref (25/D)^n (in/sec)* (from Caltrans Manual) where:

PPV = reference measurement at 25 feet from vibration source
D = distance from equipment to property line
n= vibration attenuation rate through ground (n=1.0 was utilized for this study)

5.0 Existing Noise Environment

The existing noise environment for the project site and surrounding area has been established based on noise measurement data collected by RK.

5.1 Long-Term (24-Hour) Noise Measurement Results

To determine the existing noise level environment, RK conducted four (4) 24-hour noise measurements at the project study area.

Noise levels were measured on April 7, 2021 using a Piccolo-II Type 2 integrating-averaging sound level meter. The information was utilized to establish the noise characteristics of the existing ambient environment.

The noise monitoring locations were selected based on the proximity and location to adjacent sensitive receptors. Exhibit C graphically illustrates the location of the long-term measurements.

- Long-term noise monitoring location one (LT-1) was taken along southwest corner of Fourth Street and Via Piemonte approximately 140 feet south of the centerline of Fourth Street.

- Long-term noise monitoring location two (LT-2) was taken east of Porsche Way, approximately 60 feet north of the La Quinta Inn property line.

- Long-term noise monitoring location three (LT-3) was taken northwest corner of Concours Street and Ferrari Street, approximately 110 feet to the west from the centerline of Concours Street.

- Long-term noise monitoring location four (LT-4) was taken in the parking lot, approximately 450 feet to the north from the centerline of Concours Street.

Long term noise monitoring locations represent the existing noise levels near the adjacent noise sensitive land uses. Long-term noise measurement results are summarized in Table 10, Table 11, Table 12 and Table 13. Appendix B includes photographs, field sheets and measured noise data.

Table 10
24 Noise Measurement Results LT-1[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	52.5	12:00 PM	58.9
1:00 AM	49.3	1:00 PM	59.5
2:00 AM	50.7	2:00 PM	57.4
3:00 AM	51.5	3:00 PM	58.4
4:00 AM	53.4	4:00 PM	62.6
5:00 AM	59.2	5:00 PM	59.9
6:00 AM	58.2	6:00 PM	59.8
7:00 AM	59.1	7:00 PM	58.6
8:00 AM	57.4	8:00 PM	58.2
9:00 AM	55.3	9:00 PM	56.2
10:00 AM	58.6	10:00 PM	55.1
11:00 AM	57.8	11:00 PM	51.8
24-Hour CNEL			**62.5**

[1] LT-1 was taken along southwest corner of Fourth Street and Via Piemonte approximately 140 feet south of the centerline of Fourth Street. LT-1 was recorded on 04/07/2021.

Table 11
24 Noise Measurement Results, LT-2[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	50.1	12:00 PM	50.2
1:00 AM	49.4	1:00 PM	50.8
2:00 AM	49.7	2:00 PM	52.3
3:00 AM	50.5	3:00 PM	52.8
4:00 AM	49.5	4:00 PM	53.8
5:00 AM	57.7	5:00 PM	53.4
6:00 AM	54.7	6:00 PM	52.1
7:00 AM	53.0	7:00 PM	52.6
8:00 AM	50.1	8:00 PM	56.1
9:00 AM	48.5	9:00 PM	49.7
10:00 AM	50.5	10:00 PM	50.8
11:00 AM	50.6	11:00 PM	50.3
24-Hour CNEL			**59.2**

[1] LT-2 was taken east of Porsche Way, approximately 60 feet north of La Quinta Inn property line. LT-2 was recorded on 04/07/2021.

Table 12
24 Noise Measurement Results, LT-3[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	52.5	12:00 PM	56.2
1:00 AM	45.8	1:00 PM	56.8
2:00 AM	49.0	2:00 PM	55.1
3:00 AM	49.8	3:00 PM	58.1
4:00 AM	51.7	4:00 PM	57.3
5:00 AM	52.3	5:00 PM	59.2
6:00 AM	54.8	6:00 PM	57.1
7:00 AM	55.8	7:00 PM	57.2
8:00 AM	55.0	8:00 PM	56.7
9:00 AM	57.6	9:00 PM	53.1
10:00 AM	58.1	10:00 PM	53.0
11:00 AM	55.7	11:00 PM	57.5
24-Hour CNEL			**60.6**

[1] LT-3 was taken northwest corner of Concours Street and Ferrari Street, approximately 110 feet to the west from the centerline of Concours Street. LT-2 was recorded on 04/07/2021.

Table 13
24 Noise Measurement Results, LT-4[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	39.2	12:00 PM	44.5
1:00 AM	38.8	1:00 PM	43.8
2:00 AM	40.0	2:00 PM	43.8
3:00 AM	39.1	3:00 PM	46.7
4:00 AM	38.6	4:00 PM	44.8
5:00 AM	40.5	5:00 PM	43.3
6:00 AM	44.0	6:00 PM	42.2
7:00 AM	44.8	7:00 PM	40.8
8:00 AM	48.4	8:00 PM	39.8
9:00 AM	59.3	9:00 PM	39.9
10:00 AM	50.7	10:00 PM	39.3
11:00 AM	44.9	11:00 PM	40.5
24-Hour CNEL			**49.9**

[1] LT-4 was taken in the parking lot, approximately 450 feet to the north from the centerline of Concours Street. LT-4 was recorded on 04/07/2021.

6.0 Operational Noise Impacts

This assessment analyzes the anticipated noise levels generated by the project. The main sources of noise generated by the project would include vehicular traffic noise along the adjacent roadways. Noise level impacts are compared to the City of Ontario noise standards.

The project must demonstrate that noise levels generated by the project site would not result in a permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

6.1 Stationary Source Noise Impacts

The project is not expected to consist of significant sources of stationary noise. The main sources of potential stationary noise impacts from the project would mainly include on-site circulation and parking lot noise, HVAC units and outdoor conversational noise.

The types of on-site noise from the project are typically considered compatible with other adjacent commercial/mixed use and would not typically be categorized as loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness. In particular, social activities and vehicular related noise are generally substantially less during the noise sensitive nighttime hours. Although, mechanical HVAC equipment does have the potential to operate 24-hours a day.

Rooftop mechanical HVAC equipment are expected to be located at the center of each building. The nearest noise sensitive residential receptors are located approximately 750 feet away to the west of the proposed Lot C HVAC units and the noise impacts from the operation of mechanical HVAC equipment is expected to be not significant at this distance. Therefore, a preliminary evaluation of noise impacts at the adjacent commercial uses has been provided.

Parking lot noise would occur from vehicle engine idling and exhaust, doors slamming, tires screeching, people talking, and the occasional horn honking. Parking lot noise is expected to occur on Lot F and Lot G and is conservatively assessed from the first parking space to northern residential properties; approximately 160 feet away.

The proposed site plan shows commercial/retail uses will face Via Piemonte and would be mostly shielded from the line of sight from the adjacent receptor property lines. Therefore, the outdoor conversational noise from the commercial/retail uses would not substantially contribute noise impacts to adjacent properties and was not included as a part of this analysis.

Table 14
Stationary Noise Impact Analysis[1]

Receptor			Stationary Noise Source				Combined Exterior Noise Level (Leq) dBA	
Number[2]	Land Use	Location	Source	Location	Distance[3]	Noise Level (Leq) dBA	Daytime[4]	Nighttime[4]
1	Residential	North of Lot F & Lot G	Parking Lot	Lot F & Lot G	160	34.8	34.8	34.8
2	Residential	West of Lot C	HVAC	Lot C	510	32.2	32.6	32.6
			Parking Lot	Lot F	735	21.9		
City of Ontario Residential Exterior Standard Levels							**65.0**	**50.0**
Noise Level Exceeds Standard (?)							**No**	**No**
3	Commercial	South of Lot C and Lot D	HVAC	Lot A	213	39.6	43.7	43.7
			HVAC	Lot C	243	38.5		
			HVAC	Lot D	243	38.5		
			Parking Lot	Lot F & Lot G	530	24.7		
4	Commercial	East of Lot D	HVAC	Lot D	485	32.7	36.6	36.6
			Parking Lot	Lot G	170	34.3		
5	Commercial	East of Lot A	HVAC	Lot A	213	39.6	42.4	42.4
			HVAC	Lot B	525	39.1		
6	Commercial	South of Lot B	HVAC	Lot A	580	31.1	39.0	39.0
			HVAC	Lot B	250	38.2		
City of Ontario Commercial Exterior Standard Levels							**65.0**	**60.0**
Noise Level Exceeds Standard (?)							**No**	**No**

[1] Stationary noise calculation worksheets are shown in Appendix C.
[2] Refer Exhibit A for Receptor Location.
[3] Distance from the receptor to the nearest noise source.
[4] Daytime: (7:00 A.M. to 10:00 P.M.); Nighttime: (10:00 P.M. to 7:00 A.M.)

As shown in Table 14, operational noise levels generated by the project are not expected to exceed the City's daytime standards and nighttime noise standards at the nearest receptor property line for both commercial and residential uses. Stationary noise calculation worksheets are shown in Appendix C.

6.2 Preliminary Interior Noise Analysis

Traffic noise along the adjacent roadways is expected to be the primary source of ambient noise impacting future residents at the project site. Traffic noise is analyzed to determine the project's noise/land use compatibility setting and to determine future noise levels to habitable exterior and interior areas on the project site. This section of the analysis does not necessarily apply to CEQA, as recent court rulings have indicated that CEQA is primarily concerned with the project's impact of the environment, not the environment's impact on a project.

Future traffic noise along the roadways is obtained from The Ontario Plan Figure S-3a, Future Roadway Noise Contours and represents the noise levels at the project site.

Table 15 shows the estimated future traffic noise levels at the project site and the noise/land use compatibly rating based on the City of Ontario General Plan Table LU-7 standards. The Ontario Plan Noise Level Exposure and Land Use Compatibility Guidelines is provided in Appendix A.

Table 15
Future Traffic Noise Levels[1]

Receptor	Exterior Noise Level (Ldn) (dBA CNEL)	Noise/Land Use Compatibility
Multifamily Residential	65-70	Normally Unacceptable
Retail	65-70	Normally Acceptable

[1] Source: The City of Ontario General Plan Table LU-7

The project may experience noise levels that fall within the normally unacceptable range (65-75 CNEL) for the residential part of the project and clearly acceptable (65-70 CNEL) for the retail part of the project. Hence, upgraded building construction techniques are expected to be required to achieve interior noise level standards for the residential uses.

Based on Section 5, the existing noise levels (CNEL) nearest the project site range from 60.6 CNEL to 62.5 CNEL. It should be noted that the existing noise levels were taken during typical weekday conditions and do not include noise levels during an event at the Toyota Arena event center, which may further increase noise levels (i.e., traffic) in the area. Therefore, in order to be conservative, the higher limit of the future traffic noise levels at the project site (70 dBA CNEL) has been utilized to conduct preliminary interior noise analysis.

A preliminary interior noise analysis has been prepared for the sensitive receptor locations using a typical "windows open" and "windows closed" condition. A "windows open" condition assumes 12 dBA of noise attenuation from the exterior noise level. A "windows closed" condition" assumes 20 dBA of noise attenuation from the exterior noise level.

Table 16 indicates the interior noise levels for the residential uses on the project site.

Table 16
Preliminary Interior Noise Impact Analysis

Receptor Location	Exterior Noise Level at Building Facade (CNEL)	Interior Noise Standard (CNEL)	Required Building Shell Noise Reduction (CNEL)	Interior Noise Level with Standard California Construction Windows (STC ≥ 25)		STC Rating for Windows Facing Subject Roadway
				"Windows Open" [1]	"Windows Closed" [2]	
Multifamily Residential	70	45.0	25	58	50	28

[1] A minimum of 12 dBA noise reduction is assumed with the "windows open" condition.
[2] A minimum of 20 dBA noise reduction is assumed with the "windows closed" condition.

The project is expected to require a "windows closed" condition and upgraded STC rated windows to meet the City/State interior noise standard of 45 dBA. To accommodate a windows closed conditions, all units shall be equipped with adequate fresh air ventilation, per the requirements of the California Uniform Building Code (UBC).

Prior to issuance of building permits, the project proponent should demonstrate to the City building department that the proposed building shell and window assemblies will achieve exterior to interior noise reduction necessary to meet the State of California and City of Ontario requirements.

Furthermore, the project shall comply with California Title 24 insulation building requirements for multi-family dwelling units for common separating assemblies (e.g. floor/ceiling assemblies and demising walls).

6.3 Los Angeles Ontario International Airport (LAONT)

The Los Angeles Ontario International Airport (LAONT) is centrally located in the City of Ontario. The airport is a medium-hub, full-service airport. Traffic at the airport includes general aviation, commercial passenger aviation, and air cargo freight movement. LAONT is a member of the Los Angeles World Airport (LAWA) system. LAWA is currently developing a Master Land Use Plan for LAONT that will provide a framework for the airport's development and use through the year 2030.

The LAONT is located approximately one and a quarter (1.25) miles to the northeast of the project site. A noise/land use compatibility assessment has been performed based on the project's location to the LAONT Airport. The noise contour maps for the LAONT Airport are provided in Exhibit D.

The project is located outside of the 60 dB Ldn noise contour limit; therefore, the exterior noise impact from the airport would be within the allowable limits for residential land uses and the project is considered compatible with the surrounding land use and noise environment. Noise from airport operations is expected to generate a less than significant on the proposed project.

6.4 Recommended Operational Design Features

The following recommended project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design. Design features are not typically considered mitigation under CEQA.

DF-1 Prior to the issuance of building permits, the project shall prepare a final acoustical study that demonstrates building construction will achieve the minimum interior noise standard of 45 dBA CNEL for all residential units located along arterial roadways and/or adjacent to industrial uses, per the California Building Standards Code. The following noise control measures may be required for dwelling units located near adjacent roadways and industrial uses:

- Install sound barriers between residences and noise sources.
- Install double-paned or similar sound rated windows.
- Provide sound insulating exterior walls and roofing systems.

- Locate and/or design attic vents to minimize sound propagation into each home.

- Provide forced-air ventilation systems.

- Place dwellings as far as practical from the noise source

DF-2 The project shall comply with California Title 24 building insulation requirements for exterior walls, roofs and common separating assemblies (e.g. floor/ceiling assemblies and demising walls).

DF-3 For proper acoustical performance, all exterior windows, doors, and sliding glass doors should have a positive seal and leaks/cracks must be kept to a minimum.

DF-4 The final building plans shall ensure that HVAC units are not located within an area of the project site that would contribute to a noise level exceedance at any adjacent property line, per the City of Ontario Municipal Code requirements. To meet the City's noise standards the following measures should be followed:

- All HVAC equipment shall be shielded or enclosed from the line of sight of adjacent residential uses.

7.0 Construction Noise and Vibration Impacts

Temporary construction noise and vibration impacts have been assessed from the project site to the nearest sensitive residential use to the north of Lot F and Lot G. The degree of construction noise will vary depending on the type of construction activity taking place and the location of the activity relative to the surrounding properties.

Chapter 29: Noise, Section 5-29.06 of the City's municipal code states that the following activities shall be exempted from the provisions of the noise code;

- Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the following provisions of § 5-29.09;

    i. No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

    ii. No landowner, construction company owner, contractor, subcontractor, or employer shall permit or allow any person or persons working under their direction and control to operate any tool, equipment or machine in violation of the provisions of this section.

To help further assess potential construction noise level impacts under CEQA, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006) criteria is used as a referenced threshold of significance in this report. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA Leq for an 8-hour period. In compliance with the City's Municipal Code, it is assumed construction would not occur during the noise-sensitive nighttime hours.

7.1 Typical Construction Noise Levels

Table 17 shows typical construction noise levels compiled by the Environmental Protection Agency (EPA) for common type construction equipment. Typical construction noise levels

are used to estimate potential project construction noise levels at the adjacent sensitive receptors.

Table 17
Typical Construction Noise Levels[1]

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86
Impact Equipment	
Pneumatic Wrenches	82 - 87
Jack Hammers, Rock Drills	80 - 99
Pile Drivers (Peak)	95-105
Other	
Vibrators	68 - 82
Saws	71 - 82

[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

7.2 Construction Noise Impact Analysis

This assessment analyzes potential noise impacts during all expected phases of construction, including; demolition, site preparation, grading, building construction, paving, and architectural coating. Construction phasing and equipment usage assumptions are referenced from:

- Toyota Arena Mixed Use Development AQ & GHG Impact Study, by RK Engineering Group, June 2021.

The project's estimated construction noise levels have been calculated using the Federal Highway Administration Roadway Construction Noise Model Version 1.1. Tables 18 show the noise level impacts to the nearest residential property lines to the north at 160 feet. Construction noise calculation worksheets are provided in Appendix D.

Table 18
Project Construction Noise Levels – Residential Uses to the North

Phase	Equipment	Quantity	Equipment Noise Level at 160ft (dBA Leq)	Combined Noise Level (dBA Leq)
Demolition	Concrete/Industrial Saw	1	72.5	76.3
	Excavator	3	66.6	
	Rubber Tired Dozer	2	67.6	
Site Preparation	Rubber Tired Dozers	3	67.6	77.5
	Tractors/Loaders/Backhoes	4	69.9	
Grading	Excavators	2	66.6	78.1
	Graders	1	70.9	
	Rubber Tired Dozers	1	67.6	
	Scrappers	2	69.5	
	Tractors/Loaders/Backhoes	2	69.9	
Building Construction	Cranes	1	62.5	76.2
	Forklifts	3	60.9	
	Generator Sets	1	67.5	
	Tractors/Loaders/Backhoes	3	69.9	
	Welders	1	59.9	
Paving	Cement and Mortar Mixer	2	64.7	71.8
	Pavers	2	64.1	
	Paving Equipment	2	62.9	
Architectural Coating	Air Compressors	1	63.6	63.6
Worst Case Construction Phase Noise Level - Leq (dBA)				78.1
FTA Construction Noise Criteria (Detailed Assessment: 8-Hour Leq)				80.0
Noise level exceeds FTA criteria?				No

As shown in Table 18, project construction noise levels are expected to be below the recommended 8-hour construction noise threshold provided by the FTA for adverse community reaction at the adjacent residential uses.

7.3 Construction Vibration

To determine the vibratory impacts during construction, reference construction equipment vibration levels were utilized and then extrapolated to the façade of the nearest adjacent structures. The nearest sensitive receptors are the commercial/retail structures located adjacent to the project site. All structures surrounding the project site are "new structures". No historical or fragile buildings are known to be located within the vicinity of the site.

The construction of the proposed project is not expected to require the use of substantial vibration inducing equipment or activities, such as pile drivers or blasting. The main sources of vibration impacts during construction of the project would be the operation of equipment such as bulldozer activity during demolition, loading trucks during grading and excavation, and vibratory rollers during paving.

The construction vibration assessment utilizes the referenced vibration levels and methodology set-forth within the Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018.

Table 19 shows the referenced vibration levels.

Table 19
Typical Construction Vibration Levels[1]

Equipment	Peak Particle Velocity (PPV) (inches/second) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Piledriver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Piledriver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018

Table 20 shows the project's construction-related vibration analysis at the nearest structures to the project construction area. Construction impacts are assessed from the closest area on the project site to the nearest adjacent structure at approximately 50 feet. The worst case vibratory impact from the site is estimated to be 0.098 PPV (in/sec) at the structures to the west. No damage potential is expected.

Table 20
Construction Vibration Impact Analysis

Construction Activity	Distance to Nearest Structure (ft)	Duration	Calculated Vibration Level - PPV (in/sec)	Damage Potential Level	Annoyance Criteria Level
Large Bulldozer	50	Continuous/Frequent	0.042	No Impacts	Distinctly Perceptible
Vibratory Roller	50	Continuous/Frequent	0.035	No Impacts	Barely Perceptible
Loaded Trucks	50	Continuous/Frequent	0.098	Extremely Fragile Buildings, Ruins Ancient Monuments	Distinctly Perceptible
Caisson Drilling	50	Continuous/Frequent	0.042	No Impacts	Distinctly Perceptible

As shown in Table 20, project related construction activity is not expected to cause any potential damage to the nearest structures. The annoyance potential of vibration from construction activities would range from "distinctly perceptible" to "Barely perceptible".

Construction vibration calculation worksheets are shown in Appendix D.

7.4 Recommended Construction Design Features

The following recommended project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design. Design features are not typically considered mitigation under CEQA

DF-7 Prepare a construction management plan and obtain a construction work permit from the City of Ontario prior to starting construction. The construction management plan shall ensure all contractors implement construction best management practices to reduce construction noise levels. Best management practices shall include the following:

- All construction equipment shall be equipped with muffles and other suitable noise attenuation devices (e.g., engine shields).
- Grading and construction contractors shall use quieter equipment as opposed to noisier equipment (such as rubber-tired equipment rather than track equipment), to the maximum extent feasible.
- If feasible, electric hook-ups shall be provided to avoid the use of generators. If electric service is determined to be infeasible for the site, only whisper-quiet generators shall be used (i.e., inverter generators capable of providing variable load.
- Use electric air compressors and similar power tools rather than diesel equipment, where feasible.
- Locate staging area, generators and stationary construction equipment as far from the adjacent residential homes as feasible.
- Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 5 minutes.

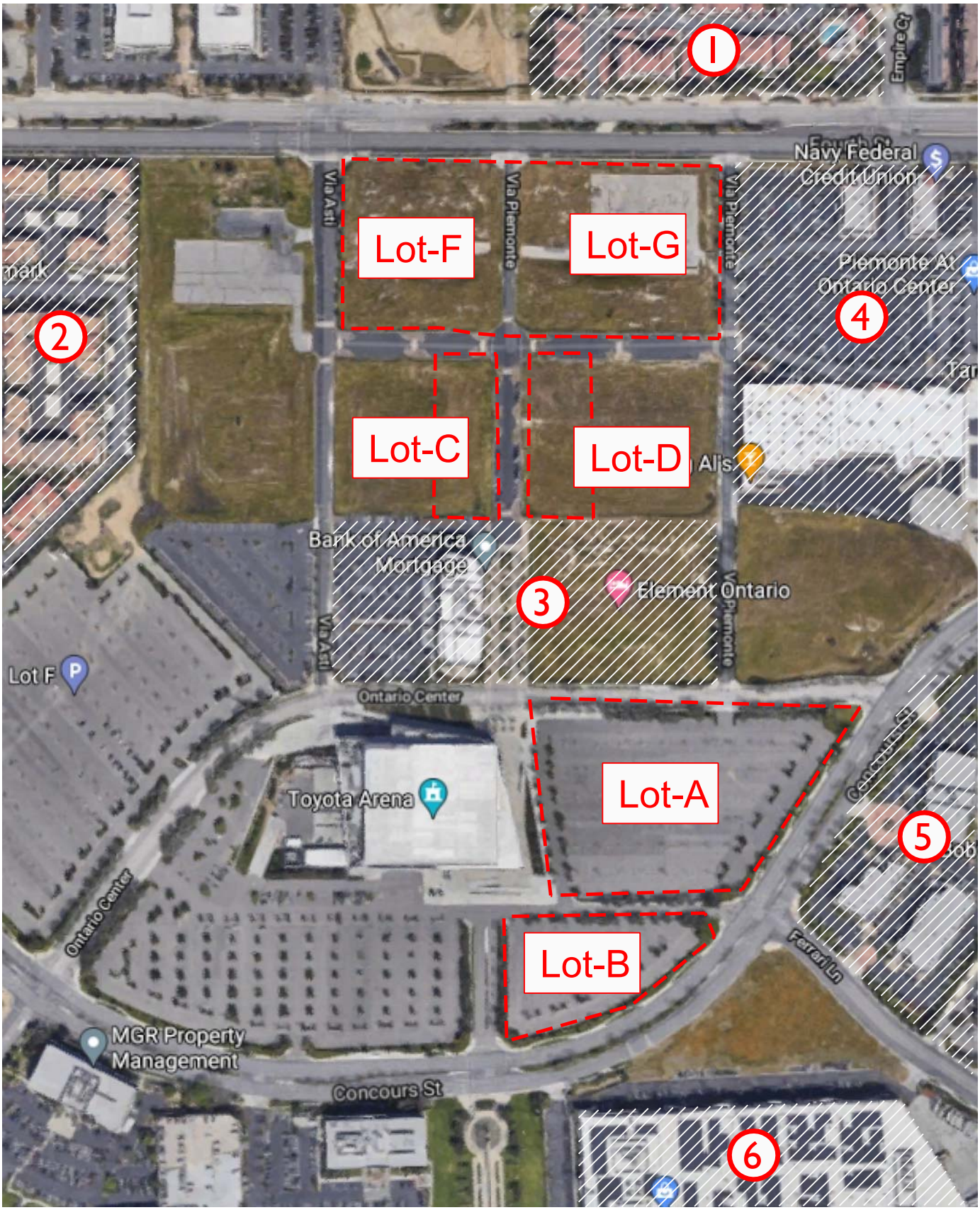
- Provide notifications and signage in readily visible locations along the perimeter of construction sites that indicate the dates and duration of construction activities, as well as provide a telephone number where neighbors can enquire about the construction process and register complaints to a designated construction noise disturbance coordinator.

- Construction activities shall not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays and Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

DF-8 No impact pile driving or blasting activities shall be permitted on the project site during construction. If impact pile driving or blasting is required, a follow-up noise and vibration impact assessment shall be conducted prior to start of any activity.

Exhibits

Location Map



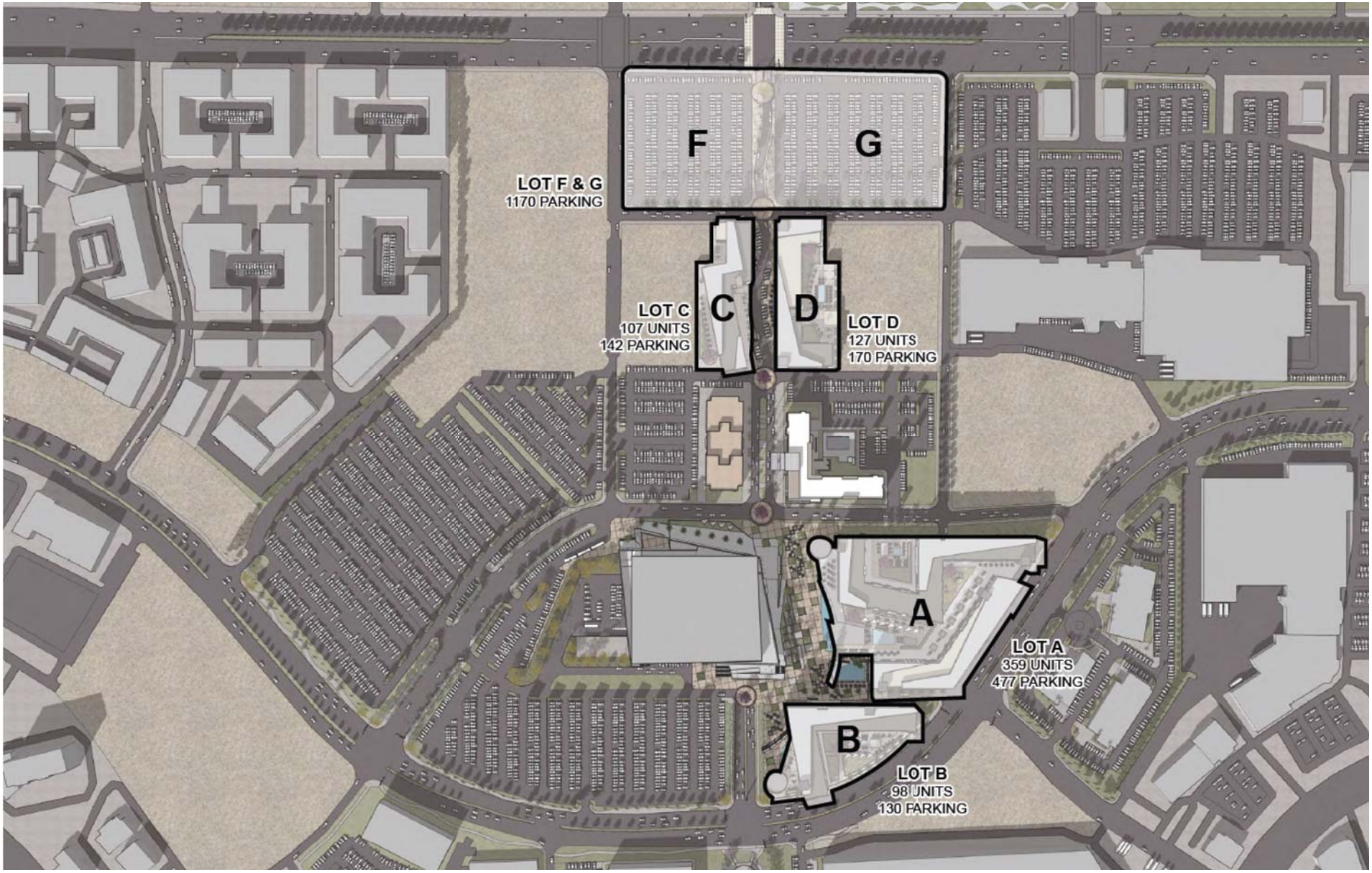
Legend:

① = Receptor Location

N

Exhibit C

Noise Monitoring Locations



N

Exhibit C

Noise Monitoring Locations

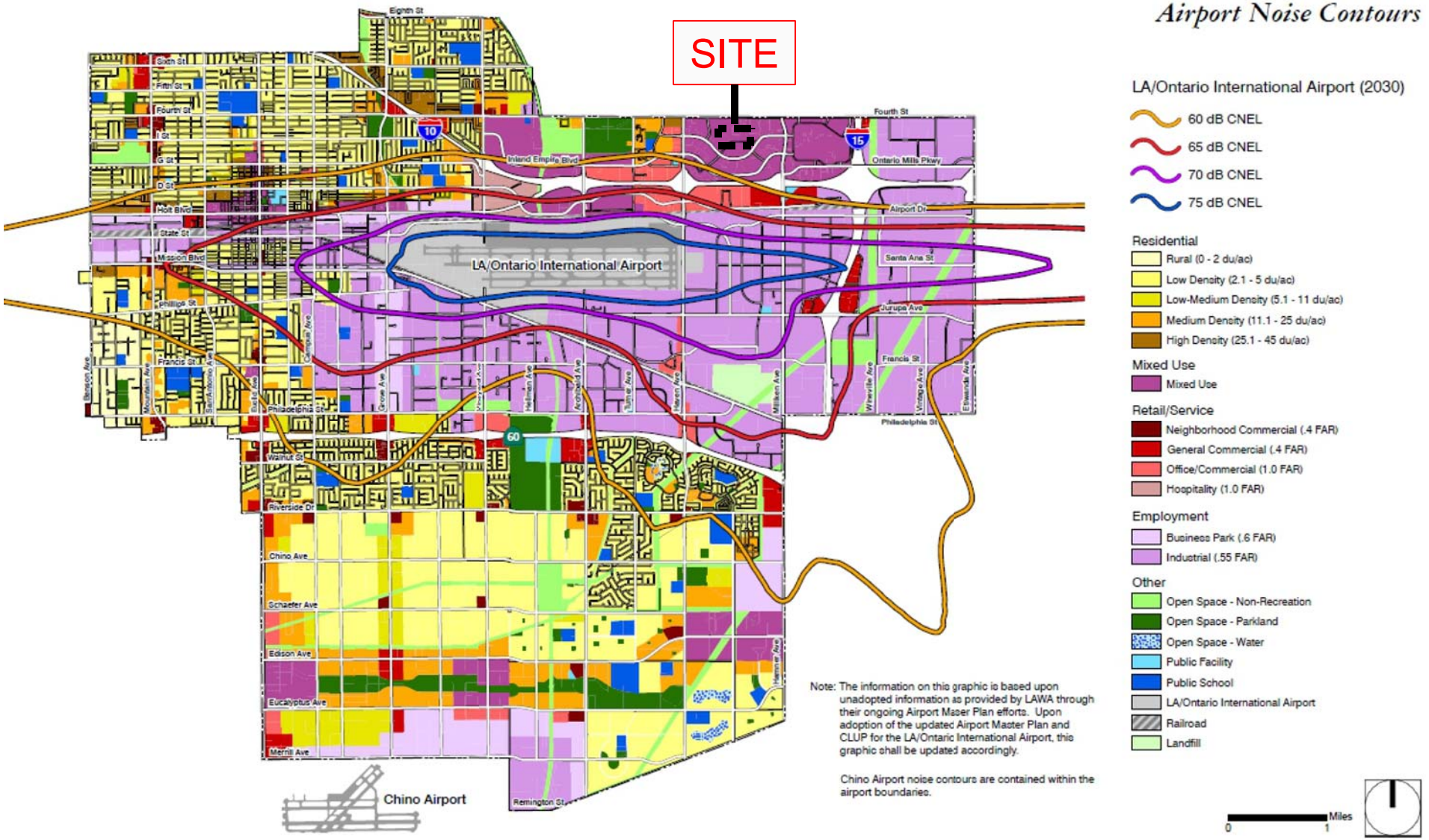
Legend:

LT-1 = Long Term (24-Hr) Noise Monitoring Location

N

Exhibit D

LAONT Airport Noise Contours



Appendices

Appendix A

City of Ontario
Noise Standards

CHAPTER 29: NOISE

5-29.01 Declaration of findings and policy

5-29.02 Definitions

5-29.03 Designated noise zones

5-29.04 Exterior noise standards

5-29.05 Interior noise standards

5-29.06 Exemptions

5-29.07 Loud and disturbing noise

5-29.08 Real property maintenance noise regulations

5-29.09 Construction activity noise regulations

5-29.10 Other public agency exceptions

5-29.11 Schools, day care centers, churches, libraries, museums, health care institutions; Special provisions

5-29.12 Sound amplifying equipment

5-29.13 Amplified sound

5-29.14 Motor vehicles

5-29.15 Noise level measurement

5-29.16 Prima facie violation

5-29.17 Penalty

5-29.18 Enforcement and administration

5-29.19 City Manager waiver

5-29.20 Noise abatement program

Sec. 5-29.01. Declaration of findings and policy.

It is hereby found and declared that:

(a) The making and creation of excessive, unnecessary or unusually loud noises within the limits of the City is a condition that has existed for some time, however, the extent and volume of such noises is increasing;

(b) The making, creation or maintenance of such excessive, unnecessary, unnatural or unusually loud noises that are prolonged, unusual and unnatural in their time, place and use affect and are a detriment to public health, comfort, convenience, safety, welfare and prosperity of the residents of the City; and

(c) The necessity in the public interest for the provisions and prohibitions hereinafter contained and enacted, is declared as a matter of legislative determination and public policy, and it is further declared

that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, comfort, convenience, safety, welfare and prosperity and the peace and quiet of the residents of the City.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.02. Definitions.

As used in this chapter, specific words and phrases are defined as follows:

(a) "Ambient noise level" shall mean the all-encompassing noise level associated with a given environment and is a composite of sounds from all sources, excluding the alleged offensive noise or excessive sound, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

(b) "Applicable (noise) zone" shall mean the noise zone category based on the actual use of the property, provided that the actual use is a legal use in the City.

(c) "A-weighted sound level" shall mean the sound pressure level in decibels (dBAs) as measured with a sound level meter using the A-weighted filter network (scale) at slow response and at a pressure of twenty (20) micropascals. The A-weighted filter de-emphasizes the very low and a very high frequency component of sound in a manner similar to the response of the human ear, and is a numerical method of rating human judgment of loudness.

(d) "Decibel (dBA)" shall mean a unit for measuring the amplitude of a sound, equal to twenty (20) times the logarithm to the base ten (10) of the ratio of pressure of the sound measured to the reference pressure of twenty (20) micropascals.

(e) "Equivalent sound or noise level (Leq)" shall mean the International Electrotechnical Commission (IEC) 60804 Standard for measurement, or the most recent revision thereof, for the sound level corresponding to a steady state noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level or the energy average noise level during the sample period. The measurement period for the purposes of this chapter is fifteen (15) minutes.

(f) "Impulsive noise" shall mean a noise of short duration usually less than one (1) second and of high intensity, with an abrupt onset and rapid decay. Such objectionable noises may also be repetitive.

(g) "Intrusive noise" shall mean that noise that intrudes over and above the ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence and tonal information content, as well as the prevailing ambient noise level.

(h) "Maintenance" shall mean the upkeep, repair or preservation of existing property or structures.

(i) "Noise" shall mean any unwanted sound or sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing or is otherwise annoying.

(j) "Noise level (sound level)" shall mean the weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum. For purposes of this chapter, all noise levels (sound levels) shall be A-weighted sound pressure level.

(k) "Noise (sound) level meter" shall mean an instrument, including a microphone, an amplifier, an output meter and frequency weighting networks for the measurement and determination of noise and sound levels. For the purposes of this chapter, the sound level meter must meet the International Electrotechnical Commission (IEC) 60651 and 60804 Standards, or the most recent revisions thereof, for Type 1 sound level meters or an instrument and the associated recording and analyzing equipment that will provide equivalent data.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.03. Designated noise zones.

The properties hereinafter described shall be assigned to the following noise zones:

Noise Zone I:	All single-family residential properties;
Noise Zone II:	All multi-family residential properties and mobile home parks;
Noise Zone III:	All commercial property;
Noise Zone IV:	The residential portion of mixed use properties;
Noise Zone V:	All manufacturing or industrial properties and all other uses.

The actual use of the property, and not necessarily its zoning designation, shall be the determining factor in establishing whether a property is in Noise Zone I, II, III, IV or V, provided that the actual use is a legal use within the applicable zone.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.04. Exterior noise standards.

(a) The following exterior noise standards, unless otherwise specifically indicated, shall apply to all properties within a designated noise zone.

Allowable Exterior Noise Level (1)		***Allowed Equivalent Noise Level, Leq. (2)***	
Noise Zone	***Type of Land Use***	***7 a.m. to 10 p.m.***	***10 p.m. to 7 a.m.***
I	Single-Family Residential	65 dBA	45 dBA
II	Multi-Family Residential, Mobile Home Parks	65 dBA	50 dBA
III	Commercial Property	65 dBA	60 dBA
IV	Residential Portion of Mixed Use	70 dBA	70 dBA
V	Manufacturing and Industrial, Other Uses	70 dBA	70 dBA

(1) If the ambient noise level exceeds the resulting standard, the ambient noise level shall be the standard.

(2) Measurements for compliance are made on the affected property pursuant to § 5-29.15.

(b) It is unlawful for any person at any location within the incorporated area of the City to create noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which noise causes the noise level, when measured at any location on any other property, to exceed either of the following:

(1) The noise standard for the applicable zone for any fifteen-minute (15) period; and

(2) A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).

(c) In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.

(d) The Noise Zone IV standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use, if the noise originates from that commercial property or use.

(e) If the measurement location is on a boundary between two (2) different noise zones, the lower noise level standard applicable to the noise zone shall apply.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.05. Interior noise standards.

(a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all properties within a designated noise zone.

Allowable Interior Noise Level (1)		**Allowed Equivalent Noise Level, Leq.** (2)	
Noise Zone	***Type of Land Use***	***7 a.m. to 10 p.m.***	***10 p.m. to 7 a.m.***
I	Single-Family Residential	45 dBA	40 dBA
II	Multi-Family Residential, Mobile Home Parks	45 dBA	40 dBA
IV	Residential Portion of Mixed Use	45 dBA	40 dBA

(1) If the ambient noise level exceeds the resulting standard, the ambient noise level shall be the standard.

(2) Measurements for compliance are made on the affected property pursuant to § 5-29.15.

(b) It is unlawful for any person at any location within the incorporated area of the City to create noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which noise causes the noise level, when measured at any location on any other property, to exceed either of the following:

(1) The noise standard for the applicable zone for any fifteen-minute (15) period;

(2) A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).

(c) In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.

(d) The Noise Zone IV standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use, if the noise originates from that commercial property or use.

(e) If the measurement location is on a boundary between two (2) different noise zones, the lower noise level standard applicable to the noise zone shall apply.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.06. Exemptions.

The following activities shall be exempted from the provisions of this chapter:

(a) Any activity conducted on public property, or on private property with the consent of the owner, by any public entity or its officers, employees, representatives, agents, subcontractors, permittees, licensees or lessees that the public entity has authorized are exempt from the provisions of this chapter. This includes, without limitation, sporting and recreational activities that are sponsored, co-sponsored, permitted or allowed by the City or any school district within the City's jurisdictional boundaries. This also includes, without limitation, occasional outdoor gatherings, public dances, shows or sporting and entertainment events, provided such events are conducted pursuant to an approval, authorization, contract, lease, permit or sublease by the appropriate public entity, specifically the planning commission or City Council;

(b) Occasional outdoor gatherings, public dances, show, sporting and entertainment events, provided said events are conducted pursuant to a permit or license issued by the appropriate jurisdiction relative to the staging of said events;

(c) Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle, work or warning alarm or bell, provided the sounding of any bell or alarm on any building or motor vehicle shall terminate its operation within forty-five (45) minutes in any hour of its being activated;

(d) Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the provisions of § 5-29.09;

(e) Noise sources associated with construction, repair, remodeling, demolition or grading of public rights-of-way or during authorized seismic surveys;

(f) All mechanical devices, apparatus or equipment associated with agriculture operations provided that:

(1) Operations do not take place between 8:00 p.m. and 7:00 a.m.;

(2) Such operations and equipment are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions; or

(3) Such operations and equipment are associated with agricultural pest control through pesticide application, provided the application is made in accordance with permits issued by or regulations enforced by the California Department of Agriculture;

(g) Noise sources associated with the maintenance of real property. Such activities shall instead be subject to the provisions of § 5-29.08;

(h) Any activity to the extent regulation thereof has been preempted by state or federal law;

(i) Any noise sources associated with people and/or music associated with a party at a residential property. Such noise shall be subject to the provisions of OMC § 5-29.07;

(j) Any noise source emanating from an ice cream truck within the City. Such noise shall be subject to the provisions of OMC § 4-18.04;

(k) Any noise sources associated with barking dogs or other intermittent noises made by animals on any properly within the City. Such noise shall be subject to the provisions of OMC Chapter 1, Title 6;

(l) Noise sources related to uses approved by a permit or development agreement adopted prior to the date of adoption of this chapter and that contains acoustic or noise standard conditions of approval. This exemption shall only be applicable during the effective period of the City-approved permit or development agreement.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.07. Loud and disturbing noise.

(a) It is unlawful for any person or property owner within the City to make, cause or allow to be made any loud, excessive, impulsive or intrusive noise, disturbance or commotion that disturbs the peace or quiet of any area or that causes discomfort or annoyance to any reasonable person of normal sensitivities in the area, after a Police or Code Enforcement Officer has first requested that the person or property owner cease and desist from making such noise. The types of loud, disturbing, excessive, impulsive or intrusive noise may include, but shall not be limited to, yelling, shouting, hooting, whistling, singing, playing a musical instrument, or emitting or transmitting any loud music or noise from any mechanical or electrical sound making or sound-amplifying device.

(b) The factors, standards, and conditions that may be considered in determining whether a violation of the provisions of this section has been committed, included, but not limited to, the following:

(1) The level of the noise;

(2) The level and intensity of the background (ambient) noise, if any;

(3) The proximity of the noise to residential or commercial sleeping areas;

(4) The nature and zoning of the area within which the noise emanates;

(5) The density of inhabitation of the area within which the noise emanates;

(6) The time of day and night the noise occurs;

(7) The duration of the noise;

(8) Whether the noise is constant, recurrent or intermittent;

(9) Whether the noise is produced by a commercial or noncommercial activity; and

(10) Whether the use is lawful under the provisions of Title 5 of this Code and whether the noise is one that could reasonably be expected from the activity or allowed use.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.08. Real property maintenance noise regulations.

(a) No person, while engaged in maintenance of real property, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, except between the hours of 8:00 a.m. and 6:00 p.m.

(b) Trimming or pruning that requires the use of chainsaws or mulching machines shall only be allowed between the hours of 8:00 a.m. and 6:00 p.m. on a weekday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday or Sunday.

(c) The use of electrical or gasoline powered blowers, such as commonly used by gardeners or other persons for cleaning lawns, yards, driveways, gutters and other property shall only be allowed between the hours of 8:00 a.m. and 6:00 p.m. on a weekday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday or Sunday.

(d) No landowner, gardener, property maintenance service, contractor, subcontractor or employer shall permit or allow any person or persons working under his or her direction or control to operate any tool, equipment or machine in violation of the provisions of this section.

(e) Exceptions. The provisions of this section shall not apply to the following:

(1) Emergency property maintenance required by the building official;

(2) The maintenance, repair or improvement of any public work or facility by public employees, by any person or persons acting pursuant to a public works contract, or by any person or persons performing such work or pursuant to the direction of, or on behalf of, any public agency; provided, however, this exception shall not apply to the City, or its employees, contractors or agents, unless:

(i) The City Manager or department head determines that the maintenance, repair or improvement is immediately necessary to maintain public service,

(ii) The maintenance, repair or improvement is of a nature that cannot feasibly be conducted during normal business hours, or

(iii) The City Council has approved project specifications, contract provisions, or an environmental document that specifically authorizes maintenance during hours of the day that would otherwise be prohibited pursuant to this section; and

(3) Any maintenance that complies with the noise limits specified in § 5-29.04.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.09. Construction activity noise regulations.

(a) No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

(b) No landowner, construction company owner, contractor, subcontractor, or employer shall permit or allow any person or persons working under their direction and control to operate any tool, equipment or machine in violation of the provisions of this section.

(c) Exceptions.

(1) The provisions of this section shall not apply to emergency construction work performed by a private party when authorized by the City Manager or his or her designee;

(2) The maintenance, repair or improvement of any public work or facility by public employees, by any person or persons acting pursuant to a public works contract, or by any person or persons performing such work or pursuant to the direction of, or on behalf of, any public agency; provided, however, this exception shall not apply to the City, or its employees, contractors or agents, unless:

(i) The City Manager or a department head determines that the maintenance, repair or improvement is immediately necessary to maintain public services,

(ii) The maintenance, repair or improvement is of a nature that cannot feasibly be conducted during normal business hours, or

(iii) The City Council has approved project specifications, contract provisions, or an environmental document that specifically authorizes construction during hours of the day that would otherwise be prohibited pursuant to this section; and

(3) Any construction that complies with the noise limits specified in §§ 5-29.04 or 5-29.05.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.10. Other public agency exceptions.

The provisions of this chapter shall not be construed to prohibit any work at different hours by or under the direction of any other public agency or public or private utility companies in cases of necessity or emergency.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.11. Schools, day care centers, churches, libraries, museums, health care institutions; Special provisions.

It is unlawful for any person to create any noise that causes the outdoor noise level at any school, day care center, hospital or similar health care institution, church, library or museum while the same is in use, to exceed the noise standards specified in § 5-29.04 prescribed for the assigned Noise Zone I.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.12. Sound amplifying equipment.

Loudspeakers, sound amplifiers, public address systems or similar devices used to amplify sounds shall be subject to the provisions of § 5-29.13. Such sound amplifying equipment shall not be construed to include electronic devices, including but not limited to, radios, tape players, tape recorders, compact disc players, MP3 players, electric keyboards, music synthesizers, record players or televisions, which are designed and operated for personal use, or used entirely within a building and are not designed or used to convey the human voice, music or any other sound to an audience outside such building, or which are used in vehicles and heard only by occupants of the vehicle in which installed.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.13. Amplified sound.

(a) The City Council enacts the following legislation for the sole purpose of securing and promoting the public health, comfort, safety and welfare for its citizenry. While recognizing that the use of sound amplifying equipment may be entitled to certain protection by the constitutional rights of freedom of speech and assembly, the City Council finds that in order to protect the public safety and the correlative rights of the citizens of this community to privacy and freedom from public nuisance of loud and unnecessary noise, reasonable regulation of the time, place and manner of the use of amplifying equipment is necessary. In no event shall approval or authorization required herein be withheld by reason of the constitutionally protected content of any material proposed to be broadcast through amplifying equipment.

(b) It is unlawful for any person, other than personnel of law enforcement or governmental agencies, to install, use or operate a loudspeaker or sound amplifying device in a fixed or movable position or mounted upon any vehicle within the City for the purpose of giving instructions, directions, talks, addresses or lectures to any persons or assemblages of persons in or upon any street, alley, sidewalk, park, place or public property without a permit to do so from the Police Chief or his or her designee. Notwithstanding any other provision of this chapter, the provisions of this section shall also apply to the use of sound amplifying equipment upon public or private property when used in connection with outdoor or indoor public or private events, whether or not admission is charged or food or beverages are sold, when such activity is to be attended by more than one hundred (100) persons and the noise emanating from the event will be audible at the property plane, or in the case of a street dance or concert on the nearest residential property. Those activities listed in § 5-29.06(a) are exempt from the requirements of this section.

(c) The Police Chief or his or her designee is authorized to approve and issue permits under this section.

(d) An application for a permit required by this section shall be filed with the Police Chief at least sixteen (16) days and no more than one hundred twenty (120) days prior to the date on which the sound amplifying equipment is intended to be used. Applications for events covered by the First Amendment of the United States Constitution are exempt from the time requirements of this section if it is shown that circumstances require a shorter filing period and the event will not constitute an unsafe condition. The application shall contain the following information:

(1) The name, address and telephone number of both the owner and the user of the sound amplifying equipment;

(2) The license number, if a sound truck is to be used;

(3) A general description of the sound amplifying equipment which is to be used;

(4) Whether sound amplifying equipment will be used for commercial or noncommercial purpose;

(5) The dates and times upon and within which, and the streets or property over or upon which, the equipment is proposed to be operated;

(6) The name or names of one (1) or more persons who will be present during the conduct of any activities for which registration is sought and who will have authority to reduce the volume of any sound amplifying equipment during the course of the activities if required pursuant to this chapter and, otherwise, to insure compliance with the provisions of this chapter;

(7) A statement by the applicant that he or she is willing and able to comply with the provisions of this chapter and the conditions of the permit; and

(8) A sketch of the area or facilities within which the activities are to be conducted, with approximate dimensions and illustration of the location and orientation of all sound-amplifying equipment.

(e) The Police Chief shall deny the permit application or revoke any permit if the chief finds any of the following:

(1) The application contains materially false or intentionally misleading information;

(2) The use of sound amplifying equipment at an event or activity proposed will be located in or upon a premises, building or structure that is hazardous to the health or safety of the employees or patrons of the premises, business, activity, or event, or the general public, under the standards established by the Uniform Building or Fire Codes, or other applicable codes, as set forth in OMC Titles 4 and 8;

(3) The use of sound amplifying equipment at an event or activity proposed in or upon a premises, building or structure that lacks adequate on-site parking for participants attending the proposed event or activity under the applicable standards set forth in OMC Title 9;

(4) The conditions of any motor vehicle movement are such that, in his or her opinion, the use of the equipment would constitute an unreasonable interference with traffic safety;

(5) The conditions of pedestrian movement are such that the use of the equipment would constitute a detriment to traffic safety;

(6) The application submitted by the applicant reveals that the applicant would violate the provisions of this section or any other provision of federal, state and/or local law;

(7) The applicant is unwilling or unable to comply with the provisions of this chapter or any conditions imposed upon any permit issued;

(8) There had already been a permitted event at the intended location, or within a two hundred (200) yard radius of the intended location and the prior permitted event was located on residentially zoned property or on a street, alley, public parking lot or neighborhood park within three (3) months prior to the intended event. Community parks are exempt from this subsection (8); or

(9) The applicant or location has had previous violations within the past calendar year, and in the judgment of the Police Chief, issuance would be contrary to the intent of this section.

(f) In determining whether the use of the equipment would constitute an unreasonable interference with or detriment to traffic safety, the Police Chief shall consider, but shall not necessarily be limited to:

(1) The volumes, patterns and speed of vehicular and pedestrian traffic in the proposed area of use;

(2) The relationship of the proposed use of equipment and potential impacts upon traffic patterns;

(3) Availability of sufficient room for the operation of the equipment without significantly interfering with the traffic patterns;

(4) Proximity to schools, playgrounds and similar facilities where use of such equipment might attract children into traffic patterns; or

(5) Proximity to busy intersections or other potentially hazardous conditions where use of such equipment might constitute a hazard by reason of its tendency to distract drivers of vehicles or pedestrians.

(g) Issuance or denial.

(1) If the application is approved, the Police Chief shall return an approved copy of the application to the applicant and shall issue a permit. The permit shall constitute permission for the use of the sound amplifying equipment as requested.

(2) Any application filed shall be either approved or disapproved within five (5) days of the filing thereof.

(3) If the application is disapproved, the Police Chief shall return a disapproved copy forthwith to the applicant with a written statement on the reason for disapproval.

(i) Any person aggrieved by a decision of the Police Chief or his or her designee may file an appeal to the City Manager. A complete and proper appeal shall be filed with the City Clerk within ten (10) calendar days of the action that is the subject of the appeal. If the applicant fails to file an appeal within the ten (10) day filing period provided herein, denial shall take effect immediately upon expiration of such filing period. All appeals shall be in writing and shall contain the following information: (a) name(s) of the person filing the appeal, (b) a brief statement in ordinary and concise language of the relief sought, and (c) the signatures of all parties named as appellants and their mailing addresses. After receiving the appeal, the City Clerk shall immediately forward the matter to the City Manager for handling.

(ii) The City Manager shall, upon receipt of the appeal, set the matter for hearing before the City Manager or a hearing officer. Any hearing officer shall be a licensed attorney or recognized mediator designated by the City Manager. The hearing shall be set for not more than ten (10) calendar days after the receipt of the appeal unless a longer time is requested or consented to by the appellant. Notice of such hearing shall be given in writing and mailed at least five (5) calendar days prior to the date of the hearing, by U.S. mail, with a proof of service attached, addressed to the address listed on the permit application, or the written appeal if different from the permit application. The notice shall state the grounds of the complaint or reason for the denial and shall state the time and place where such hearing will be held.

(iii) The City Manager or hearing officer shall, within ten (10) calendar days following the conclusion of the hearing, make a written finding and decision, which shall be delivered to the City and the appellant by first class mail. Notwithstanding any provision in this Code, the decision of the City Manager or hearing officer shall be the final administrative decision of the City. Any party dissatisfied with the decision of the City Manager or hearing officer may seek review of such decision under the provisions of Code Civil Procedure, §§ 1094.5 and 1094.8, as amended from time to time.

(h) In addition to any other provisions of this Code, the use of sound-amplifying equipment and sound trucks in the City shall be subject to the following regulations:

(1) The only sounds permitted are music and human speech;

(2) Sound shall not be emitted within one hundred (100) yards of hospitals, churches, schools and City Hall;

(3) The volume of sound shall be controlled so that it will not be audible for a distance in excess of one hundred (100) feet from the sound amplifying equipment or sound truck, and so that the volume is not unreasonably loud, raucous, jarring, disturbing or a nuisance to persons within the range of allowed audibility; or

(4) The sound amplifying equipment or sound truck shall not be used between the hours of 8:00 p.m. and 8:00 a.m.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.14. Motor vehicles.

The use of any motor vehicle in such a condition as to create excessive, impulsive or intrusive noises is prohibited. The discharge into the open air of the exhaust of any internal combustion engine, stationary or mounted on wheels, motorboat or motor vehicle, including motor cycle, whether or not discharged through a muffler or other similar device, which discharge creates excessive, unusual, impulsive or intrusive noise is prohibited. Motor vehicles shall comply with the noise regulations of the California Vehicle Code.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.15. Noise level measurement.

(a) The location selected for measuring exterior noise levels in a residential area shall be at any part of a private yard, patio, deck or balcony normally used for human activity and identified by the owner or, if occupied by someone other than the owner, the occupant of the affected property as suspected of exceeding the noise level standard. This location may be the closest point in the private yard or patio, or on the deck or balcony, to the noise source, but should not be located in nonhuman activity areas such as trash container storage areas, planter beds, above or contacting a property line fence, or other areas not normally used as part of the yard, patio, deck or balcony. The location selected for measuring exterior noise levels in a nonresidential area shall be at the closest point to the noise source. The measurement microphone height shall be five (5) feet above finish elevation or, in the case of a deck or balcony, the measurement microphone height shall be five (5) feet above the finished floor level.

(b) The location selected for measuring interior noise levels shall be made within the affected residential unit. The measurements shall be made at a point at least four (4) feet from the wall, ceiling or floor, or within the frame of a window opening, nearest the noise source. The measurements shall be made with windows in an open position.

(c) Any decibel measurement made pursuant to the provisions of this chapter shall be measured in decibels (dBAs) as measured with a sound level meter using the A-weighted sound pressure level.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.16. Prima facie violation.

Any noise exceeding the noise level standard as specified in §§ 5-29.04 and 5-29.05, shall be deemed to be prima facie evidence of a violation of the provisions of this chapter.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.17. Penalty.

(a) Any person who negligently or knowingly violates any provision of this chapter shall be guilty of an infraction and upon conviction shall be punishable by a fine specified in OMC § 1-2.01. Each day a violation occurs shall constitute a separate offense and shall be punishable as such.

(b) Any person who negligently or knowingly violates any provision of this chapter may also be subject to fine(s) specified in the administrative citation schedule of fines set forth in OMC § 1-5.04. The manner of issuing administrative citations shall comply with all the procedures specified in OMC Chapter 5, Title 1.

(c) As an additional remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provisions of this chapter, which operation or maintenance causes or creates sound levels exceeding the allowable standards as specified in this chapter, shall be deemed and is declared to be a public nuisance and may be subject to abatement by a restraining order or injunction issued by a court of competent jurisdiction.

(d) Any violation of this chapter is declared to be a public nuisance and may be abated in accordance with law. The expense of enforcing this chapter is declared to be public nuisance and may be by resolution of the City Council declared to be a lien and special assessment against the property on which such nuisance is maintained, and any such charge shall also be a personal obligation of the property owner.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.18. Enforcement and administration.

(a) It shall be the responsibility of Police or Code Enforcement Officers to enforce the provisions of this chapter and to perform all other functions required by this chapter. Such duties shall include, but not be limited to investigating potential violations, issuing warning notices and citations, and providing evidence to the City prosecutor for legal action.

(b) For violations of § 5-29.07, Police or Code Enforcement Officers shall obtain a declaration under penalty of perjury from two (2) declarants living in separate households within a sixty (60) day period stating in detail all of the following:

(1) That the declarant is a resident of a residential neighborhood located within two hundred (200) yards of the noise source; and

(2) Within the past month declarant has heard noise for substantially long periods to the extreme annoyance of the declarant.

(3) Declarations from two (2) declarants are required to prove a violation of § 5-29.07, but are not required to prove that a person has violated any other provision of this chapter.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.19. City Manager waiver.

The City Manager is authorized to grant a temporary waiver to the provisions of this chapter for a period of time necessary to correct the violations of this chapter, if such temporary waiver would be in the public interest and there is no feasible and prudent alternative to the activity, or the method of conducting the activity, for which the temporary waiver is sought. This time period may include a commitment to a program that includes placing necessary orders and entering into necessary contracts within thirty (30) days for repair or installation.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.20. Noise abatement program.

(a) In circumstances where adopted community-wide noise standards and policies prove impractical in controlling noise generated from a specific source, the City Council may establish a noise abatement program that recognizes the characteristics of the noise source and affected property and that incorporates specialized mitigation measures.

(b) Noise abatement programs shall set forth in detail the approved terms, conditions and requirements for achieving maximum compliance with noise standards and policies. Said terms, conditions and requirements may include, but shall not be limited to, limitations, restrictions, or prohibitions on operating hours, location of operations, and the types of equipment.

(§ 2, Ord. 2888, eff. March 6, 2008)

NOISE LEVEL EXPOSURE AND LAND USE COMPATIBILITY GUIDELINES

Table LU-7

LAND USE CATEGORIES		COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)						
Category	Land Use	55	60	65	70	75	80	
Residential/ Lodging	Single Family / Duplex							
	Multi-Family							
	Mobile Homes							
	Hotel/Motels							
Public/Institutional	Schools/Hospitals							
	Churches/ Libraries							
	Auditoriums/Concert Halls							
Commercial	Offices							
	Retail							
Industrial	Manufacturing							
	Warehousing							
Recreational/ Open Space	Parks/Playgrounds							
	Golf Courses/ Riding Stables							
	Outdoor Spectator Sports							
	Outdoor Music Shells/ Amphitheaters							
	Livestock/Wildlife Preserves							
	Crop Agriculture							

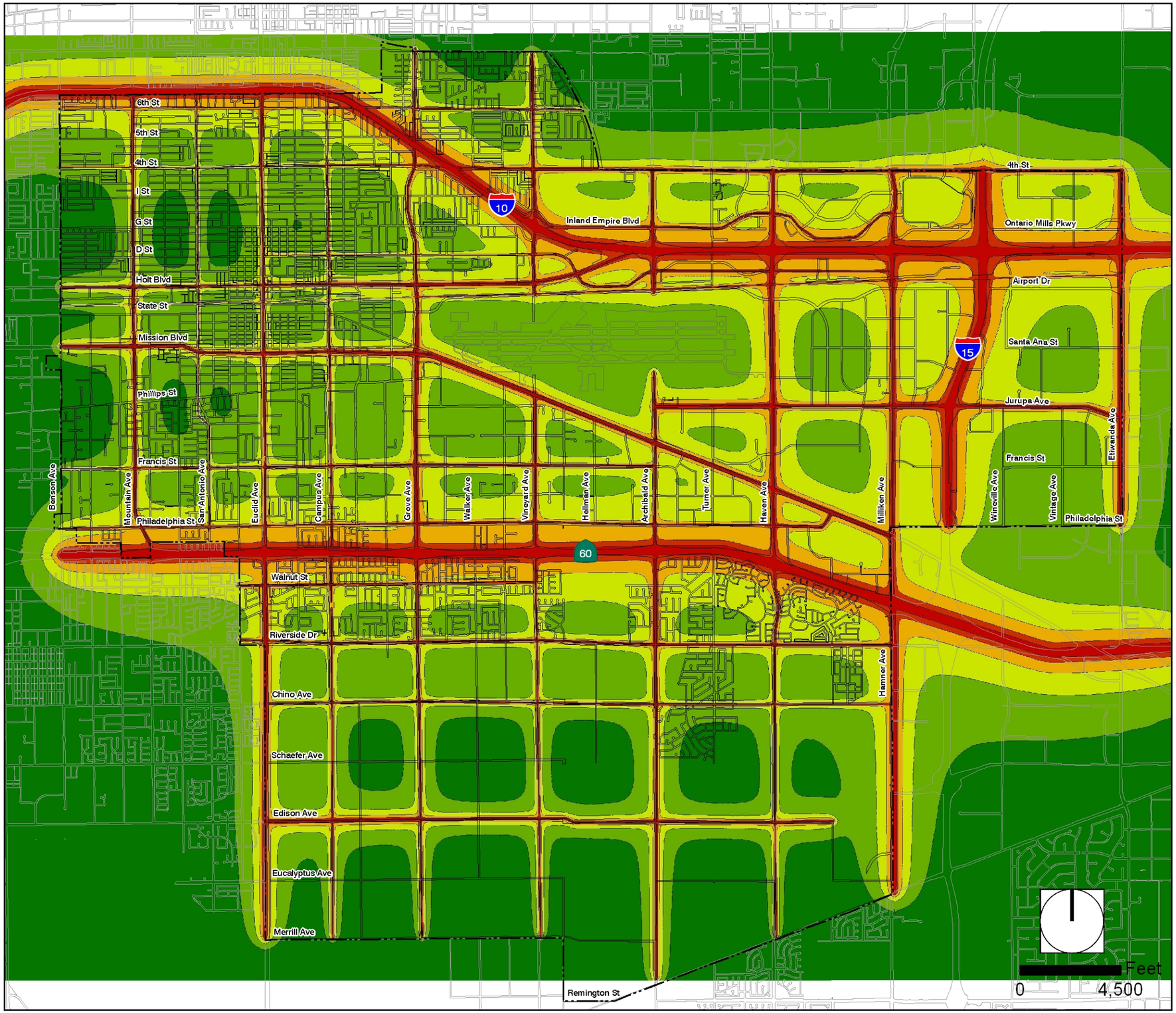
LEGEND

Clearly Acceptable:	No special noise insulation required, assuming buildings of normal conventional construction.
Normally Acceptable:	Acoustical reports will be required for major new residential construction. Conventional construction with closed windows and fresh air supply systems of air conditioning will normally suffice.
Normally Unacceptable:	New construction should be discouraged. Noise/aviation easements required for all new construction. If new construction does proceed, a detailed analysis of noise reduction requirements must be made and necessary noise insulation features included.
Clearly Unacceptable:	No new construction should be permitted.

Note: For noise compatibility criteria and contours for Ontario International Airport refer to the adopted ALUCP for ONT.

Figure S-3a

Future Roadway Noise Contours



Noise Level Ldn in dBA CNEL

	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	

Source: SoundPlan Noise Model, Braunstein and Berndt, GmbH, Version 6.5. Noise contours do not take into account attenuation provided by building structures or masonry walls or noise from the Los Angeles Ontario International Airport, Chino Airport, or Union Pacific Railroad.

THE ONTARIO PLAN
A FRAMEWORK FOR THE FUTURE

Appendix B

Field Data and Photos

Field Sheet

Project: Toyota Arena Mixed Use Development **Engineer:** M. Torres

Date: 4/7/2021
JN: 2957-2021-02

Measurement Address: Toyota Arena
City: Ontario
Site No.: 1

Sound Level Meter:
Piccolo II
Serial # P0218042101
Serial # P0218092808
Serial # P0221010801
Serial # P0221010802

Calibrator:
CA114 Sound Calibrator
Serial # 500732

Calibration Record:

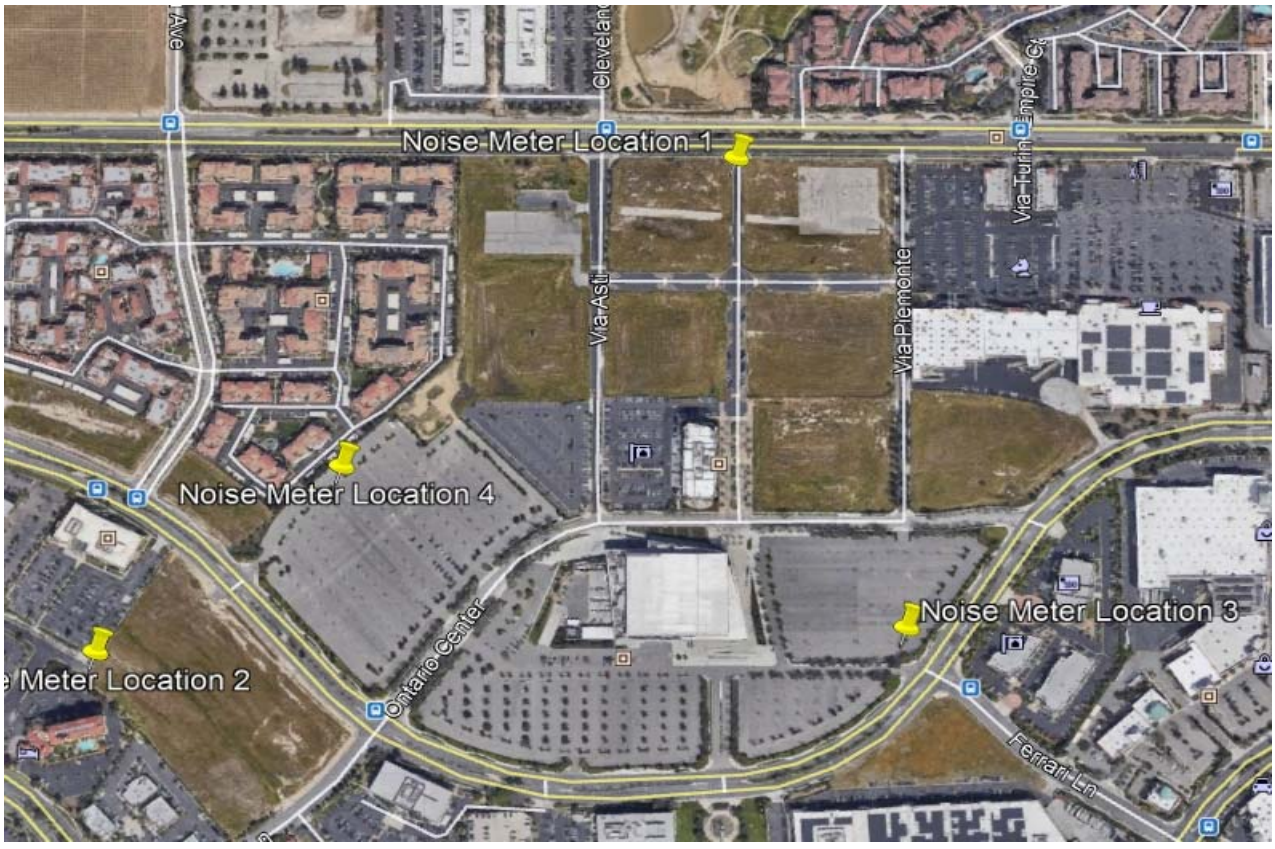
	Input, dB/	Reading, dB/	Offset, dB/	Time
1	94.0			9:47 AM
2	94.0			10:18 AM
3	94.0			10:47 AM
4	94.0			10:54 AM

Notes:
Temp: 55
Windspeed: 8 MPH
Direction: SSW
Skies: and Partly Cloudy
Camera:
Photo Nos.

Meter Settings:
☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS ___60____- MINUTE
☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☒ L_N PERCENTILE VALUES

Notes:

Measurement Type:
Long-term X
Short-term



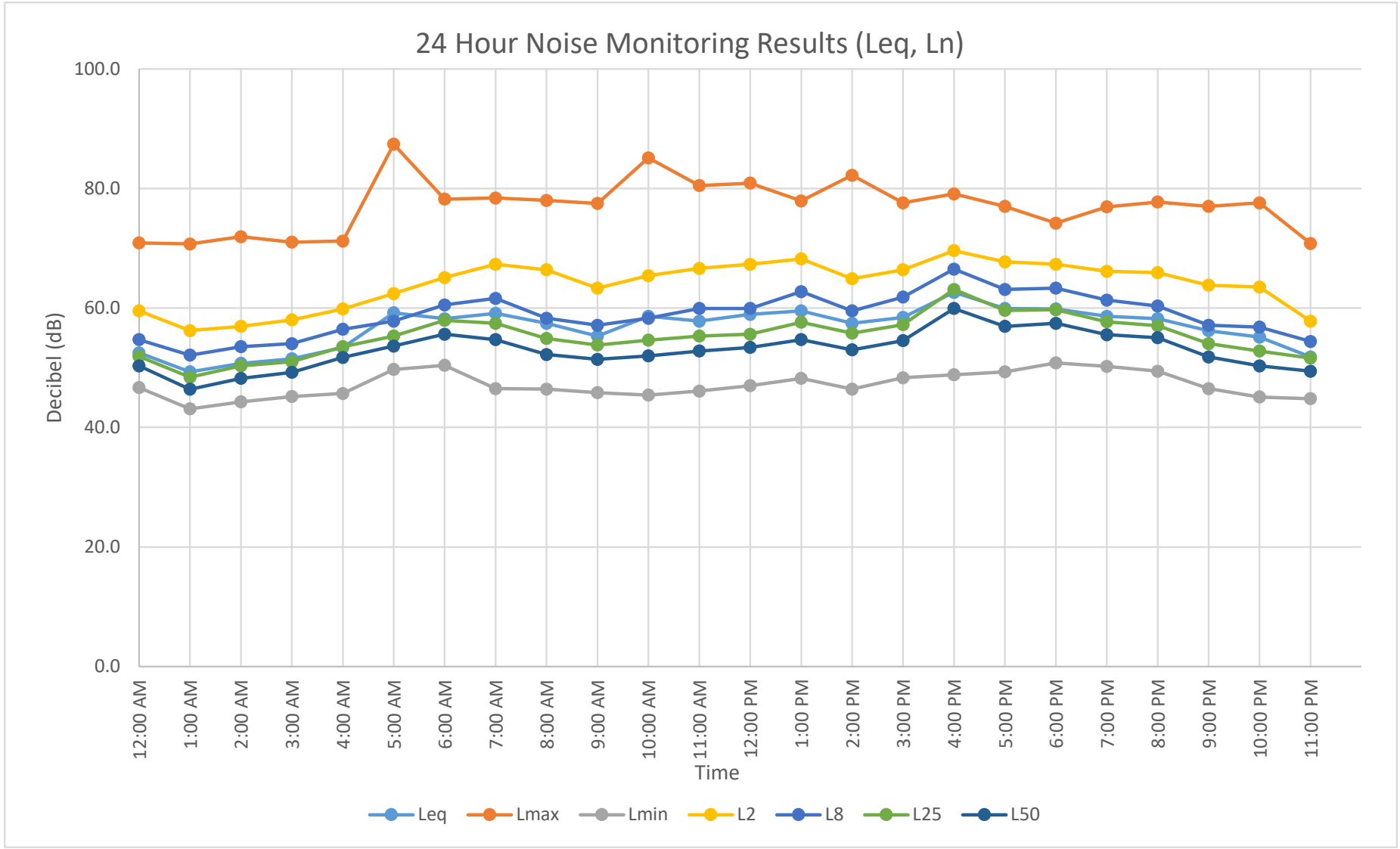
RK engineering group, inc.

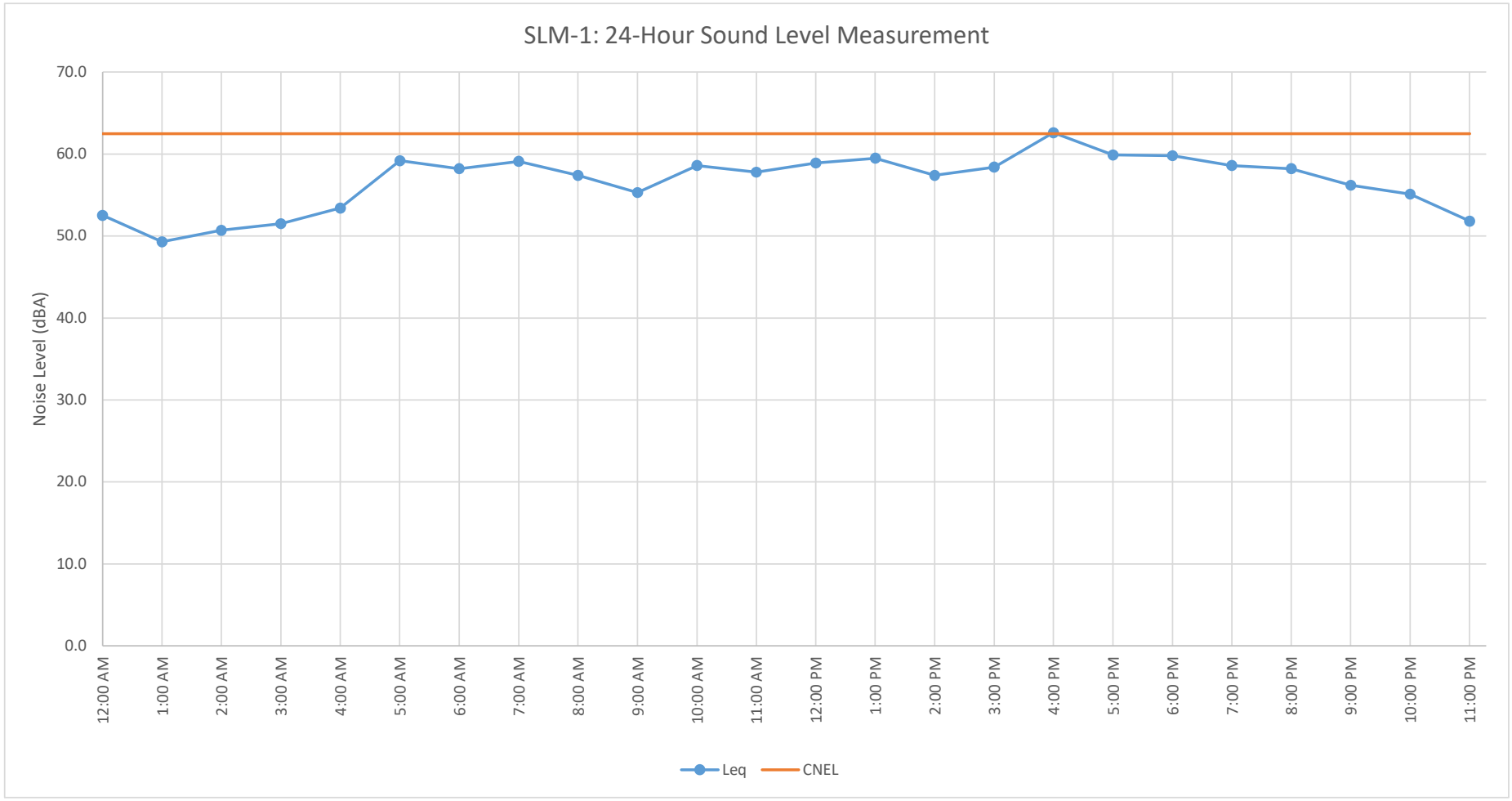
Field Sheet - ST1 Location Photos

Project: Toyota Arena Mixed Use Development	**Engineer:** M. Torres	**Date:**	4/7/2021
		JN:	2957-2021-02
Measurement Address: Southwest Corner of Via Piemonte and Fourth Street.	**City:** Ontario	**Site No.:**	1

RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	Southwest Corner of Resort Way and Haven Avenue					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	52.5	70.9	46.7	59.5	54.7	51.9	50.3
1:00 AM	49.3	70.7	43.1	56.2	52.1	48.4	46.4
2:00 AM	50.7	71.9	44.3	56.9	53.5	50.3	48.2
3:00 AM	51.5	71.0	45.2	58.0	54.0	51.0	49.2
4:00 AM	53.4	71.2	45.7	59.8	56.4	53.5	51.7
5:00 AM	59.2	87.4	49.7	62.4	57.8	55.3	53.6
6:00 AM	58.2	78.2	50.4	65.1	60.5	57.9	55.6
7:00 AM	59.1	78.4	46.5	67.3	61.6	57.4	54.7
8:00 AM	57.4	78.0	46.4	66.4	58.3	54.9	52.2
9:00 AM	55.3	77.5	45.8	63.3	57.1	53.8	51.4
10:00 AM	58.6	85.1	45.4	65.4	58.3	54.6	52.0
11:00 AM	57.8	80.5	46.1	66.6	59.9	55.3	52.8
12:00 PM	58.9	80.9	47.0	67.3	59.9	55.6	53.4
1:00 PM	59.5	77.9	48.2	68.2	62.7	57.6	54.7
2:00 PM	57.4	82.2	46.4	64.9	59.5	55.8	53.0
3:00 PM	58.4	77.6	48.3	66.4	61.8	57.2	54.5
4:00 PM	62.6	79.1	48.8	69.6	66.5	63.1	59.9
5:00 PM	59.9	77.0	49.3	67.7	63.1	59.6	56.9
6:00 PM	59.8	74.2	50.8	67.3	63.3	59.7	57.4
7:00 PM	58.6	76.9	50.2	66.1	61.3	57.7	55.5
8:00 PM	58.2	77.7	49.4	65.9	60.3	57.0	55.0
9:00 PM	56.2	77.0	46.5	63.8	57.1	54.0	51.8
10:00 PM	55.1	77.6	45.1	63.5	56.8	52.8	50.3
11:00 PM	51.8	70.8	44.8	57.8	54.4	51.6	49.4
Daytime	58.7	85.1	45.1	66.6	61.3	57.5	54.9
Nighttime	54.7	87.4	43.1	60.5	56.2	53.5	51.5


24 Hour Noise Monitoring Results (Leq, Ln)
Decibel (dB)
100.0
80.0
60.0
40.0
20.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50

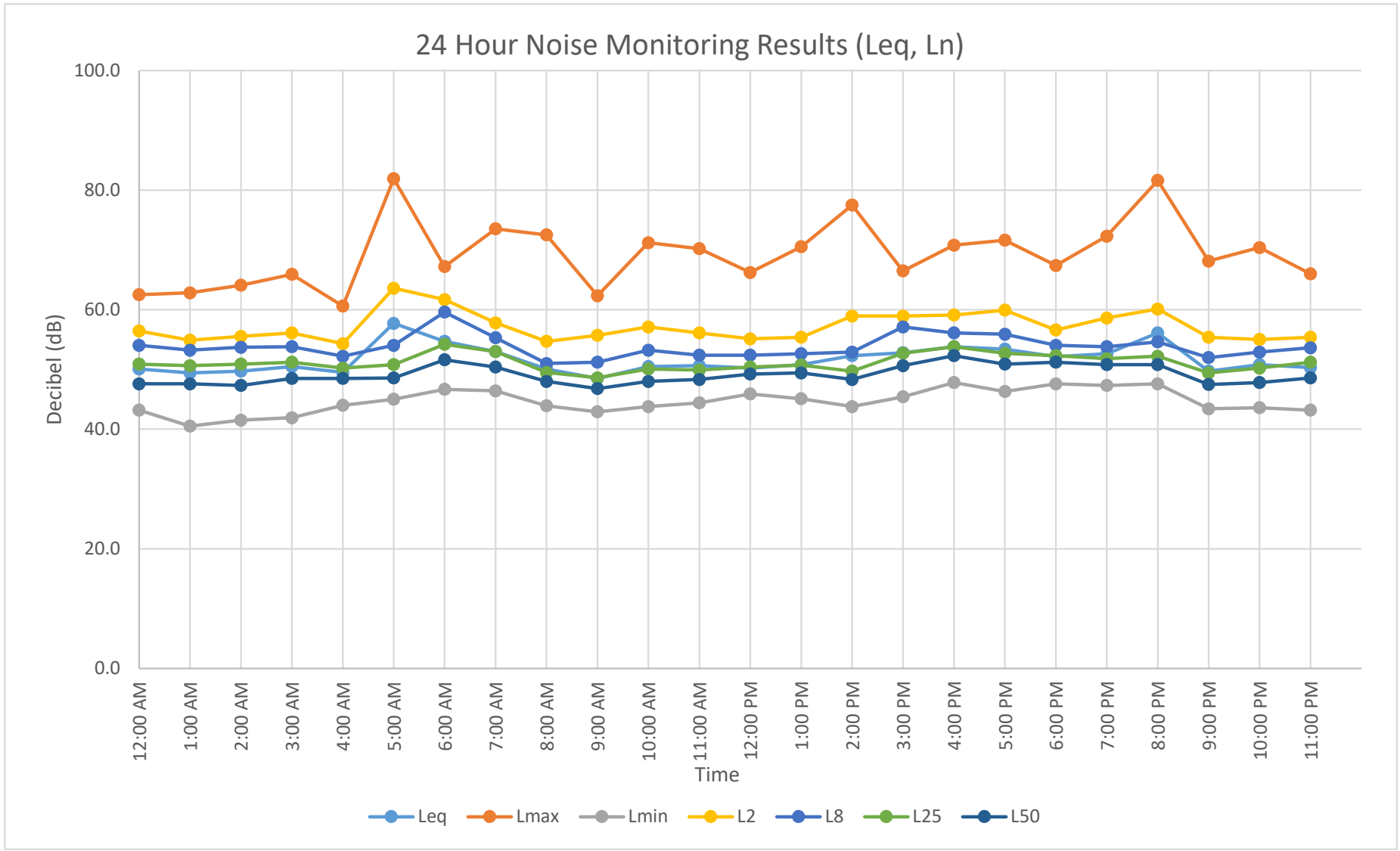

SLM-1: 24-Hour Sound Level Measurement
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

Field Sheet - ST2 Location Photos

Project: Toyota Arena Mixed Use Development	**Engineer:** M. Torres	**Date:**	4/7/2021
		JN:	2957-2021-02
Measurement Address: East of Porsche Way, North of La Quinta Inn Site	**City:** Ontario	**Site No.:**	2

RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	East of Porsche Way, North of La Quinta Inn Site					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	50.1	62.5	43.2	56.4	54.0	50.9	47.6
1:00 AM	49.4	62.8	40.5	54.9	53.2	50.6	47.6
2:00 AM	49.7	64.1	41.5	55.5	53.7	50.9	47.3
3:00 AM	50.5	65.9	41.9	56.1	53.8	51.2	48.5
4:00 AM	49.5	60.6	44.0	54.3	52.2	50.2	48.5
5:00 AM	57.7	81.9	45.0	63.6	54.0	50.8	48.6
6:00 AM	54.7	67.2	46.7	61.7	59.6	54.2	51.6
7:00 AM	53.0	73.5	46.4	57.8	55.3	53.0	50.4
8:00 AM	50.1	72.5	43.9	54.7	51.0	49.5	48.0
9:00 AM	48.5	62.3	42.9	55.7	51.2	48.6	46.8
10:00 AM	50.5	71.2	43.8	57.1	53.2	50.1	48.0
11:00 AM	50.6	70.2	44.4	56.1	52.4	49.9	48.3
12:00 PM	50.2	66.2	45.9	55.1	52.4	50.4	49.2
1:00 PM	50.8	70.5	45.1	55.4	52.6	50.7	49.4
2:00 PM	52.3	77.5	43.8	58.9	52.9	49.7	48.3
3:00 PM	52.8	66.5	45.4	58.9	57.1	52.7	50.6
4:00 PM	53.8	70.8	47.8	59.1	56.1	53.8	52.3
5:00 PM	53.4	71.6	46.3	59.9	55.9	52.7	50.9
6:00 PM	52.1	67.4	47.6	56.6	54.0	52.3	51.2
7:00 PM	52.6	72.3	47.3	58.6	53.8	51.8	50.8
8:00 PM	56.1	81.6	47.6	60.1	54.6	52.2	50.8
9:00 PM	49.7	68.1	43.4	55.4	52.0	49.4	47.5
10:00 PM	50.8	70.4	43.6	55.0	52.9	50.2	47.8
11:00 PM	50.3	66.0	43.2	55.4	53.6	51.2	48.6
Daytime	52.1	81.6	42.9	57.5	53.9	51.3	49.7
Nighttime	52.7	81.9	40.5	58.7	54.9	51.4	48.7


24 Hour Noise Monitoring Results (Leq, Ln)
100.0
80.0
60.0
40.0
20.0
0.0
Decibel (dB)
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
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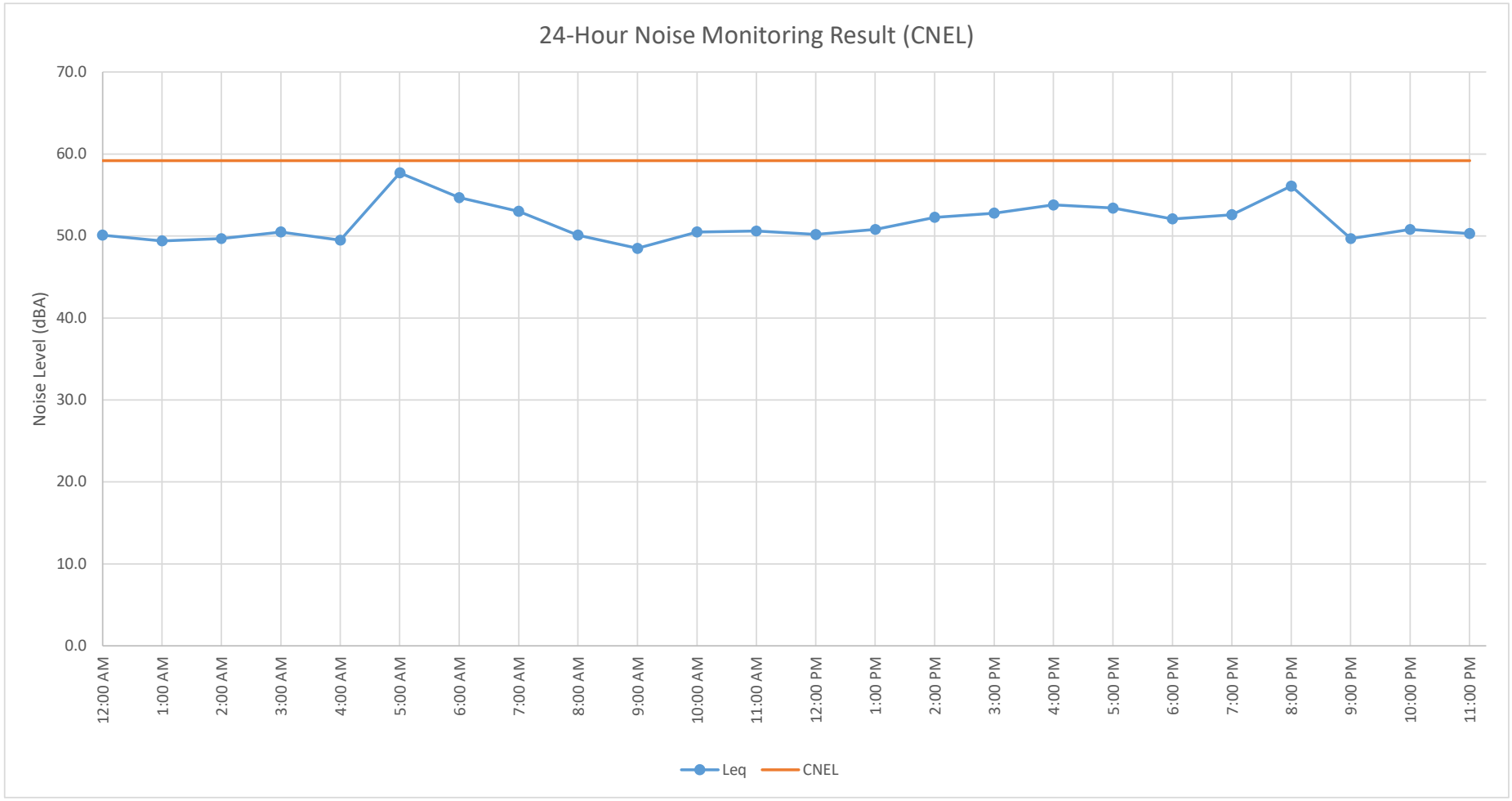
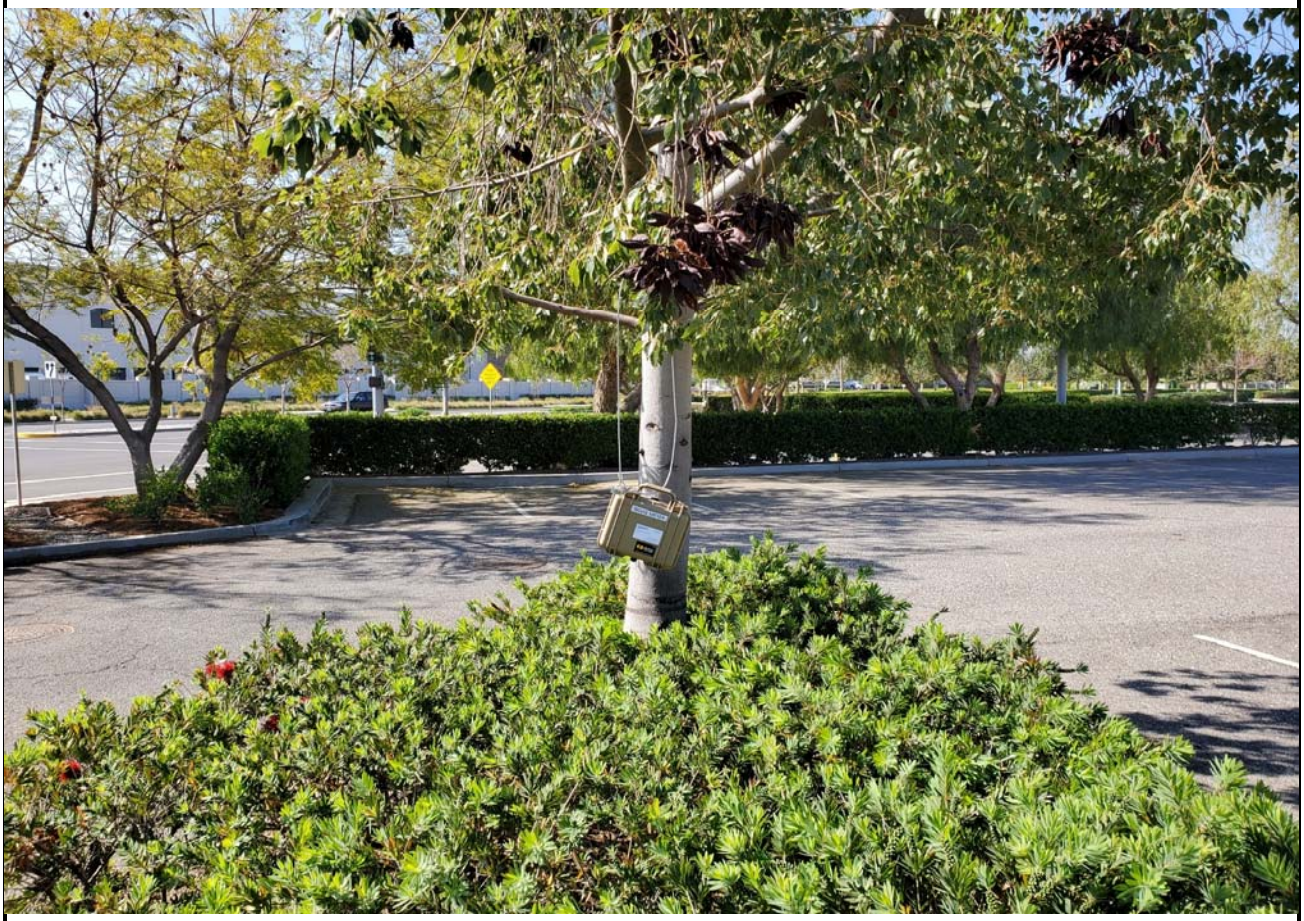
Time
Leq
Lmax
Lmin
L2
L8
L25
L50


24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

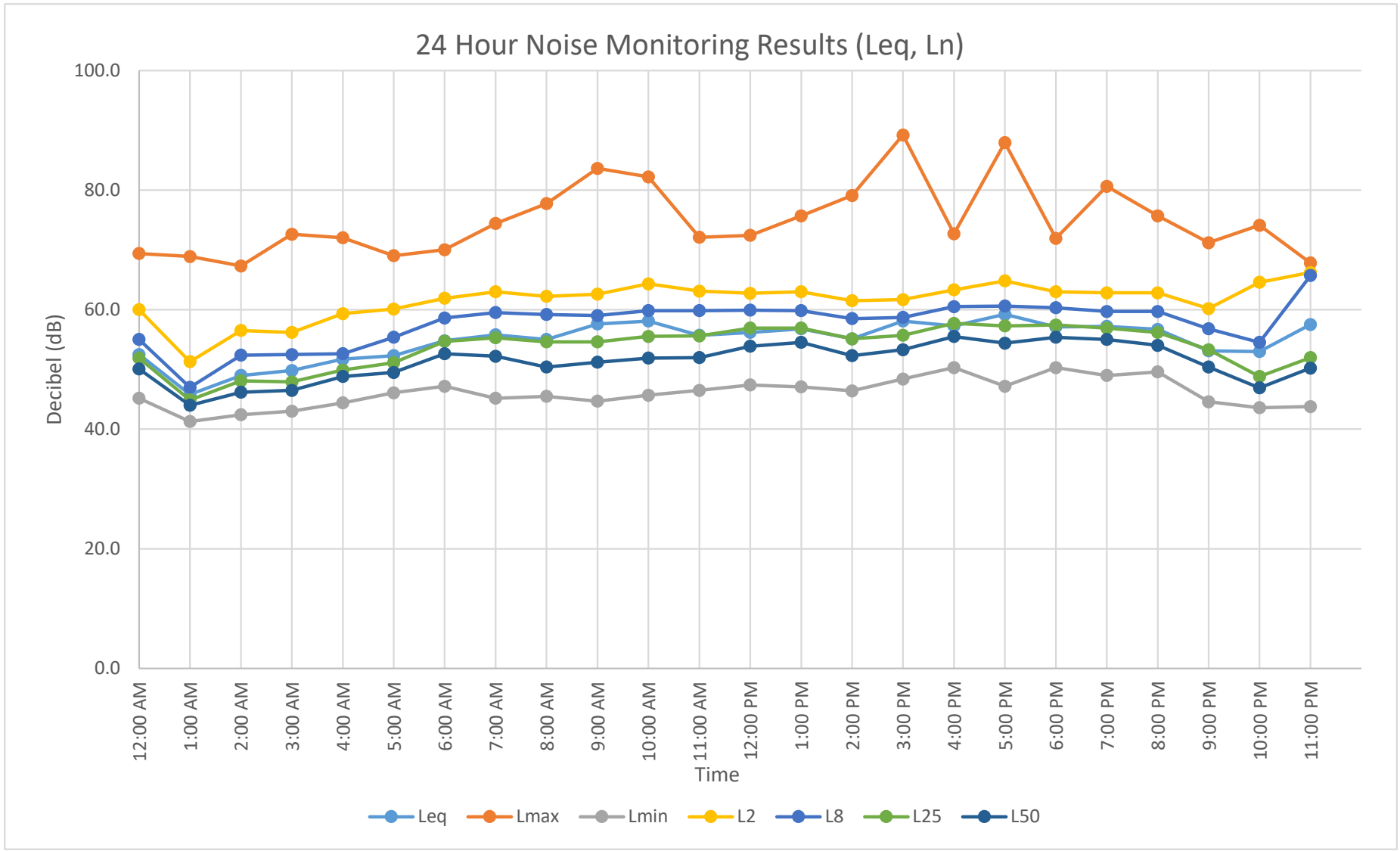
Field Sheet - ST3 Location Photos

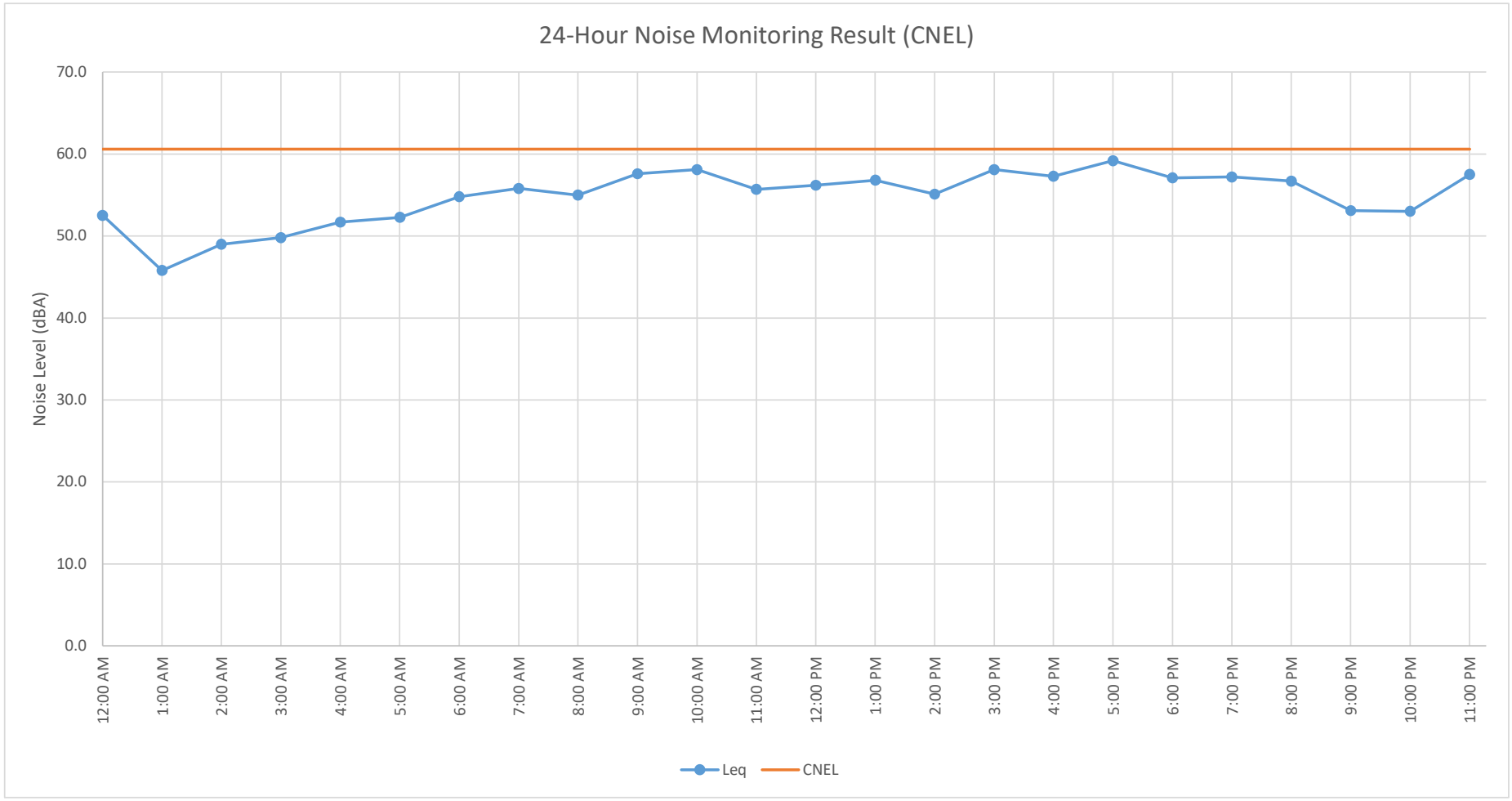
Project: Toyota Arena Mixed Use Development **Engineer:** M. Torres		**Date:** 4/7/2021 **JN:** 2957-2021-02
Measurement Address: Northwest Corner of Concours Street and Ferrari Lane	**City:** Ontario	**Site No.:** 3



RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	Northwest Corner of Concours Street and Ferrari Lane					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	52.5	69.4	45.2	60.0	55.0	51.9	50.1
1:00 AM	45.8	68.9	41.3	51.3	47.0	44.9	44.0
2:00 AM	49.0	67.3	42.4	56.5	52.4	48.1	46.2
3:00 AM	49.8	72.6	43.0	56.2	52.5	47.9	46.5
4:00 AM	51.7	72.0	44.4	59.3	52.6	49.9	48.8
5:00 AM	52.3	69.0	46.1	60.1	55.4	51.1	49.5
6:00 AM	54.8	70.0	47.2	61.9	58.6	54.7	52.6
7:00 AM	55.8	74.4	45.2	63.0	59.5	55.3	52.2
8:00 AM	55.0	77.7	45.5	62.2	59.2	54.6	50.4
9:00 AM	57.6	83.6	44.7	62.6	59.0	54.6	51.2
10:00 AM	58.1	82.2	45.7	64.3	59.8	55.5	51.9
11:00 AM	55.7	72.1	46.5	63.1	59.8	55.6	52.0
12:00 PM	56.2	72.4	47.4	62.7	59.9	56.9	53.9
1:00 PM	56.8	75.7	47.1	63.0	59.8	56.9	54.5
2:00 PM	55.1	79.1	46.4	61.5	58.5	55.1	52.3
3:00 PM	58.1	89.2	48.4	61.7	58.7	55.7	53.3
4:00 PM	57.3	72.7	50.3	63.3	60.5	57.7	55.5
5:00 PM	59.2	87.9	47.2	64.8	60.6	57.3	54.4
6:00 PM	57.1	71.9	50.3	63.0	60.3	57.4	55.4
7:00 PM	57.2	80.6	49.0	62.8	59.7	56.9	55.0
8:00 PM	56.7	75.7	49.6	62.8	59.7	56.2	54.0
9:00 PM	53.1	71.2	44.6	60.2	56.8	53.3	50.4
10:00 PM	53.0	74.1	43.6	64.6	54.5	48.8	46.9
11:00 PM	57.5	67.8	43.8	66.2	65.7	52.0	50.2
Daytime	56.7	89.2	43.6	63.0	59.4	55.9	53.2
Nighttime	52.9	72.6	41.3	60.8	58.5	50.9	49.2


24 Hour Noise Monitoring Results (Leq, Ln)
100.0
80.0
60.0
40.0
20.0
0.0
Decibel (dB)
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50

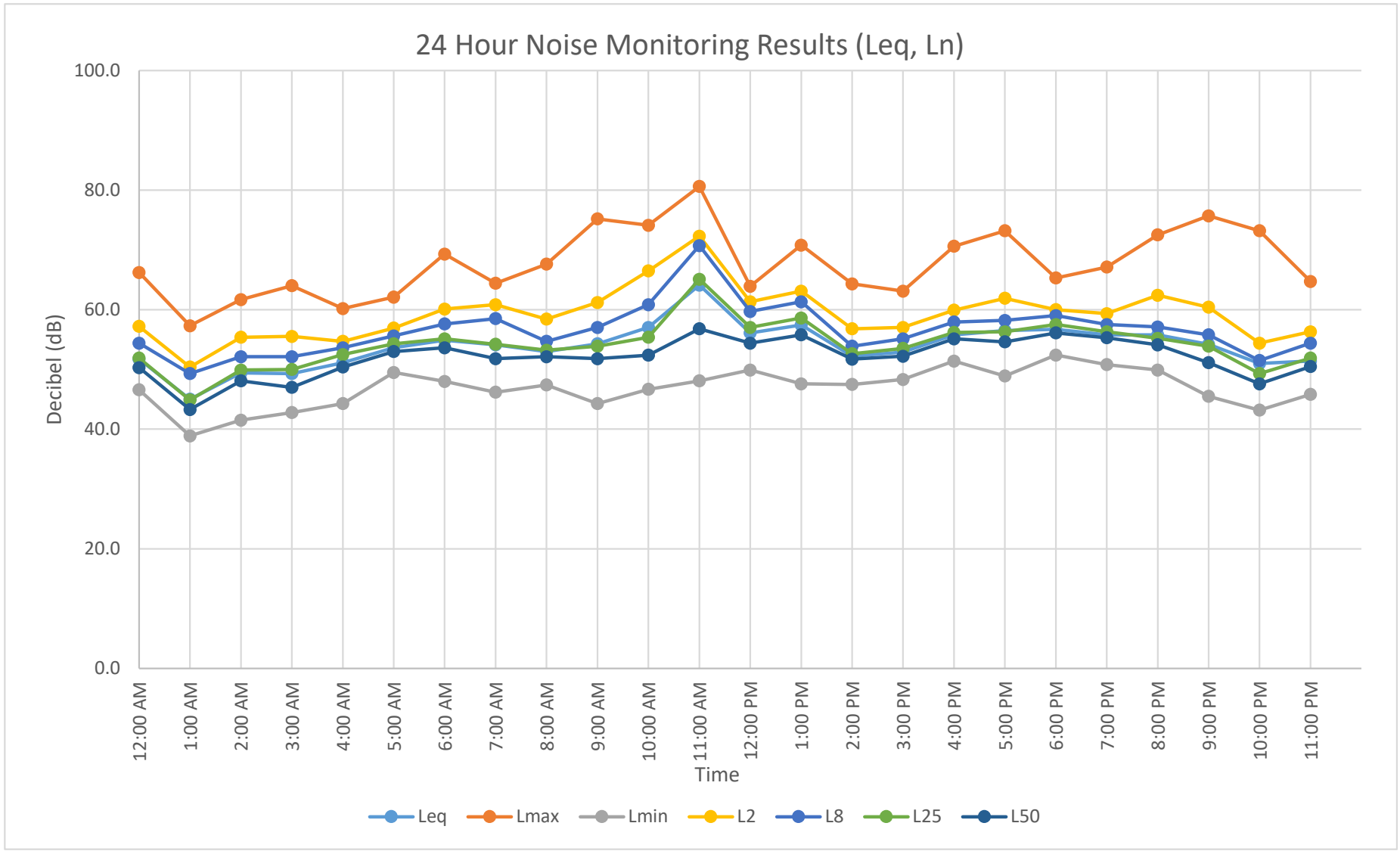

24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

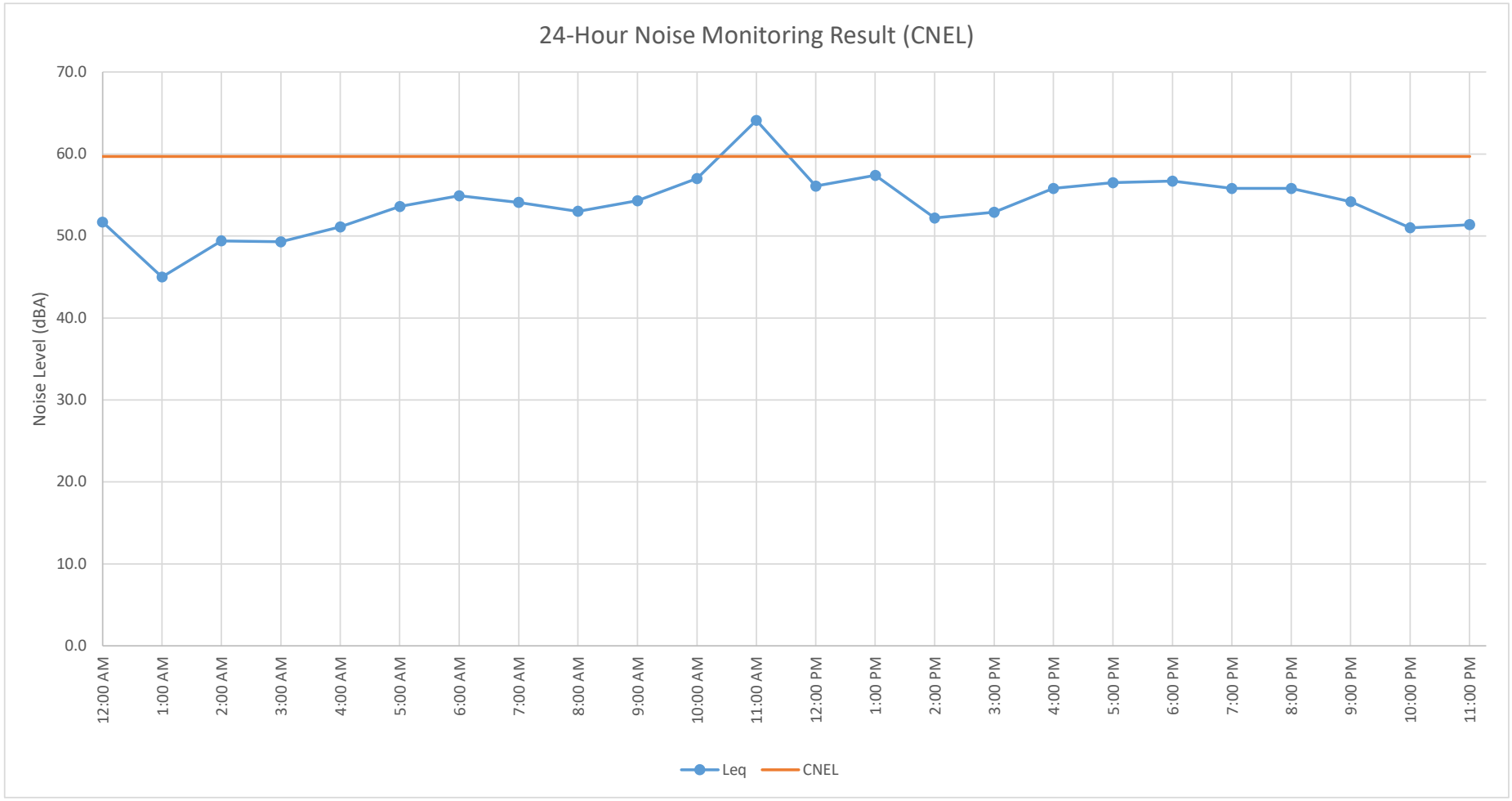
Field Sheet - ST4 Location Photos

Project: Toyota Arena Mixed Use Development **Engineer:** M. Torres	**Date:**	4/7/2021
	JN:	2957-2021-02
Measurement Address: In the parking lot along Western Project Site Boundary **City:** Ontario	**Site No.:**	4

RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	In the parking lot, along Western Project Site Boundary					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	51.7	66.2	46.6	57.2	54.4	51.9	50.3
1:00 AM	45.0	57.3	38.9	50.4	49.3	44.9	43.3
2:00 AM	49.4	61.7	41.5	55.4	52.1	49.9	48.1
3:00 AM	49.3	64.0	42.8	55.5	52.1	50.0	47.0
4:00 AM	51.1	60.2	44.3	54.7	53.6	52.5	50.4
5:00 AM	53.6	62.1	49.5	56.9	55.6	54.3	53.0
6:00 AM	54.9	69.3	48.0	60.1	57.6	55.1	53.6
7:00 AM	54.1	64.4	46.2	60.8	58.5	54.2	51.8
8:00 AM	53.0	67.6	47.4	58.4	54.7	53.2	52.1
9:00 AM	54.3	75.2	44.3	61.2	57.0	53.9	51.8
10:00 AM	57.0	74.1	46.7	66.5	60.8	55.4	52.4
11:00 AM	64.1	80.6	48.1	72.3	70.7	65.1	56.8
12:00 PM	56.1	63.9	49.9	61.3	59.7	57.0	54.4
1:00 PM	57.4	70.8	47.6	63.1	61.3	58.6	55.8
2:00 PM	52.2	64.3	47.5	56.8	53.9	52.6	51.7
3:00 PM	52.9	63.1	48.3	57.0	55.1	53.5	52.2
4:00 PM	55.8	70.6	51.4	59.9	57.9	56.2	55.1
5:00 PM	56.5	73.2	48.9	61.9	58.2	56.3	54.6
6:00 PM	56.7	65.3	52.4	60.0	59.0	57.5	56.1
7:00 PM	55.8	67.1	50.8	59.3	57.5	56.3	55.3
8:00 PM	55.8	72.5	49.9	62.4	57.1	55.2	54.1
9:00 PM	54.2	75.7	45.5	60.4	55.8	53.9	51.1
10:00 PM	51.0	73.2	43.2	54.4	51.5	49.3	47.6
11:00 PM	51.4	64.7	45.8	56.3	54.4	51.9	50.5
Daytime	56.7	80.6	43.2	63.6	61.2	57.2	53.9
Nighttime	51.6	69.3	38.9	56.5	54.2	52.1	50.5


24 Hour Noise Monitoring Results (Leq, Ln)
100.0
80.0
60.0
40.0
20.0
0.0
Decibel (dB)
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50


24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

Appendix C

Stationary Noise Analysis Results

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Parking Lot F and Parking Lot G	DATE:	27-May-21
LOCATION:	Residential Uses to the north of Lot F & G	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	170.0			
DT WALL=	0.0			
DT W/OB=	170.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	0.0		NOISE HTH EL=	3.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	170					34.8	
SHIELDING	170					0.0	
ADJ LEVEL	170	***0.0***	***0.0***	***0.0***	***0.0***	***34.8***	***0.0***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -29.0459534

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot C HVAC	DATE:	27-May-21
LOCATION:	Residential West of Lot C	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	520.0			
DT WALL=	0.0			
DT W/OB=	520.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	520	32.2	32.2	32.2	32.2	32.2	32.2
SHIELDING	520	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	520	***32.2***	***32.2***	***32.2***	***32.2***	***32.2***	***32.2***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -44.7776418

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot F Parking Lot	DATE:	27-May-21
LOCATION:	Residential West of Lot C	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	745.0			
DT WALL=	0.0			
DT W/OB=	745.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	745	-41.9	-41.9	-41.9	-41.9	21.9	-41.9
SHIELDING	745	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	745	***-41.9***	***-41.9***	***-41.9***	***-41.9***	***21.9***	***-41.9***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -41.8801004

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot A HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	223.0			
DT WALL=	0.0			
DT W/OB=	223.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	223	39.6	39.6	39.6	39.6	39.6	39.6
SHIELDING	223	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	223	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -37.4236722

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot C HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	253.0			
DT WALL=	0.0			
DT W/OB=	253.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	253	38.5	38.5	38.5	38.5	38.5	38.5
SHIELDING	253	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	253	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -38.5199853

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot D HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	253.0			
DT WALL=	0.0			
DT W/OB=	253.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	253	38.5	38.5	38.5	38.5	38.5	38.5
SHIELDING	253	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	253	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -38.5199853

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot F & G Parking Lot	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	540.0			
DT WALL=	0.0			
DT W/OB=	540.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	540	-39.1	-39.1	-39.1	-39.1	24.7	-39.1
SHIELDING	540	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	540	***-39.1***	***-39.1***	***-39.1***	***-39.1***	***24.7***	***-39.1***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -39.0848502

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot D HVAC	DATE:	27-May-21
LOCATION:	Commercial East of Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	495.0			
DT WALL=	0.0			
DT W/OB=	495.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	495	32.7	32.7	32.7	32.7	32.7	32.7
SHIELDING	495	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	495	***32.7***	***32.7***	***32.7***	***32.7***	***32.7***	***32.7***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -44.3496789

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot G Parking Lot	DATE:	27-May-21
LOCATION:	Commercial East of Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	180.0			
DT WALL=	0.0			
DT W/OB=	180.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	180	-29.5	-29.5	-29.5	-29.5	34.3	-29.5
SHIELDING	180	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	180	***-29.5***	***-29.5***	***-29.5***	***-29.5***	***34.3***	***-29.5***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -29.5424251

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot A HVAC	DATE:	27-May-21
LOCATION:	Commercial East of Lot A	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	223.0			
DT WALL=	0.0			
DT W/OB=	223.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	223	39.6	39.6	39.6	39.6	39.6	39.6
SHIELDING	223	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	223	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -37.4236722

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot B HVAC	DATE:	27-May-21
LOCATION:	Commercial East of Lot A	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	235.0			
DT WALL=	0.0			
DT W/OB=	235.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	235	39.1	39.1	39.1	39.1	39.1	39.1
SHIELDING	235	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	235	***39.1***	***39.1***	***39.1***	***39.1***	***39.1***	***39.1***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -37.8789322

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot B HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot B	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	590.0			
DT WALL=	0.0			
DT W/OB=	590.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	590	31.1	31.1	31.1	31.1	31.1	31.1
SHIELDING	590	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	590	***31.1***	***31.1***	***31.1***	***31.1***	***31.1***	***31.1***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -45.8746151

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot B HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot B	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	260.0			
DT WALL=	0.0			
DT W/OB=	260.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	260	38.2	38.2	38.2	38.2	38.2	38.2
SHIELDING	260	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	260	***38.2***	***38.2***	***38.2***	***38.2***	***38.2***	***38.2***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -38.7570419

NOISE INTERVAL AVERAGER (2.0)

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-2
LOCATION:	Receptor 2	DATE:	27-May-21
SOURCE:	Combined Noise Levels	BY:	D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot C					32.2	
2	Lot F					21.9	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	32.6	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-2
LOCATION:	Receptor 3	DATE:	27-May-21
SOURCE:	Combined Noise Levels	BY:	D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot A					39.6	
2	Lot C					38.5	
3	Lot D					38.5	
4	Lot F & Lot G					24.7	
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	43.7	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT: Toyota Arena Mixed Use Development
LOCATION: Receptor 4
SOURCE: Combined Noise Levels

JOB #: 2957-2021-2
DATE: 27-May-21
BY: D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot D					32.7	
2	Lot G					34.3	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	36.6	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT: Toyota Arena Mixed Use Development
LOCATION: Receptor 5
SOURCE: Combined Noise Levels

JOB #: 2957-2021-2
DATE: 27-May-21
BY: D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot A					39.6	
2	Lot B					39.1	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	42.4	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-2
LOCATION:	Receptor 6	DATE:	27-May-21
SOURCE:	Combined Noise Levels	BY:	D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot A					31.1	
2	Lot B					38.2	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	39.0	#NUM!

Appendix D

Construction Noise and Vibration
Analysis Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Demolition	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	160	0
Excavator	No	40		80.7	160	0
Dozer	No	40		81.7	160	0
Excavator	No	40		80.7	160	0
Excavator	No	40		80.7	160	0
Dozer	No	40		81.7	160	0

Results

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Saw	79.5	72.5
Excavator	70.6	66.6
Dozer	71.6	67.6
Excavator	70.6	66.6
Excavator	70.6	66.6
Dozer	71.6	67.6
Total	79.5	76.3

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Site Preparation	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	160	0
Tractor	No	40	84		160	0
Dozer	No	40		81.7	160	0
Tractor	No	40	84		160	0
Tractor	No	40	84		160	0
Dozer	No	40		81.7	160	0
Tractor	No	40	84		160	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Dozer		71.6	67.6
Tractor		73.9	69.9
Dozer		71.6	67.6
Tractor		73.9	69.9
Tractor		73.9	69.9
Dozer		71.6	67.6
Tractor		73.9	69.9
	Total	73.9	77.5

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Grading	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	160	0
Grader	No	40	85		160	0
Dozer	No	40		81.7	160	0
Scraper	No	40		83.6	160	0
Tractor	No	40	84		160	0
Excavator	No	40		80.7	160	0
Scraper	No	40		83.6	160	0
Tractor	No	40	84		160	0

	Results			
	Calculated (dBA)		Noise Limits (dBA)	
Equipment	*Lmax	Leq		
Excavator	70.6	66.6		
Grader	74.9	70.9		
Dozer	71.6	67.6		
Scraper	73.5	69.5		
Tractor	73.9	69.9		
Excavator	70.6	66.6		
Scraper	73.5	69.5		
Tractor	73.9	69.9		
Total	74.9	78.1		

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Building Construction	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	160	0
Pickup Truck	No	40		75	160	0
Generator	No	50		80.6	160	0
Tractor	No	40	84		160	0
Welder / Torch	No	40		74	160	0
Pickup Truck	No	40		75	160	0
Pickup Truck	No	40		75	160	0
Tractor	No	40	84		160	0
Tractor	No	40	84		160	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Crane		70.4	62.5
Pickup Truck		64.9	60.9
Generator		70.5	67.5
Tractor		73.9	69.9
Welder / Torch		63.9	59.9
Pickup Truck		64.9	60.9
Pickup Truck		64.9	60.9
Tractor		73.9	69.9
Tractor		73.9	69.9
	Total	73.9	76.2

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Paving	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	160	0
Paver	No	50		77.2	160	0
Roller	No	20		80	160	0
Concrete Mixer Truck	No	40		78.8	160	0
Paver	No	50		77.2	160	0
Roller	No	20		80	160	0

Results

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Mixer Truck	68.7	64.7
Paver	67.1	64.1
Roller	69.9	62.9
Concrete Mixer Truck	68.7	64.7
Paver	67.1	64.1
Roller	69.9	62.9
Total	69.9	71.8

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	160	0

Results

Calculated (dBA)

Equipment		*Lmax	Leq
Compressor (air)		67.6	63.6
	Total	67.6	63.6

*Calculated Lmax is the Loudest value.

VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Caisson Drilling	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.042 in/sec**

Equipment Type =	3	Caisson Drilling
PPV_{ref} =	0.089	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Large Bulldozer	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.042 in/sec**

Equipment Type =	2	Large Bulldozer
PPV_{ref} =	0.089	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Loaded Truck	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.035 in/sec**

Equipment Type =	4	Loaded Trucks
PPV_{ref} =	0.076	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Vibratory Roller	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.098 in/sec**

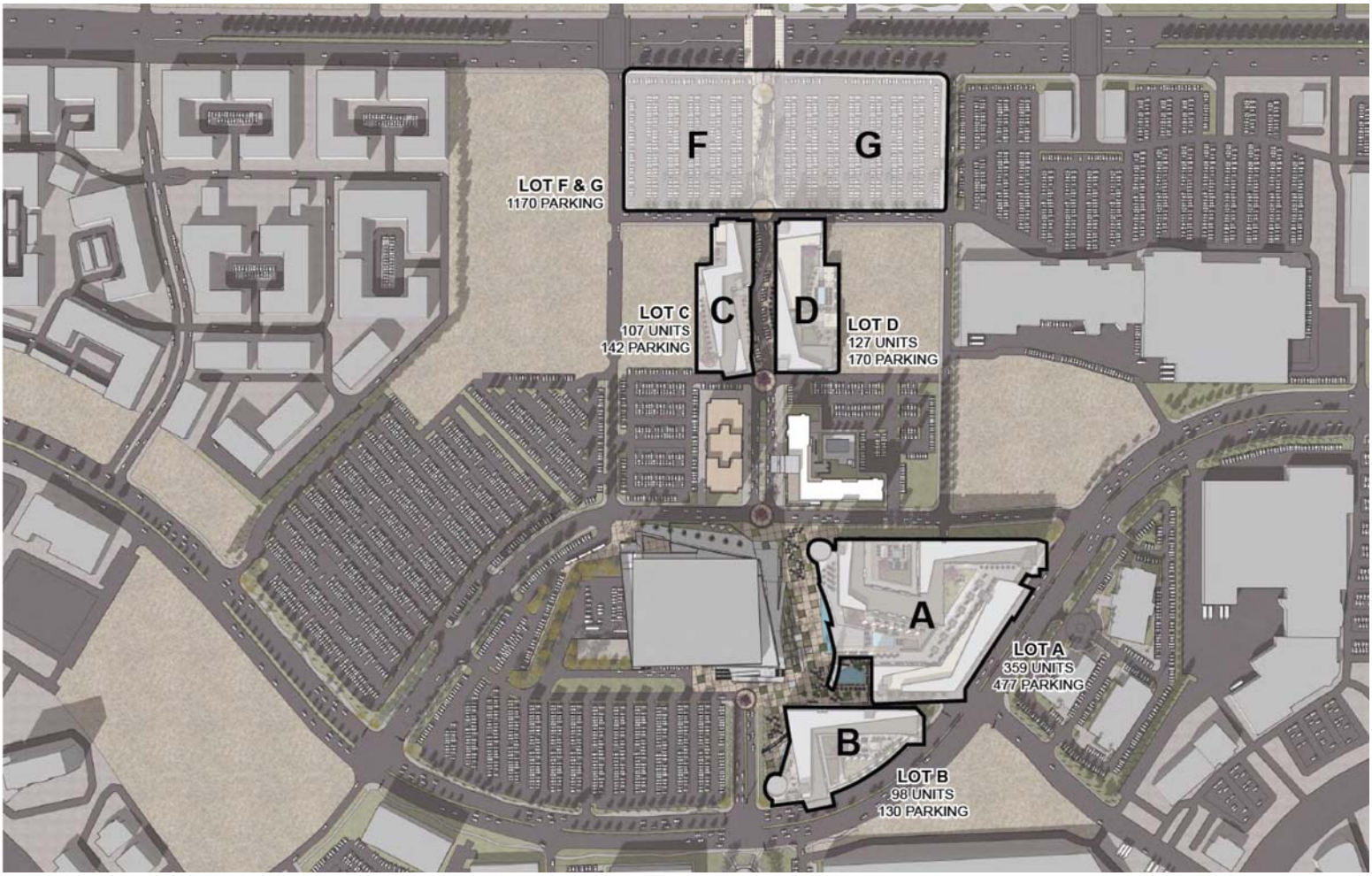
Equipment Type =	1	Vibratory Roller
PPV_{ref} =	0.210	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

APPENDIX D
ENERGY STUDY

TOYOTA ARENA MIXED-USE DEVELOPMENT
ENERGY CONSERVATION ANALYSIS
City of Ontario



TOYOTA ARENA MIXED-USE DEVELOPMENT
ENERGY CONSERVATION ANALYSIS
City of Ontario, California

Prepared for:

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Bryan Estrada, AICP, PTP
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June 4, 2021

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1.0 Introduction

1.1 Purpose of Report and Study Objectives

The purpose of this energy conservation analysis is to review the energy implications of the proposed Toyota Arena Mixed-Use Development (project) and provide recommendations to reduce wasteful, inefficient and unnecessary consumption of energy during construction and operation. This analysis has been prepared within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.).

CEQA Guidelines, Appendix F, Energy Conservation, describes the framework within which energy conservation should be analyzed. Conserving energy implies the wise and efficient use of energy through decreasing overall per capita energy consumption, decreasing reliance on fossil fuels (such as coal, natural gas and oil), and increasing reliance on renewable energy sources. This analysis considers energy impacts to include:

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction and operation.

2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.

3. The effects of the project on peak and base period demands for electricity and other forms of energy.

4. The degree to which the project complies with existing energy standards.

5. The effects of the project on energy resources.

1.2 Site Location

The proposed project site is located adjacent to the Toyota Arena, north of Concourse Street and south of Fourth Street, in the City of Ontario.

The project site is located with Ontario Center Specific Plan and zoned for Urban Commercial within the Specific Plan. The City of Ontario General Plan land use map designates the project site as Mixed Use.

The project location map is provided in Exhibit A.

1.3 Project Description

The project consists of construction and operation of a mixed use town center development with residential and commercial/retail land use within four development lots.

The proposed project includes a total of 691 residential dwelling units, 71,200 square feet of commercial/retail uses and the demolition and relocation of approximately 1,170 surface parking spaces. The total project site area is approximately 18.73 acres.

The site plan used for this analysis, provided by the applicant, is illustrated in Exhibit B. Table 1 summarizes the land use assumptions used for this analysis.

Table 1
Land Use Summary

Lot	Dwelling Units	Retail (SF)[1]	Parking Spaces
A	359	25,256	477[2]
B	98	20,802	130[2]
C	107	11,047	142[2]
D	127	14,095	170[2]
E & F	--	--	1,170
Total	691	71,200	2,089

[1] S.F. – Square Feet
[2] Parking Structure

The site plan used in this analysis was provided by the applicant, and is illustrated in Exhibit B.

1.4 Utility Providers

The project will be served by the following utility providers, as shown in Table 2.

Table 2
Utility Providers

Utility	Provider
Electricity	Southern California Edison
Natural Gas	Southern California Gas Company
Water	Ontario Public Works & OMUC
Sewer	Ontario Public Works & OMUC
Telephone	Frontier Communications
Cable	Frontier Communications

1.5 Summary of CEQA Impacts

Table 3 provides a summary of the project's impact to Energy resources, per the impact criteria described in CEQA Guidelines, Appendix G.

Table 3
CEQA Energy Impact Criteria

Energy Impact Criteria	Potentially Significant	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

1.6 Project Design Features

The following project design features are considered standard building code requirements and best practices that will be included in the project design to will help reduce energy consumption. Design features are not typically considered mitigation under CEQA.

Construction Design Features

DF-1 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

Operational Design Features

DF-2 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

DF-3 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-4 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-5 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-6 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-7 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-8 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

DF-9 Provide electric vehicle charging stations per the requirements of CALGreen.

2.0 Regulatory Setting

Energy is controlled through various federal and state laws and regulations. This section provides a brief overview of key energy legislation and policies at the federal and state levels over the past 50 years.

2.1 Federal Regulations

Table 4
U.S. Energy Policy Legislative Acts

Date	Legislative Act and Description
1975	**Energy Policy and Conservation Act** Established the Strategic Petroleum Reserve and mandated vehicle fuel economy standards
1978	**National Energy Act** Established tax incentives and disincentives, alternative fuel programs, energy efficiency initiatives, and other regulatory and market-based initiatives in response to the oil crisis earlier in the decade. Comprised of 5 statutes: **Energy Tax Act** Created the Gas Guzzler tax for vehicles with mileage below specified levels and offered income tax credit for citizens using solar, wind, or geothermal energy sources at home **Natural Gas Policy Act** Set up wellhead pricing maximums, rules for allocating costs of high-cost gas to industrial consumers, and provided authority to high priority users in times of supply emergency; gave FERC jurisdiction over almost all natural gas production **National Energy Conservation Policy Act** Replaced Minimum Energy Performance Standards (MEPS) set forth in the EPCA of 1975, changed energy standards from voluntary to mandatory, Required federal agencies to do energy audits of their operations, Provided loans for families to purchase solar heating or cooling systems, and Established grants for schools, hospitals, local governments, and public housing authorities willing to use energy conservation measures **Power Plant and Industrial Fuel Use Act** Restricted construction of power plants fueled primarily by oil or natural gas and instead encouraged power plants fueled by coal, nuclear, and alternative fuels and restricted use of oil and natural gas in industrial boilers. Repealed in 1987 with the Natural Gas Utilization Act **Public Utility Regulatory Policies Act** Promoted use of renewable energy, encouraged cogeneration plants.
1980	**Energy Security Act** Title I: US Synthetic Fuels Corporation Act Established the Synthetic Fuels Corporation (which only existed until 1985) for the purpose of partnering with industry for the creation of a market for domestically-produced synthetic liquid fuels; moved research and development for synthetic fuels away from the Department of Energy and into this public-private partnership with the hopes of speeding up results. Title II: Biomass Energy and Alcohol Fuels Act Provided loan guarantees for small-scale biomass energy projects; established the Office of Alcohol Fuels, the Office of Energy from Municipal Waste.

Table 4
U.S. Energy Policy Legislative Acts

Date	Legislative Act and Description
	Title III: Energy Targets Required the submission of energy targets for net imports. Title IV: Renewable Initiatives Established incentives for the use of renewable energy resources Title V: Solar Energy and Energy Conservation Encouraged energy conservation and the use of solar energy, reducing dependence on foreign energy supplies. Title VI: Geothermal Energy Act Authorized loans from the Geothermal Resources Development Fund for exploration and determination of economic viability of a geothermal reservoir, cancels loan if reservoir is deemed unacceptable for development. Title VII: Acid Precipitation Program Established a task force to study the causes and risks of acid precipitation Title VIII: Strategic Petroleum Reserve Established that 500,000,000 barrels of crude oil must be in storage before any can be sold and calls for the reserve to increase its supply 100,000 barrels per day until the storage capacity is reached
1992	**Energy Policy Act** Amended the National Energy Conservation Policy Act of 1978. Created framework for wholesale electricity generation. Provided financial incentives to users/developers of clean-fuel vehicles; repealed alternative minimum tax for some producers. Intended to expand the use of natural gas.
2002	**Farm Security and Rural Investment Act (Farm Bill)** Included $405 million in mandatory funding over the following 5 years for the procurement of bio-based products, grants and loans for renewable energy and energy efficiency projects, research and development and the bioenergy program. Included, for reasons of national energy and security, rural economic development, and environmental sustainability in light of climate change impacts.
2005	**Energy Policy Act** Offers tax benefits to individuals who increase energy efficiency in existing homes, buy or lease hybrid/alternative vehicles, required all public utilities to offer net metering on request, increased required amounts of renewable fuel in gasoline sold in the US, and encourages more domestic energy production
2007	**Energy Independence and Security Act** Increased CAFE standards to 35 mpg (fleet-wide for passenger autos and light trucks) by 2020; instituted new conservation measures for federal fleet vehicles; authorized increased taxpayer-funded biofuel production (36 billion gallons by 2022 - 21 billion of which must be derived from non-cornstarch products). Revised standards for appliances and lighting; all federal buildings must use Energy Star lighting products; training for green jobs; loans for small business energy efficiency improvements.
2008	**Food, Conservation, and Energy Act (Farm Bill)** Includes provisions for loan guarantees for bio-refineries, payments to support expansion of advanced biofuels, expands the existing Rural Energy for America Program, provides grant monies for biofuel and bio-based product research and development
2009	**The American Recovery and Reinvestment Act of 2009**

Table 4
U.S. Energy Policy Legislative Acts

Date	Legislative Act and Description
	$800 billion economic stimulus package aimed at job creation and the promotion of investment and consumer spending; included $4.3 billion in tax credits to homeowners for energy efficiency improvements in 2009-2010, $300 million for reducing diesel engine emissions, $21.5 billion for energy infrastructure, $27.2 billion for energy efficiency and renewable energy research and investment, $2 billion in research for DOE, $600 million in research for NOAA
2015	**The Clean Power Plan** The first comprehensive plan to reduce carbon emissions from power plants by 32% in 2030, compared to 2005 levels. The plan was repealed under the Trump Administration. The Biden Administration has recently said it will not try to resurrect the plan, but will instead be proposing a new rule aimed at limiting GHG emissions from power plants.

[1] Source: Robinson, Brandi. Penn State University. https://www.e-education.psu.edu/geog432/node/116

2.2 State of California Regulations

California has a long-standing history of support for energy conservation and renewable energy.

Table 5 provides a summary of some of the key legislative acts, policies and regulations in the State of California for encouraging energy conservation and renewable energy.

Table 5
California Energy Policy Legislative Acts and Regulations

Date	Legislative Act and Description
1974	**Warren-Alquist Act** Established the California Energy Commission (CEC) as the state's primary energy policy and planning agency. Responsible for preparing State Energy Plan. CEC's goals are to reduce energy costs and environmental impacts of energy use, while ensuring a safe, resilient, and reliable supply of energy.
1978	**Title 24 of the California Code of Regulations** Establishes the Renewable Portfolio Standard (RPS) program, requiring 20% of retail sales from renewable energy by 2017.
2002	**Senate Bill 1078** Required 20% of retail sales from renewable energy by 2017.
2003	**Energy Action Plan I** Accelerated the 20% renewable deadline to 2010.
2005	**Energy Action Plan II** Recommended further goal of 33% renewable by 2020.
2006	**Senate Bill 107** Codified the accelerated 20% renewable by 2010 deadline into law.
2008	**Executive Order S-14-08** Signed by Gov. Schwarzenegger, requires 33% renewables by 2020.
2009	**Executive Order S-21-09** Directs the California Air Resources Board, under its AB 32 authority, to adopt regulations by July 31, 2010, consistent with the 33% renewable energy target established in Executive Order S-14-08.
2011	**Senate Bill X1-2** Signed by Gov. Edmund G. Brown, Jr., codifies 33% renewable by 2020 RPS
2015	**Senate Bill 350 – Clean Energy and Pollution Reduction Act of 2015** Signed by Gov. Edmund G. Brown, Jr. codifies 50% by 2030 RPS
2018	**Senate Bill 100** Signed by Gov. Edmund G. Brown, Jr. codifies 60% by 2030 & 100% by 2045 RPS

[1] Source: California Energy Commission. https://www.energy.ca.gov/renewables/index.html

3.0 Project Energy Consumption

3.1 Energy Consumption Methodology

The three (3) main types of energy expected to be consumed by the project include electricity, natural gas and petroleum products in the form of gasoline and diesel fuel. Energy usage for the proposed project is calculated based on the *CalEEMod* and *Toyota Arena Mixed Use Development Air Quality and Greenhouse Gas Analysis, prepared by RK Engineering Group, Inc., dated June 2021* (Air/GHG Study).

The California Emissions Estimator Model Version 2020.4.0 (CalEEMod) is used to calculate energy usage from project construction and operational activities.

The CalEEMod Annual Reports for the project are provided in Appendix A.

3.2 Electricity Consumption

The project will use electricity for many different operational activities including, but not limited to, building heating and cooling, lighting, appliances, electronics, mechanical equipment, electric vehicle charging, and parking lot lighting. Indirect electricity usage will also be required to supply, distribute, and treat water and wastewater. Electricity will be provided to the site by Southern California Edison.

Temporary electricity usage for construction activities may include lighting, electric equipment and mobile office uses, however, CalEEMod does not calculate electricity usage during construction. Electricity usage during construction is expected to be short-term and relatively minor compared to the operational demand, and therefore electricity usage during construction is not counted in this analysis.

Table 6 shows the project's estimated operational electricity consumption in kilowatt-hours per year (kWh/year) and millions of Btu per year.

Table 6
Project Electricity Consumption

Land Use/Activity	Electricity Consumption[1]	
	(kWhr/yr)[2]	(MBtu/yr)[2]
Apartments Mid Rise	2,736,370.00	9,336.49
Enclosed Parking with Elevator	1,999,740.00	6,823.11
Parking Lot	163,800.00	558.89
Regional Shopping Center	864,368.00	2,949.22
Water Supply and Treatment	1,066,561.70	3,639.11
Total	6,830,839.70	23,306.83

[1] Source: CalEEMod Defaults. Refer Appendix A

[2] kWhr/yr = Kilowatt Hours per Year
MBtu/yr = Million British Thermal Units per Year

3.3 Natural Gas Consumption

The project will use natural gas for such things as building heating and cooling, cooking, kitchen appliances, and gas water heaters. Natural gas is not expected to be used during construction in any significant quantities and is not included in the overall calculation of the project's natural gas consumption.

Table 7 shows the project's estimated operational natural gas consumption in millions of Btu per year.

Table 7
Project Natural Gas Consumption

Land Use/Activity	Natural Gas Consumption[1] (MBtu/yr)[2]
Apartments Mid Rise	9,938.08
Regional Shopping Center	156.64
Total	10,094.72

[1] Source: CalEEMod Defaults. Refer Appendix A

[2] MBtu/yr = Millions of British Thermal Units per Year

3.4 Petroleum Consumption

The project's energy consumption from petroleum products is primarily associated with transportation related activities. This includes gasoline and diesel fuel usage for auto and truck trips during construction and operation and off-road equipment usage during construction.

3.4.1 Petroleum Consumption - Construction

Construction of the project is estimated to last approximately 21 months and consist of demolition, site preparation, grading, building construction, paving, and architectural coating phases. Construction activities will consume energy in the form of motor vehicle fuel (gasoline and diesel) for off-road construction equipment and on-road vehicle trips. Vehicle trips include workers and vendors traveling to and from the job-site.

Table 8 shows the project's energy consumption for all off-road equipment during construction. For purposes of this analysis, all off-road equipment is assumed to run on diesel fuel. Table 9 shows the project's energy consumption from on-road vehicle trips during construction.

TABLE 8
Construction Off-Road Equipment Energy Consumption

Phase[1]	Phase Duration (Days)[1]	Equipment[1]	Amount[1]	Hours/ Day[1]	Horspower (HP)[1]	Load Factor[1]	HP-hrs[2]	Fuel Consumption Rate[3] (hp-hr/gal)	Diesel Fuel Consumption (gal.)	Diesel Fuel Consumption by Phase (gal.)	MBtu[4]
Demolition	20	Concrete/Industrial Saws	1	8	81	0.73	9,460.8	18.5	511.4	3,778.2	519.048
		Excavators	3	8	158	0.38	28,819.2		1,557.8		
		Rubber Tired Dozers	2	8	247	0.40	31,616.0		1,709.0		
Site Preparation	10	Rubber Tired Dozers	3	8	247	0.40	23,712.0		1,281.7	1,902.5	261.371
		Tractors/Loaders/Backhoes	4	8	97	0.37	11,484.8		620.8		
Grading	30	Excavators	2	8	158	0.38	28,819.2		1,557.8	9,336.0	1,282.589
		Graders	1	8	187	0.41	18,400.8		994.6		
		Rubber Tired Dozers	1	8	247	0.40	23,712.0		1,281.7		
		Scrapers	2	8	367	0.48	84,556.8		4,570.6		
		Tractors/Loaders/Backhoes	2	8	97	0.37	17,227.2		931.2		
Building Construction	300	Cranes	1	7	231	0.29	140,679.0		7,604.3	37,503.2	5,152.233
		Forklifts	3	8	89	0.20	128,160.0		6,927.6		
		Generator Sets	1	8	84	0.74	149,184.0		8,064.0		
		Tractors/Loaders/Backhoes	3	7	97	0.37	226,107.0		12,222.0		
		Welders	1	8	46	0.45	49,680.0		2,685.4		
Paving	20	Pavers	1	6	130	0.42	6,552.0		354.2	1,124.8	154.520
		Paving Equipment	1	8	132	0.36	7,603.2		411.0		
		Rollers	1	7	132	0.36	6,652.8		359.6		
Architectural Coating	75	Air Compressors	1	6	78	0.48	16,848.0		910.7	910.7	125.113
								Total Energy Requirements		**54,555.4**	**7,494.875**

[1] Source: Appendix A Annual Results Sheet. (CalEEMod v.2020.4.0)

[2] HP-hrs = Horsepower Hours.

[3] Source: Carl Moyer Program Guidelines. 2017 Revisions. Table D-21. https://www.arb.ca.gov/msprog/moyer/guidelines/current.htm

[4] Mbtu = Millions of Btu; assuming 1 gallon of diesel fuel = 137,381 Btu.

Table 9
Construction On-Road Trips Energy Consumption

Construction Phase[1]	Phase Duration (Days)[1]	Trips /Day[1]	Trip Length[1]	Phase VMT	Vehicle Class[1]	Vehicle Mix[1]	Average Fuel Economy (MPG)[2]	Gasoline			Diesel			Total MBtu[3]
								Fuel Split[2]	Fuel Consumption by Veh. Class (gal.)	Fuel Consumption by Phase (gal.)	Fuel Split[2]	Fuel Consumption by Veh. Class (gal.)	Fuel Consumption by Phase	
Worker Trips														
Demolition	20	15	14.7	4,410	LDA	0.50	32.59	0.9938	67.24		0.0062	0.42		
					LDT1	0.25	27.46	0.9996	40.13	150.21	0.0004	0.02	0.66	18.18
					LDT2	0.25	25.60	0.9947	42.84		0.0053	0.23		
Site Prerparation	10	18	14.7	2,646	LDA	0.50	32.59	0.9938	40.34		0.0062	0.25		
					LDT1	0.25	27.46	0.9996	24.08	90.13	0.0004	0.01	0.40	10.91
					LDT2	0.25	25.60	0.9947	25.70		0.0053	0.14		
Grading	30	20	14.7	8,820	LDA	0.50	32.59	0.9938	134.48		0.0062	0.84		
					LDT1	0.25	27.46	0.9996	80.27	300.42	0.0004	0.03	1.33	36.36
					LDT2	0.25	25.60	0.9947	85.68		0.0053	0.46		
Building Construction	300	871	14.7	3,841,110	LDA	0.50	32.59	0.9938	58,565.44		0.0062	365.37		
					LDT1	0.25	27.46	0.9996	34,956.06	130,833.53	0.0004	13.99	578.17	15,835.58
					LDT2	0.25	25.60	0.9947	37,312.03		0.0053	198.81		
Paving	20	15	14.7	4,410	LDA	0.50	32.59	0.9938	67.24		0.0062	0.42		
					LDT1	0.25	27.46	0.9996	40.13	150.21	0.0004	0.02	0.66	18.18
					LDT2	0.25	25.60	0.9947	42.84		0.0053	0.23		
Architectural Coating	75	174	14.7	191,835	LDA	0.50	32.59	0.9938	2,924.91		0.0062	18.25		
					LDT1	0.25	27.46	0.9996	1,745.80	6,534.17	0.0004	0.70	28.88	790.87
					LDT2	0.25	25.60	0.9947	1,863.46		0.0053	9.93		
Sub-Total Worker Trips Energy Consumption									Gasoline (gal.)	138,058.66		Diesel (gal.)	610.10	16,710.08
Vendor Trips														
Building Construction	300	222	6.9	459,540	MHDT	0.50	9.58	0.2679	6,425.41	6,458.51	0.7321	17,558.94	50,633.90	7,733.93
					HHDT	0.50	6.94	0.0010	33.11		0.9990	33,074.96		
Hauling Trips														
Demolition	20	1,483	20.0	593,200	HHDT	1.00	6.94	0.0010	85.48	85.48	0.9990	85,390.03	85,390.03	11,741.26
Total On-Road Construction Trips Energy Consumption									**Gasoline (gal.)**	**144,602.65**		**Diesel (gal.)**	**136,634.02**	**36,185.27**

1 Source: Appendix A Annual Results Sheet. (CalEEMod v.2020.4.0)
[2] Source: EMFAC2017 Web Database. https://www.arb.ca.gov/emfac/2017/. (See Appendix B for more details.)
[3] Mbtu = Millions of Btu; assuming 1 gallon of gasoline fuel = 120,429 Btu and 1 gallon of diesel fuel = 137,381 Btu

3.4.2 Petroleum Consumption - Operation

The project is expected to consume energy from auto and truck trips generated by the proposed land uses, as described in the Toyota Arena Mixed Use Development Traffic Impact Study Scoping Agreement, by RK, May 2021 and the Toyota Arena Mixed Use Development Air Quality and Greenhouse Gas Impact Study, prepared by RK Engineering Group, Inc., dated June 2021. Operational vehicle trips are associated with workers, customers and vendors/non-workers (i.e., delivery, service, maintenance vehicles, etc.) traveling to and from the site.

Table 10 shows the project's petroleum energy consumption for all operational trips generated by the project on an annual basis.

Table 10
Operational Trips Energy Consumption - Annual

Vehicle Class	Vehicle Mix	Average Fuel Economy (MPG)	Mitigated Annual VMT	Gasoline		Diesel		MBtu
				Fuel Split	Fuel Consumption (gal.)	Fuel Split	Fuel Consumption (gal.)	
LDA	55.05%	32.59		0.9938	171,606.07	0.0062	1,070.60	20,813.43
LDT1	5.72%	27.46		0.9996	21,269.87	0.0004	8.51	2,562.68
LDT2	17.64%	25.60		0.9947	70,077.78	0.0053	373.39	8,490.69
MDV	14.23%	20.81		0.9815	68,604.36	0.0185	1,293.10	8,439.60
LHD1	2.76%	13.81		0.7188	14,708.48	0.2812	5,754.07	2,561.83
LHD2	0.34%	14.18		0.5328	1,294.18	0.4672	1,134.84	311.76
MHD	0.53%	9.58	10,221,754	0.2679	1,524.84	0.7321	4,166.97	756.10
HHD	0.81%	6.94		0.0010	11.92	0.9990	11,909.43	1,637.56
OBUS	0.03%	5.11		1.0000	523.61	0.0000	0.00	63.06
UBUS	0.01%	5.18		0.9866	231.56	0.0134	3.15	28.32
MCY	2.59%	36.38		1.0000	7,278.11	0.0000	0.00	876.50
SBUS	0.04%	8.15		0.3076	172.34	0.6924	387.94	74.05
MH	0.24%	6.07		0.8447	3,377.72	0.1553	621.00	492.09
Total Operational Trips Energy Usage				Gasoline Consumption (gal.)	360,680.84	Diesel Consumption (gal.)	26,723.00	47,107.67

[1] Source: Toyota Arena Mixed Use Development Air Quality and Greenhouse Gas Analysis, by RK Engineering Group, Inc. (CalEEMod .2020.4.0)
[2] Source: EMFAC2017 Web Database. https://www.arb.ca.gov/emfac/2017/. (See Appendix B for more details.)
[3] MBtu/yr = Millions of Btu per year; assuming 1 gallon of gasoline fuel = 120,429 Btu and 1 gallon of diesel fuel = 137,381 Btu

3.5 Summary of Project Energy Consumption

Table 11 provides a summary of the project's annual operational energy consumption.

Table 11
Annual Energy Consumption

Activity	Energy Consumption (MBtu/yr)[1]
Total Annual Operational Energy Consumption	**80,509.21**
Electricity	23,306.83
Natural Gas	10,094.72
Petroleum	47,107.67

[1] MBtu/yr = Millions of Btu per year. Operational activities only.

4.0 Energy Impacts

4.1 Energy Impact Criteria

This analysis has been prepared within the context of the CEQA Guidelines, Appendix F, Energy Conservation, and Appendix G, Environmental Checklist Form. According to CEQA, the goal of conserving energy implies the wise and efficient use of energy through decreasing overall per capita energy consumption, decreasing reliance on fossil fuels (such as coal, natural gas and oil), and increasing reliance on renewable energy sources.

A significant environmental impact would result if the project would;

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation, or;

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.2 Energy Impact – 1

Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

The project's impact is considered less than significant with the inclusion of the mandatory requirements of California's Building Energy Efficiency Standards (Title 24, Part 6) and Green Building Standards (CALGreen, Title 24, Part 11). California's building energy efficiency standards are some of the strictest in the nation and the project's compliance with California's building code will ensure that wasteful, inefficient or unnecessary consumption of energy is minimized. The building standards code is designed to reduce the amount of energy needed to heat or cool a building, reduce energy usage for lighting and appliances.

The following recommended design features are provided to reduce wasteful, inefficient and unnecessary consumption of energy. Design features are consistent with the recommended design features provided with Air/GHG study.

Construction Design Features

DF-1 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

Operational Design Features

DF-2 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

DF-3 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-4 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-5 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-6 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-7 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-8 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

DF-9 Provide electric vehicle charging stations per the requirements of CALGreen.

4.3 Energy Impact – 2

Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The project's impact is considered less than significant as the project will purchase electricity through Southern California Edison which is subject to the requirements of California Senate Bill 100 (SB 100). SB 100 is the most stringent and current energy legislation in California; requiring that renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045.[1]

The project will further comply with the mandatory requirements of California's Green Building and Building Energy Efficiency standards that promote renewable energy and energy efficiency.

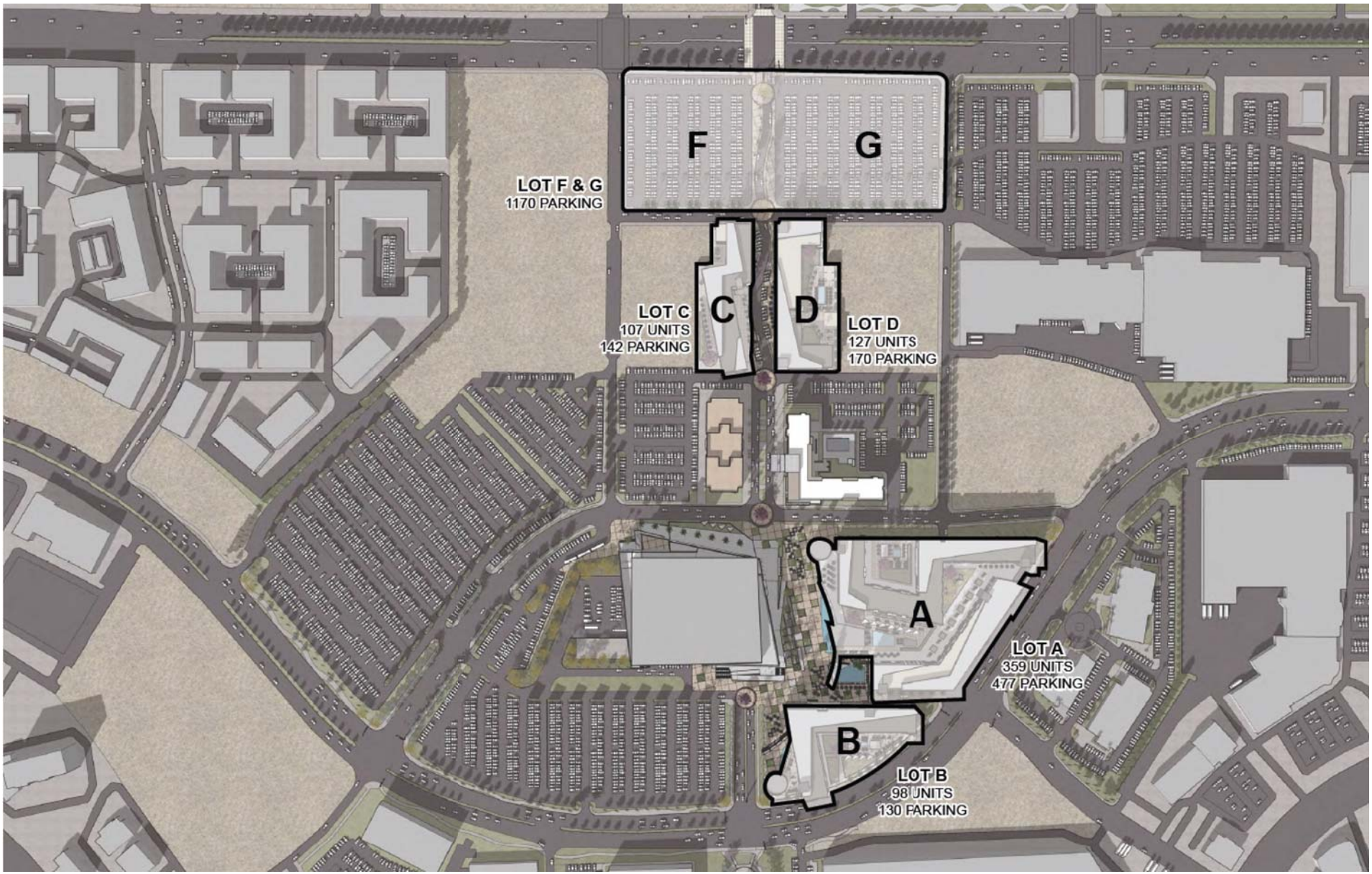
[1] SB-100 California Renewables Portfolio Standard Program. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100

Exhibits

Location Map

N

Exhibit B
Site Plan



Appendices

Appendix A

CalEEMod Annual Emissions Output

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Toyota Arena Mixed Use Development

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	691.00	Dwelling Unit	11.47	691,000.00	1976
Enclosed Parking with Elevator	919.00	Space	0.00	367,600.00	0
Parking Lot	1,170.00	Space	7.26	468,000.00	0
Regional Shopping Center	71.20	1000sqft	0.00	71,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	531.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The proposed project consists of a mixed-use town center development with 691 multifamily DU and 71,200 square feet of commercial/retail land uses on approximately 18.73 acres.

Construction Phase - The project's architectural coating phase will be extended to 75 days.

Demolition - The project is proposing to demolish approximetely 326,026 square feet of surface asphalt parking lot.

Vehicle Trips - The trip generation rates have been updated to reflect Toyota Arena TIA Scoping Agreement, by RK, May 25, 2021 and Traffic Impact Study and SANBAG VMT Model.

Fleet Mix - Operational fleet mix adjusted to equal 2% trucks with GVWR > 10,000 lbs.

Woodstoves - SCAQMD Rule 445 restricts wood burning hearths/fireplaces from being installed in new development.

Construction Off-road Equipment Mitigation - Project will be required to comply with SCAQMD Rule 403 regarding fugitive dust control.

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	75.00
tblConstructionPhase	PhaseEndDate	4/13/2023	6/29/2023
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberWood	34.55	0.00
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	LHD2	0.00	7.1960e-003

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tblFleetMix	LHD2	0.00	7.1960e-003
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	UBUS	0.00	1.1900e-004
tblFleetMix	UBUS	0.00	2.5400e-004
tblFleetMix	UBUS	0.00	2.5400e-004

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tblFleetMix	UBUS	0.00	1.1900e-004
tblLandUse	LotAcreage	18.18	11.47
tblLandUse	LotAcreage	8.27	0.00
tblLandUse	LotAcreage	10.53	7.26
tblLandUse	LotAcreage	1.63	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	4.37
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	4.37
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	4.37
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.91	5.17
tblVehicleTrips	ST_TR	46.12	36.38
tblVehicleTrips	SU_TR	4.09	5.17
tblVehicleTrips	WD_TR	5.44	5.17
tblVehicleTrips	WD_TR	37.75	29.77
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1379	1.4343	0.9987	2.4700e-003	0.4484	0.0609	0.5093	0.1435	0.0564	0.1999	0.0000	224.5415	224.5415	0.0463	9.7200e-003	228.5934
2022	0.6978	3.6944	6.6165	0.0197	1.4235	0.1269	1.5504	0.3823	0.1195	0.5017	0.0000	1,821.1850	1,821.1850	0.1147	0.1062	1,855.7077
2023	2.7410	0.5904	1.2453	3.4500e-003	0.2593	0.0218	0.2812	0.0694	0.0206	0.0900	0.0000	318.7457	318.7457	0.0230	0.0147	323.7039
Maximum	**2.7410**	**3.6944**	**6.6165**	**0.0197**	**1.4235**	**0.1269**	**1.5504**	**0.3823**	**0.1195**	**0.5017**	**0.0000**	**1,821.1850**	**1,821.1850**	**0.1147**	**0.1062**	**1,855.7077**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0376	0.2555	1.0489	2.4700e-003	0.2033	5.1200e-003	0.2085	0.0635	5.0000e-003	0.0685	0.0000	224.5413	224.5413	0.0463	9.7200e-003	228.5933
2022	0.5186	1.9549	6.7591	0.0197	1.4235	0.0270	1.4506	0.3823	0.0258	0.4081	0.0000	1,821.1847	1,821.1847	0.1147	0.1062	1,855.7073
2023	2.7062	0.2501	1.2939	3.4500e-003	0.2593	3.4000e-003	0.2627	0.0694	3.2600e-003	0.0727	0.0000	318.7457	318.7457	0.0230	0.0147	323.7038
Maximum	**2.7062**	**1.9549**	**6.7591**	**0.0197**	**1.4235**	**0.0270**	**1.4506**	**0.3823**	**0.0258**	**0.4081**	**0.0000**	**1,821.1847**	**1,821.1847**	**0.1147**	**0.1062**	**1,855.7073**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**8.79**	**56.98**	**-2.72**	**0.00**	**11.50**	**83.06**	**17.91**	**13.45**	**82.65**	**30.62**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**10-1-2021**	**12-31-2021**	1.5660	0.2892
2	**1-1-2022**	**3-31-2022**	1.0897	0.6152
3	**4-1-2022**	**6-30-2022**	1.0873	0.6076
4	**7-1-2022**	**9-30-2022**	1.0992	0.6143
5	**10-1-2022**	**12-31-2022**	1.1139	0.6289
6	**1-1-2023**	**3-31-2023**	1.0104	0.6811
7	**4-1-2023**	**6-30-2023**	2.3186	2.2757
		Highest	2.3186	2.2757

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599
Energy	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	1,929.6251	1,929.6251	0.0966	0.0203	1,938.1000
Mobile	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668
Waste						0.0000	0.0000		0.0000	0.0000	79.6983	0.0000	79.6983	4.7100	0.0000	197.4492
Water						0.0000	0.0000		0.0000	0.0000	15.9564	242.7848	258.7412	1.6539	0.0405	312.1654
Total	**5.7552**	**3.1557**	**27.5037**	**0.0406**	**3.8326**	**0.1149**	**3.9475**	**1.0209**	**0.1130**	**1.1339**	**95.6547**	**5,726.3881**	**5,822.0429**	**6.7306**	**0.2377**	**6,061.1414**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599
Energy	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	1,929.6251	1,929.6251	0.0966	0.0203	1,938.1000
Mobile	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668
Waste						0.0000	0.0000		0.0000	0.0000	79.6983	0.0000	79.6983	4.7100	0.0000	197.4492
Water						0.0000	0.0000		0.0000	0.0000	15.9564	242.7848	258.7412	1.6539	0.0405	312.1654
Total	**5.7552**	**3.1557**	**27.5037**	**0.0406**	**3.8326**	**0.1149**	**3.9475**	**1.0209**	**0.1130**	**1.1339**	**95.6547**	**5,726.3881**	**5,822.0429**	**6.7306**	**0.2377**	**6,061.1414**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2021	10/28/2021	5	20	
2	Site Preparation	Site Preparation	10/29/2021	11/11/2021	5	10	
3	Grading	Grading	11/12/2021	12/23/2021	5	30	

4	Building Construction	Building Construction	12/24/2021	2/16/2023	5	300	
5	Paving	Paving	2/17/2023	3/16/2023	5	20	
6	Architectural Coating	Architectural Coating	3/17/2023	6/29/2023	5	75	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 7.26

Residential Indoor: 1,399,275; Residential Outdoor: 466,425; Non-Residential Indoor: 106,800; Non-Residential Outdoor: 35,600; Striped Parking Area: 50,136 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,483.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	871.00	222.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	174.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

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3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1605	0.0000	0.1605	0.0243	0.0000	0.0243	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0317	0.3144	0.2157	3.9000e-004		0.0155	0.0155		0.0144	0.0144	0.0000	34.0008	34.0008	9.5700e-003	0.0000	34.2400
Total	**0.0317**	**0.3144**	**0.2157**	**3.9000e-004**	**0.1605**	**0.0155**	**0.1760**	**0.0243**	**0.0144**	**0.0387**	**0.0000**	**34.0008**	**34.0008**	**9.5700e-003**	**0.0000**	**34.2400**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.7800e-003	0.1221	0.0296	4.5000e-004	0.0128	1.7400e-003	0.0145	3.5100e-003	1.6600e-003	5.1700e-003	0.0000	44.2265	44.2265	1.9200e-003	7.0100e-003	46.3629
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.1000e-004	5.1000e-004	5.8300e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3559	1.3559	4.0000e-005	4.0000e-005	1.3693
Total	**4.3900e-003**	**0.1226**	**0.0354**	**4.6000e-004**	**0.0144**	**1.7500e-003**	**0.0162**	**3.9500e-003**	**1.6700e-003**	**5.6200e-003**	**0.0000**	**45.5824**	**45.5824**	**1.9600e-003**	**7.0500e-003**	**47.7322**

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3.2 Demolition - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0614	0.0000	0.0614	9.2900e-003	0.0000	9.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.6200e-003	0.0200	0.2328	3.9000e-004		6.2000e-004	6.2000e-004		6.2000e-004	6.2000e-004	0.0000	34.0007	34.0007	9.5700e-003	0.0000	34.2400
Total	**4.6200e-003**	**0.0200**	**0.2328**	**3.9000e-004**	**0.0614**	**6.2000e-004**	**0.0620**	**9.2900e-003**	**6.2000e-004**	**9.9100e-003**	**0.0000**	**34.0007**	**34.0007**	**9.5700e-003**	**0.0000**	**34.2400**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.7800e-003	0.1221	0.0296	4.5000e-004	0.0128	1.7400e-003	0.0145	3.5100e-003	1.6600e-003	5.1700e-003	0.0000	44.2265	44.2265	1.9200e-003	7.0100e-003	46.3629
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.1000e-004	5.1000e-004	5.8300e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3559	1.3559	4.0000e-005	4.0000e-005	1.3693
Total	**4.3900e-003**	**0.1226**	**0.0354**	**4.6000e-004**	**0.0144**	**1.7500e-003**	**0.0162**	**3.9500e-003**	**1.6700e-003**	**5.6200e-003**	**0.0000**	**45.5824**	**45.5824**	**1.9600e-003**	**7.0500e-003**	**47.7322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7179	16.7179	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.0983**	**0.0102**	**0.1085**	**0.0505**	**9.4000e-003**	**0.0599**	**0.0000**	**16.7179**	**16.7179**	**5.4100e-003**	**0.0000**	**16.8530**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	3.0000e-004	3.5000e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8136	0.8136	3.0000e-005	2.0000e-005	0.8216
Total	**3.7000e-004**	**3.0000e-004**	**3.5000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8136**	**0.8136**	**3.0000e-005**	**2.0000e-005**	**0.8216**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0376	0.0000	0.0376	0.0193	0.0000	0.0193	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3300e-003	0.0101	0.1043	1.9000e-004		3.1000e-004	3.1000e-004		3.1000e-004	3.1000e-004	0.0000	16.7178	16.7178	5.4100e-003	0.0000	16.8530
Total	**2.3300e-003**	**0.0101**	**0.1043**	**1.9000e-004**	**0.0376**	**3.1000e-004**	**0.0379**	**0.0193**	**3.1000e-004**	**0.0196**	**0.0000**	**16.7178**	**16.7178**	**5.4100e-003**	**0.0000**	**16.8530**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	3.0000e-004	3.5000e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8136	0.8136	3.0000e-005	2.0000e-005	0.8216
Total	**3.7000e-004**	**3.0000e-004**	**3.5000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8136**	**0.8136**	**3.0000e-005**	**2.0000e-005**	**0.8216**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1381	0.0000	0.1381	0.0548	0.0000	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7425	81.7425	0.0264	0.0000	82.4034
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.1381**	**0.0298**	**0.1678**	**0.0548**	**0.0274**	**0.0822**	**0.0000**	**81.7425**	**81.7425**	**0.0264**	**0.0000**	**82.4034**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2300e-003	1.0100e-003	0.0117	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7118	2.7118	8.0000e-005	8.0000e-005	2.7386
Total	**1.2300e-003**	**1.0100e-003**	**0.0117**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7118**	**2.7118**	**8.0000e-005**	**8.0000e-005**	**2.7386**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0528	0.0000	0.0528	0.0210	0.0000	0.0210	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.0495	0.4950	9.3000e-004		1.5200e-003	1.5200e-003		1.5200e-003	1.5200e-003	0.0000	81.7424	81.7424	0.0264	0.0000	82.4033
Total	**0.0114**	**0.0495**	**0.4950**	**9.3000e-004**	**0.0528**	**1.5200e-003**	**0.0543**	**0.0210**	**1.5200e-003**	**0.0225**	**0.0000**	**81.7424**	**81.7424**	**0.0264**	**0.0000**	**82.4033**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2300e-003	1.0100e-003	0.0117	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7118	2.7118	8.0000e-005	8.0000e-005	2.7386
Total	**1.2300e-003**	**1.0100e-003**	**0.0117**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7118**	**2.7118**	**8.0000e-005**	**8.0000e-005**	**2.7386**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.7000e-003	0.0523	0.0497	8.0000e-005		2.8800e-003	2.8800e-003		2.7000e-003	2.7000e-003	0.0000	6.9491	6.9491	1.6800e-003	0.0000	6.9910
Total	**5.7000e-003**	**0.0523**	**0.0497**	**8.0000e-005**		**2.8800e-003**	**2.8800e-003**		**2.7000e-003**	**2.7000e-003**	**0.0000**	**6.9491**	**6.9491**	**1.6800e-003**	**0.0000**	**6.9910**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5700e-003	0.0364	0.0122	1.3000e-004	4.2000e-003	6.1000e-004	4.8100e-003	1.2100e-003	5.9000e-004	1.8000e-003	0.0000	12.4033	12.4033	3.5000e-004	1.8400e-003	12.9601
Worker	0.0107	8.8300e-003	0.1016	2.6000e-004	0.0287	1.6000e-004	0.0288	7.6100e-003	1.5000e-004	7.7600e-003	0.0000	23.6201	23.6201	7.3000e-004	7.2000e-004	23.8534
Total	**0.0123**	**0.0453**	**0.1138**	**3.9000e-004**	**0.0329**	**7.7000e-004**	**0.0336**	**8.8200e-003**	**7.4000e-004**	**9.5600e-003**	**0.0000**	**36.0234**	**36.0234**	**1.0800e-003**	**2.5600e-003**	**36.8135**

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3.5 Building Construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8000e-004	6.7000e-003	0.0524	8.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	6.9491	6.9491	1.6800e-003	0.0000	6.9910
Total	**9.8000e-004**	**6.7000e-003**	**0.0524**	**8.0000e-005**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**	**0.0000**	**6.9491**	**6.9491**	**1.6800e-003**	**0.0000**	**6.9910**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5700e-003	0.0364	0.0122	1.3000e-004	4.2000e-003	6.1000e-004	4.8100e-003	1.2100e-003	5.9000e-004	1.8000e-003	0.0000	12.4033	12.4033	3.5000e-004	1.8400e-003	12.9601
Worker	0.0107	8.8300e-003	0.1016	2.6000e-004	0.0287	1.6000e-004	0.0288	7.6100e-003	1.5000e-004	7.7600e-003	0.0000	23.6201	23.6201	7.3000e-004	7.2000e-004	23.8534
Total	**0.0123**	**0.0453**	**0.1138**	**3.9000e-004**	**0.0329**	**7.7000e-004**	**0.0336**	**8.8200e-003**	**7.4000e-004**	**9.5600e-003**	**0.0000**	**36.0234**	**36.0234**	**1.0800e-003**	**2.5600e-003**	**36.8135**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0492	1.3293	0.4713	5.3900e-003	0.1820	0.0151	0.1971	0.0525	0.0144	0.0669	0.0000	524.0510	524.0510	0.0141	0.0776	547.5317
Worker	0.4268	0.3350	4.0179	0.0108	1.2415	6.6400e-003	1.2482	0.3297	6.1200e-003	0.3359	0.0000	995.8912	995.8912	0.0284	0.0286	1,005.1289
Total	**0.4760**	**1.6644**	**4.4892**	**0.0162**	**1.4236**	**0.0217**	**1.4452**	**0.3823**	**0.0205**	**0.4028**	**0.0000**	**1,519.9422**	**1,519.9422**	**0.0425**	**0.1062**	**1,552.6606**

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3.5 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0426	0.2905	2.2698	3.5000e-003		5.3000e-003	5.3000e-003		5.3000e-003	5.3000e-003	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.0426**	**0.2905**	**2.2698**	**3.5000e-003**		**5.3000e-003**	**5.3000e-003**		**5.3000e-003**	**5.3000e-003**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0492	1.3293	0.4713	5.3900e-003	0.1820	0.0151	0.1971	0.0525	0.0144	0.0669	0.0000	524.0510	524.0510	0.0141	0.0776	547.5317
Worker	0.4268	0.3350	4.0179	0.0108	1.2415	6.6400e-003	1.2482	0.3297	6.1200e-003	0.3359	0.0000	995.8912	995.8912	0.0284	0.0286	1,005.1289
Total	**0.4760**	**1.6644**	**4.4892**	**0.0162**	**1.4236**	**0.0217**	**1.4452**	**0.3823**	**0.0205**	**0.4028**	**0.0000**	**1,519.9422**	**1,519.9422**	**0.0425**	**0.1062**	**1,552.6606**

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3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0267	0.2445	0.2762	4.6000e-004		0.0119	0.0119		0.0112	0.0112	0.0000	39.4068	39.4068	9.3700e-003	0.0000	39.6412
Total	**0.0267**	**0.2445**	**0.2762**	**4.6000e-004**		**0.0119**	**0.0119**		**0.0112**	**0.0112**	**0.0000**	**39.4068**	**39.4068**	**9.3700e-003**	**0.0000**	**39.6412**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.2600e-003	0.1392	0.0564	6.8000e-004	0.0238	1.0000e-003	0.0248	6.8700e-003	9.5000e-004	7.8200e-003	0.0000	65.7744	65.7744	1.7100e-003	9.7200e-003	68.7139
Worker	0.0516	0.0385	0.4818	1.3700e-003	0.1624	8.2000e-004	0.1632	0.0431	7.5000e-004	0.0439	0.0000	126.8010	126.8010	3.3300e-003	3.4400e-003	127.9095
Total	**0.0559**	**0.1778**	**0.5382**	**2.0500e-003**	**0.1862**	**1.8200e-003**	**0.1880**	**0.0500**	**1.7000e-003**	**0.0517**	**0.0000**	**192.5754**	**192.5754**	**5.0400e-003**	**0.0132**	**196.6233**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.5700e-003	0.0380	0.2968	4.6000e-004		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	39.4068	39.4068	9.3700e-003	0.0000	39.6411
Total	**5.5700e-003**	**0.0380**	**0.2968**	**4.6000e-004**		**6.9000e-004**	**6.9000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**39.4068**	**39.4068**	**9.3700e-003**	**0.0000**	**39.6411**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.2600e-003	0.1392	0.0564	6.8000e-004	0.0238	1.0000e-003	0.0248	6.8700e-003	9.5000e-004	7.8200e-003	0.0000	65.7744	65.7744	1.7100e-003	9.7200e-003	68.7139
Worker	0.0516	0.0385	0.4818	1.3700e-003	0.1624	8.2000e-004	0.1632	0.0431	7.5000e-004	0.0439	0.0000	126.8010	126.8010	3.3300e-003	3.4400e-003	127.9095
Total	**0.0559**	**0.1778**	**0.5382**	**2.0500e-003**	**0.1862**	**1.8200e-003**	**0.1880**	**0.0500**	**1.7000e-003**	**0.0517**	**0.0000**	**192.5754**	**192.5754**	**5.0400e-003**	**0.0132**	**196.6233**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0103	0.1019	0.1458	2.3000e-004		5.1000e-003	5.1000e-003		4.6900e-003	4.6900e-003	0.0000	20.0269	20.0269	6.4800e-003	0.0000	20.1888
Paving	9.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0198**	**0.1019**	**0.1458**	**2.3000e-004**		**5.1000e-003**	**5.1000e-003**		**4.6900e-003**	**4.6900e-003**	**0.0000**	**20.0269**	**20.0269**	**6.4800e-003**	**0.0000**	**20.1888**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.9000e-004	4.8800e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.4000e-004	0.0000	1.2845	1.2845	3.0000e-005	3.0000e-005	1.2958
Total	**5.2000e-004**	**3.9000e-004**	**4.8800e-003**	**1.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**1.2845**	**1.2845**	**3.0000e-005**	**3.0000e-005**	**1.2958**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8000e-003	0.0122	0.1730	2.3000e-004		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	20.0268	20.0268	6.4800e-003	0.0000	20.1888
Paving	9.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0123**	**0.0122**	**0.1730**	**2.3000e-004**		**3.7000e-004**	**3.7000e-004**		**3.7000e-004**	**3.7000e-004**	**0.0000**	**20.0268**	**20.0268**	**6.4800e-003**	**0.0000**	**20.1888**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.9000e-004	4.8800e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.4000e-004	0.0000	1.2845	1.2845	3.0000e-005	3.0000e-005	1.2958
Total	**5.2000e-004**	**3.9000e-004**	**4.8800e-003**	**1.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**1.2845**	**1.2845**	**3.0000e-005**	**3.0000e-005**	**1.2958**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.6081					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.1900e-003	0.0489	0.0679	1.1000e-004		2.6600e-003	2.6600e-003		2.6600e-003	2.6600e-003	0.0000	9.5747	9.5747	5.7000e-004	0.0000	9.5890
Total	**2.6153**	**0.0489**	**0.0679**	**1.1000e-004**		**2.6600e-003**	**2.6600e-003**		**2.6600e-003**	**2.6600e-003**	**0.0000**	**9.5747**	**9.5747**	**5.7000e-004**	**0.0000**	**9.5890**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0227	0.0170	0.2123	6.0000e-004	0.0715	3.6000e-004	0.0719	0.0190	3.3000e-004	0.0193	0.0000	55.8774	55.8774	1.4700e-003	1.5200e-003	56.3659
Total	**0.0227**	**0.0170**	**0.2123**	**6.0000e-004**	**0.0715**	**3.6000e-004**	**0.0719**	**0.0190**	**3.3000e-004**	**0.0193**	**0.0000**	**55.8774**	**55.8774**	**1.4700e-003**	**1.5200e-003**	**56.3659**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.6081					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1100e-003	4.8300e-003	0.0687	1.1000e-004		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004	0.0000	9.5747	9.5747	5.7000e-004	0.0000	9.5890
Total	**2.6092**	**4.8300e-003**	**0.0687**	**1.1000e-004**		**1.5000e-004**	**1.5000e-004**		**1.5000e-004**	**1.5000e-004**	**0.0000**	**9.5747**	**9.5747**	**5.7000e-004**	**0.0000**	**9.5890**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0227	0.0170	0.2123	6.0000e-004	0.0715	3.6000e-004	0.0719	0.0190	3.3000e-004	0.0193	0.0000	55.8774	55.8774	1.4700e-003	1.5200e-003	56.3659
Total	**0.0227**	**0.0170**	**0.2123**	**6.0000e-004**	**0.0715**	**3.6000e-004**	**0.0719**	**0.0190**	**3.3000e-004**	**0.0193**	**0.0000**	**55.8774**	**55.8774**	**1.4700e-003**	**1.5200e-003**	**56.3659**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668
Unmitigated	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	3,572.47	3,572.47	3572.47	5,682,657	5,682,657
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	2,119.62	2,590.26	1502.32	4,539,098	4,539,098
Total	5,692.09	6,162.73	5,074.79	10,221,754	10,221,754

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	4.37	4.37	4.37	100.00	0.00	0.00	100	0	0
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375
Enclosed Parking with Elevator	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Parking Lot	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Regional Shopping Center	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,390.9324	1,390.9324	0.0863	0.0105	1,396.2061
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,390.9324	1,390.9324	0.0863	0.0105	1,396.2061
NaturalGas Mitigated	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	538.6927	538.6927	0.0103	9.8800e-003	541.8939
NaturalGas Unmitigated	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	538.6927	538.6927	0.0103	9.8800e-003	541.8939

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	9.93808e+006	0.0536	0.4579	0.1949	2.9200e-003		0.0370	0.0370		0.0370	0.0370	0.0000	530.3338	530.3338	0.0102	9.7200e-003	533.4853
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	156640	8.4000e-004	7.6800e-003	6.4500e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.3589	8.3589	1.6000e-004	1.5000e-004	8.4086
Total		**0.0544**	**0.4656**	**0.2013**	**2.9700e-003**		**0.0376**	**0.0376**		**0.0376**	**0.0376**	**0.0000**	**538.6927**	**538.6927**	**0.0103**	**9.8700e-003**	**541.8939**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	9.93808e+006	0.0536	0.4579	0.1949	2.9200e-003		0.0370	0.0370		0.0370	0.0370	0.0000	530.3338	530.3338	0.0102	9.7200e-003	533.4853
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	156640	8.4000e-004	7.6800e-003	6.4500e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.3589	8.3589	1.6000e-004	1.5000e-004	8.4086
Total		**0.0544**	**0.4656**	**0.2013**	**2.9700e-003**		**0.0376**	**0.0376**		**0.0376**	**0.0376**	**0.0000**	**538.6927**	**538.6927**	**0.0103**	**9.8700e-003**	**541.8939**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	2.73637e+006	660.2910	0.0410	4.9600e-003	662.7945
Enclosed Parking with Elevator	1.99974e+006	482.5424	0.0299	3.6300e-003	484.3719
Parking Lot	163800	39.5253	2.4500e-003	3.0000e-004	39.6751
Regional Shopping Center	864368	208.5738	0.0129	1.5700e-003	209.3646
Total		**1,390.9324**	**0.0863**	**0.0105**	**1,396.2061**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	2.73637e+006	660.2910	0.0410	4.9600e-003	662.7945
Enclosed Parking with Elevator	1.99974e+006	482.5424	0.0299	3.6300e-003	484.3719
Parking Lot	163800	39.5253	2.4500e-003	3.0000e-004	39.6751
Regional Shopping Center	864368	208.5738	0.0129	1.5700e-003	209.3646
Total		**1,390.9324**	**0.0863**	**0.0105**	**1,396.2061**

6.0 Area Detail

6.1 Mitigation Measures Area

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599
Unmitigated	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2608					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.8082					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0143	0.1218	0.0518	7.8000e-004		9.8500e-003	9.8500e-003		9.8500e-003	9.8500e-003	0.0000	141.0446	141.0446	2.7000e-003	2.5900e-003	141.8827
Landscaping	0.2173	0.0824	7.1552	3.8000e-004		0.0396	0.0396		0.0396	0.0396	0.0000	11.6939	11.6939	0.0113	0.0000	11.9772
Total	**3.3006**	**0.2042**	**7.2070**	**1.1600e-003**		**0.0494**	**0.0494**		**0.0494**	**0.0494**	**0.0000**	**152.7384**	**152.7384**	**0.0140**	**2.5900e-003**	**153.8599**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2608					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.8082					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0143	0.1218	0.0518	7.8000e-004		9.8500e-003	9.8500e-003		9.8500e-003	9.8500e-003	0.0000	141.0446	141.0446	2.7000e-003	2.5900e-003	141.8827
Landscaping	0.2173	0.0824	7.1552	3.8000e-004		0.0396	0.0396		0.0396	0.0396	0.0000	11.6939	11.6939	0.0113	0.0000	11.9772
Total	**3.3006**	**0.2042**	**7.2070**	**1.1600e-003**		**0.0494**	**0.0494**		**0.0494**	**0.0494**	**0.0000**	**152.7384**	**152.7384**	**0.0140**	**2.5900e-003**	**153.8599**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	258.7412	1.6539	0.0405	312.1654
Unmitigated	258.7412	1.6539	0.0405	312.1654

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	45.0214 / 28.3831	231.8315	1.4805	0.0363	279.6546
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	5.27396 / 3.23243	26.9097	0.1734	4.2500e-003	32.5109
Total		**258.7412**	**1.6539**	**0.0405**	**312.1654**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	45.0214 / 28.3831	231.8315	1.4805	0.0363	279.6546
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	5.27396 / 3.23243	26.9097	0.1734	4.2500e-003	32.5109
Total		**258.7412**	**1.6539**	**0.0405**	**312.1654**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	79.6983	4.7100	0.0000	197.4492
Unmitigated	79.6983	4.7100	0.0000	197.4492

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	317.86	64.5227	3.8132	0.0000	159.8523
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	74.76	15.1756	0.8969	0.0000	37.5969
Total		**79.6983**	**4.7100**	**0.0000**	**197.4492**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	317.86	64.5227	3.8132	0.0000	159.8523
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	74.76	15.1756	0.8969	0.0000	37.5969
Total		**79.6983**	**4.7100**	**0.0000**	**197.4492**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number

11.0 Vegetation

Appendix B

EMFAC2017 Vehicle Consumption Data

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2011Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	Fuel	Population	VMT	Fuel_Consumption	Fuel Split (Gas:Diesel)	MPG, by Fuel Type	MPG, Average
SOUTH COAST AQMD	2023	LDA	GAS	6635002.295	252710542.7	7971.24403	99.38%	31.70	32.59
South Coast AQMD	2023	LDA	DSL	62492.97958	2469815.67	49.3916685	0.62%	50.00	
South Coast AQMD	2023	LDA	ELEC	150700.3971	6237105.777	0			
South Coast AQMD	2023	LDT1	GAS	758467.6481	27812996.47	1023.913006	99.96%	27.16	27.46
South Coast AQMD	2023	LDT1	DSL	360.7799144	8408.618214	0.366459477	0.04%	22.95	
South Coast AQMD	2023	LDT1	ELEC	7122.93373	303507.5334	0			
South Coast AQMD	2023	LDT2	GAS	2285150.139	85272415.53	3338.798312	99.47%	25.54	25.6
South Coast AQMD	2023	LDT2	DSL	15594.68309	650362.8069	17.73812611	0.53%	36.66	
South Coast AQMD	2023	LDT2	ELEC	28809.63735	917592.8423	0			
South Coast AQMD	2023	MDV	GAS	1589862.703	55684188.36	2693.883526	98.15%	20.67	20.81
South Coast AQMD	2023	MDV	DSL	36128.1019	1425691.372	50.65281491	1.85%	28.15	
South Coast AQMD	2023	MDV	ELEC	16376.67653	537591.7438	0			
South Coast AQMD	2023	LHD1	GAS	174910.3847	6216642.74	583.3851736	71.88%	10.66	13.81
South Coast AQMD	2023	LHD1	DSL	125545.0822	4994753.051	228.1779285	28.12%	21.89	
South Coast AQMD	2023	LHD2	GAS	30102.75324	1034569.096	111.5753864	53.28%	9.27	14.18
South Coast AQMD	2023	LHD2	DSL	50003.13116	1935029.912	97.84811618	46.72%	19.78	
South Coast AQMD	2023	MHDT	GAS	25624.3151	1363694.415	265.2060557	26.79%	5.14	9.58
South Coast AQMD	2023	MHDT	DSL	122124.488	8120623.353	724.7695868	73.21%	11.20	
South Coast AQMD	2023	HHDT	GAS	75.10442936	8265.097091	1.936286145	0.10%	4.27	6.94
South Coast AQMD	2023	HHDT	DSL	115130.71	13671497.32	1970.514243	99.90%	6.94	
South Coast AQMD	2023	OBUS	GAS	5955.291639	245774.0168	48.07750689	100.00%	5.11	5.11
South Coast AQMD	2023	OBUS	DSL	0	0	0	0.00%	0.00	
South Coast AQMD	2023	UBUS	GAS	957.7686184	89782.63172	17.62416327	98.66%	5.09	5.18
South Coast AQMD	2023	UBUS	DSL	13.00046095	1416.621572	0.239500509	1.34%	5.91	
South Coast AQMD	2023	UBUS	ELEC	16.11693886	1320.163255	0			
South Coast AQMD	2023	SBUS	GAS	2783.643068	112189.6089	12.19474692	30.76%	9.20	8.15
South Coast AQMD	2023	SBUS	DSL	6671.825716	210853.9115	27.44411242	69.24%	7.68	
South Coast AQMD	2023	MCY	GAS	305044.5141	2104623.657	57.849018	100.00%	36.38	36.38
South Coast AQMD	2023	MH	GAS	34679.50542	330042.9197	63.26295123	84.47%	5.22	6.07
South Coast AQMD	2023	MH	DSL	13122.69387	124302.0239	11.63031832	15.53%	10.69	

APPENDIX E
OTHER CEQA TOPICS/ENVIRONMENTAL ANALYSIS CHECKLIST

UPDATES TO THE CEQA GUIDELINES

The State of California adopted revisions to the CEQA Guidelines which became effective on January 1, 2019. Pursuant to CEQA Guidelines Sections 15007(d), the City of Ontario must comply with the new Guidelines 120 days after they become effective, which in this case is May 1, 2019. City staff have provided the following supplemental discussion of CEQA Guidelines Appendix G topics where appropriate. Additionally, this section includes a discussion of the CEQA Environmental Checklist.

ENVIRONMENTAL ANALYSIS CHECKLIST

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
1. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒
2. AGRICULTURE AND FOREST RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
3. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒
4. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
5. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒
6. GEOLOGY AND SOILS. Would the project:				
a) Result in potentially significant environmental impact due to the wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation:	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficient:	☐	☐	☒	☐
7. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii. Strong seismic ground shaking?	☐	☐	☐	☒
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv. Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18 1 B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
8. GREENHOUSE GAS EMISSIONS. Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emission of greenhouse gases?	☐	☐	☒	☐
9. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within the safety zone of the airport land use compatibility plan for ONT or Chino Airports, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
10. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any other water quality standards or waste discharge requirements or potential for discharge of storm water pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas?	☐	☒	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site or volume of storm water runoff to cause environmental harm or potential for significant increase in erosion of the project site or surrounding areas?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site or potential for significant changes in the flow velocity or volume of storm water runoff to cause environmental harm?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff during construction and/or post- construction activity?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality or potential for discharge of storm water to affect the beneficial uses of receiving water?	☐	☒	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Expose people or structures to inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
11. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, airport land use compatibility plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒
12. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally- important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
13. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within the noise impact zones of the airport land use compatibility plan for ONT and Chino Airports, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
14. POPULATION AND HOUSING. Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of road or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
15. PUBLIC SERVICES. Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i. Fire protection?	☐	☒	☐	☐
ii. Police protection?	☐	☒	☐	☐
iii. Schools?	☐	☒	☐	☐
iv. Parks?	☐	☒	☐	☐
v. Other public facilities?	☐	☐	☐	☒

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
16. RECREATION. Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which have an adverse physical effect on the environment?	☐	☐	☐	☒
17. TRANSPORTATION/TRAFFIC. Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
18. TRIBAL CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resources Code Section 21074?	☐	☐	☐	☒
19. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? In making this determination, the City shall consider whether the project is	☐	☒	☐	☐

Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
subject to the water supply assessment requirements of Water Code Section 10910, et seq. (SB 610), and the requirements of Government Code Section 664737 (SB 221).				
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☒	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☒	☐	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒
20. WILDFIRE. Would the project:				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	☒
d) Expose people or structures to significant risks, including downslope, or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒
21. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?	☐	☐	☐	☒
c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current project, and the effects of probable future projects.)	☐	☐	☒	☐
d) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

EXPLANATION OF THRESHOLDS

1. AESTHETICS

Would the project:

a) Have a substantial adverse effect on a scenic vista?

Discussion of Effects: The Policy Plan (General Plan) does not identify scenic vistas within the City. However, the Policy Plan (Policy CD1-5) requires all major north-south streets to be designed and redeveloped to feature views of the San Gabriel Mountains located to the east. The Project site is located south of Fourth Street, north of Concours Street, between Haven Avenue and Milliken Avenue, and less than one-quarter mile north of Interstate 10 (I-10); refer to Figure 1. The Project site is not located in a major north-south arterial street as identified in the Functional Roadway Classification Plan (Figure M-2) of the Mobility Element within the General Plan.

Additionally, implementation of the proposed Project would result in development of commercial/retail and residential uses that are similar in scale, character, and intensity to those envisioned under the adopted OCSP and assessed in the Certified EIR. On this basis, the Project is not anticipated to result in different or greater aesthetic impacts than those identified in the Certified EIR. Therefore, no adverse impacts are anticipated in relation to the Project.

Mitigation: None required.

b) Substantially damage scenic resources, including, but not limited to, tress, rock outcroppings and historic buildings within a state scenic highway?

Discussion of Effects: The City of Ontario is served by three freeways: I-10, I-15, and SR-60. I-10 and SR-60 traverse the northern and central portion of the City, respectively, in an east–west direction. I-15 traverses the northeastern portion of the City in a north–south direction. These segments of I-10, I-15, and SR-60 have not been officially designated as scenic highways by the California Department of Transportation. In addition, there are no historic buildings, or any scenic resources identified on or in the vicinity of the Project site. Therefore, it would not result in adverse environmental impacts.

Mitigation: None required.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Discussion of Effects: The proposed Project would not degrade the existing visual character or quality of the site or its surroundings. The Project site is located in an area that is characterized by a mix of commercial, entertainment retail, office, and high-density residential land uses, and is surrounded by commercial and office land uses.

The proposed Project would substantially improve the visual quality of the area through development of the site with a mix of commercial, entertainment retail, office, and high-density residential land uses, which would be consistent with the policies of the Community Design Element of the Policy Plan (General Plan) and zoning designations on the property, as well as with the commercial and office development in the surrounding area. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

Discussion of Effects: New lighting would be introduced to the site with the development of the proposed Project. Pursuant to the requirements of the City's Development Code, Project on-site lighting would be shielded, diffused or indirect, to avoid glare to pedestrians or motorists. In addition, lighting fixtures would be selected and located to confine the area of illumination to within the Project site and minimize light spillage.

Site lighting plans would be subject to review by the Planning Department and Police Department prior to issuance of building permits (pursuant to the City's Building Security Ordinance). Therefore, no adverse impacts are anticipated.

Mitigation: None required.

2. AGRICULTURE AND FOREST RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

Discussion of Effects: The site is presently vacant and does not contain any agricultural uses. Further, the site is identified as "Other Land" and "Urban and Built-Up Land" on the map prepared by the California Resources Agency, pursuant to the Farmland Mapping and Monitoring Program. The "Other Land" consists of vacant and nonagricultural land that is greater than 40 acres in area and is surrounded on all sides by urban development. As a result, no adverse environmental impacts are anticipated.

Mitigation: None required.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

Discussion of Effects: The Project site is not zoned for agricultural use. The project site is zoned SP (Specific Plan) and is located within the Urban Commercial land use district and the Piemonte Overlay district of the OCSP, which is intended for development with a mix of commercial, entertainment retail, office, and high density residential land uses. The proposed Project is consistent with the development standards and allowed land uses of the proposed land use district. Furthermore, there is no Williamson Act contract in effect on the subject site. Therefore, no impacts to agricultural uses are anticipated, nor would there be any conflict with existing or Williamson Act contracts.

Mitigation: None required.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)?

Discussion of Effects: The proposed Project is intended for development with a mix of commercial, entertainment retail, office, and high-density residential land uses. The proposed Project is consistent with the Land Use Element (Figure LU-6) of the Policy Plan (General Plan) and the development standards and allowed land uses of the Urban Commercial land use district and the Piemonte Overlay district of the OCSP. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

Discussion of Effects: There is currently no land in the City of Ontario that qualifies as forest land as defined in Public Resources Code section 12220(g). Neither The Ontario Plan nor the City's Zoning Code provide designations for forest land. Consequently, the proposed Project would not result in the loss or conversion of forest land.

Mitigation: None required.

e) Involve other changes in the existing environment, which, due to their location or nature, could individually or cumulatively result in loss of Farmland to non-agricultural use or conversion of forest land to non-forest use?

Discussion of Effects: The proposed Project site is not designated as Farmland is currently zoned Specific Plan, and is located within the Urban Commercial land use district and the Piemonte Overlay district of the OCSP, which is intended for development with a mix of commercial, entertainment retail, office, and high-density residential land uses. The proposed Project site is currently partly vacant, but previously graded, on the northern portion of the site and fully developed with parking areas currently utilized for the Toyota Arena. There are no agricultural uses occurring onsite. As a result, to the extent that the Project would result in changes to the existing environment those changes would not result in loss of Farmland to non-agricultural use.

Additionally, there is currently no land in the City of Ontario that qualifies as forest land as defined in Public Resources Code Section 12220(g). Neither The Ontario Plan nor the City's Zoning Code provide designations for forest land. Consequently, to the extent that the proposed Project would result in changes to the existing environment, those changes would not impact forest land.

Mitigation Required: None required.

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

Discussion of Effects: The Project would not conflict with or obstruct implementation of any air quality plan. As noted in The Ontario Plan FEIR (Section 5.3), pollutant levels in the Ontario area already exceed Federal and State standards. To reduce pollutant levels, the City of Ontario is actively participating in

efforts to enhance air quality by implementing Control Measures in the Air Quality Management Plan for local jurisdictions within the South Coast Air Basin.

The proposed Project is consistent with The Ontario Plan, for which the EIR was prepared and impacts evaluated. Furthermore, the Project is consistent with the City's participation in the Air Quality Management Plan (AQMP).

Additionally, implementation of the Project would result in the construction of commercial/retail and residential uses in a much lower scope and character to those assessed in the Certified EIR. As such, construction-related air pollutant emissions would be lower to than those considered in the Certified EIR. Further, shown in Table 3-7, the proposed Project would not exceed any construction emission thresholds. Additionally, as discussed in the Addendum, a reduction in total average daily traffic generation is anticipated under the Project. As a result, reductions in vehicle pollutant emissions are anticipated. Based on the preceding discussion, the proposed Project would not result in different or greater air quality impacts than those identified in the Certified EIR. Please refer also to Addendum Section 3.5.3, "Air Quality." A less than significant impact would occur.

Mitigation: None required.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Discussion of Effects: Short term air quality impacts will result from construction related activities associated with construction activity, such as excavation and grading, machinery and equipment emissions, vehicle emissions from construction employees, etc. The daily emissions of nitrogen oxides and particulates from resulting grading and vehicular emissions may exceed threshold levels of the South SCAQMD.

The Project must follow mandatory SCAQMD rules and requirements with regards to fugitive dust control, as described in Section 6.1.3 of the SCAQMD rules. Compliance with the standard dust control measures is considered to be part of the conditions of approval for the Project and built into the design features. Table 3-7, shows that, the Project's daily construction emissions would be below the applicable SCAQMD air quality standards and thresholds of significance. As a result, the Project would not contribute substantially to an existing or projected air quality violation. As noted in Table 1-1, the Certified EIR include a set of mitigation measures that are applicable to the proposed Project.

Mitigation: Air Quality

MM-AQ-1 Regular watering, paving construction roads, or other dust control measures defined in SCAQMD Rule 403 will occur during construction.

MM-AQ-2 Construction equipment will be maintained in proper tune to minimize the volume of equipment exhaust emissions.

MM-AQ-3 Comprehensive ridesharing incentive program will be developed as part of a Transportation System Management.

MM-AQ-4 Orientation of Project for transit convenience and accessibility will occur in design phase; provision of easy pedestrian access will occur in design phase; provision of bus shelters, benches and bus pockets on streets.

MM-AQ-5 Provision of traffic flow improvements will occur as buildout of project occurs.

MM-AQ-6 Inclusion of solar and other energy-saving devices in residences and businesses including:

- delamping
- increased building insulation
- heating/ventilation/air conditioning improvements
- solar heaters
- utilization of landscape features to shade buildings

MM-AQ-7 Construction activities should avoid high ozone days and discontinue construction during second stage alerts. After grading, seed and water until vegetation cover is established.

MM-AQ-8 Wet area down, sufficient enough to form a crust on the surface with repeated soakings, as necessary, to maintain the crust and prevent dust pickup by the wind.

MM-AQ-9 Use water trucks or sprinkler systems to keep all areas where vehicles move damp enough to prevent dust from being raised beyond site operations. Wet construction areas down in the late morning and after work is completed in the day.

MM-AQ-10 Use low sulfur fuel for construction equipment (0.5 percent by weight).

As noted in the Certified EIR, a less than significant impact will occur with implementation of the applicable mitigation measures.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

Discussion of Effects: The Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the region is in non-attainment under an applicable federal or state ambient air quality because of the limited size and scope of the project. Although no impacts are anticipated, the Project would still comply with the air quality standards of the TOP FEIR and the SCAQMD resulting in impacts that are less than significant [please refer also to Addendum Section 3.5.3, "Air Quality."] A less than significant impact would occur.

Mitigation: None required.

d) Expose sensitive receptors to substantial pollutant concentrations?

Discussion of Effects: Sensitive receptors are defined as populations that are more susceptible to the effects of pollution than the population at large. The SCAQMD identifies the following as sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, childcare centers, and athletic facilities. According to the SCAQMD, projects have the potential to create significant impacts if they are located within one-quarter mile of sensitive receptors and would emit toxic air contaminants identified in SCAQMD Rule 1401.

Given the close proximity of the project to nearest sensitive receptors (residential homes to the north), several measures are provided to help ensure the potential health risk associated with Diesel Particulate Matter (DPM) during construction is reduced to the maximum extent feasible. This includes a requirement for Tier 4 engines on all diesel-powered construction equipment. Tier 4 engines, along with the latest

national fuel standards, have been shown to yield PM reductions of over 95 percent from the typical Tier 2 and Tier 3 engines[8].

It is presumed that with the recommended design features and Tier 4 engines in place that the potential short term construction health risks would be adequately reduced to be less than significant. Design features DF-3 through DF-9 are recommended to help ensure the Project does not expose receptors to substantial pollution concentrations during construction. However, these are not considered mitigation measures. A less than significant impact would occur.

Mitigation: None required.

e) Create objectionable odors affecting a substantial number of people?

Discussion of Effects: The uses proposed on the subject site, as well as those permitted within the Urban Commercial land use district and the OCSP, do not create objectionable odors. Further, the Project shall comply with the policies of the Ontario Municipal Code and the General Plan. Additionally, as noted in the Air Quality and Greenhouse Gas Analysis, the Project's operations would result in less than significant odor impacts. Therefore, no adverse impacts are anticipated.

4. BIOLOGICAL RESOURCES

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Discussion of Effects: The site is located within an area that has historically been found to contain Delhi Soils, which is potential habitat for the Delhi Sand Flower-loving Fly (DSF), a federally listed endangered species. However, as a result of previous development, grading, and land uses on the Project site, including construction and operation of the Ontario Motor Speedway (razed in 1981), and more recently, construction activity associated with the phased development of approximately 1.3 million square feet of retail, office, hotel, and entertainment uses, and 800 multiple-family dwelling units, including mass grading of the entire Project area, the installation of public utilities, and the construction of street improvements, have left the Project site in an extremely disturbed state. This determination is supported by previous environmental reports addressing the Project site, including Ontario International Centre EIR 80-3 (SCH No. 80062538), Certified EIR 88-2 (SCH No. 89041009), and the POCA, all of which have found the Project site to be in an extremely disturbed state, with no native soils or native vegetation on the site. The Project site has not been designated as a planned recovery zone for the DSF, and in its current condition, does not provide suitable habitat. No impact would occur.

Mitigation: None required.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife, or U.S. Fish and Wildlife Service?

[8] EPA. Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel; Final Rule. (40 CFR Parts 9, 69, et al.)

Discussion of Effects: The Project site does not contain any riparian habitat or other sensitive natural community identified by the California Department of Fish & Wildlife, or U.S. Fish & Wildlife Service. Therefore, no adverse environmental impacts are anticipated.

Mitigation: None required.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Discussion of Effects: No wetland habitat is present on site. Therefore, Project implementation would have no impact on these resources.

Mitigation: None required.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Discussion of Effects: The Project site is a mixed vacant and fully developed property that is bounded on all four sides by development. As a result, there are no wildlife corridors connecting this site to other areas. Therefore, no adverse environmental impacts are anticipated.

Mitigation: None required.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Discussion of Effects: The City of Ontario does not have any ordinances protecting biological resources. Further, the site does not contain any mature trees necessitating the need for preservation. As a result, no adverse environmental impacts are anticipated.

Mitigation: None required.

f) Conflict with the provisions of an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other approved local, regional, or state habitat conservation plan?

Discussion of Effects: The site is not part of an adopted HCP, NCCP or other approved habitat conservation plan. As a result, no adverse environmental impacts are anticipated.

Mitigation: None required.

5. CULTURAL RESOURCES

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Discussion of Effects: The Project site does not contain any buildings, structures, or objects. Additionally, as part of the Project site development during the OCSP, CECA, POCA, POOSCP, the Project site has been previously disturbed and fully graded. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Discussion of Effects: The Ontario Plan FEIR (Section 5.5) indicates no archeological sites or resources have been recorded in the City with the Archeological Information Center at San Bernardino. As noted above, because the site has been previously fully disturbed and graded and no historical structures existing on-site, no adverse change in significance or an archaeological resource is anticipated.

Mitigation: None required.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Discussion of Effects: As described in the Certified EIR, cultural resources were not anticipated to be affected by the OCSP. As previously noted, the Project site has been previously graded. As such, the proposed Project would not affect areas or resources not previously considered in the Certified EIR. No additional or different impacts have been identified based on the Project

Mitigation: None required.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Discussion of Effects: The proposed Project is in an area that has been previously disturbed by development. No known religious or sacred sites exist within the Project area. Thus, human remains are not expected to be encountered during any construction activities. However, in the unlikely event that human remains are discovered, existing regulations, including the California Public Resources Code Section 5097.98, would afford protection for human remains discovered during development activities. Furthermore, standard conditions have been imposed on the Project that in the event of unanticipated discoveries of human remains are identified during excavation, construction activities, the area shall not be disturbed until any required investigation is completed by the County Coroner and/or Native American consultation has been completed, if deemed applicable.

Mitigation: None required.

6. Energy

Would the project:

a) Result in potentially significant environmental impact due to the wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation:

A Project specific Energy Study was prepared by RK Engineering Group, Inc. Findings are summarized herein, and the technical study is available as Appendix D of this Addendum.

Discussion of Effects: As described in the Certified EIR, the Project's impact is considered less than significant with the inclusion of the mandatory requirements of California's Building Energy Efficiency Standards (Title 24, Part 6) and Green Building Standards (CALGreen, Title 24, Part 11). California's building energy efficiency standards are some of the strictest in the nation and the Project's compliance with California's building code would ensure that wasteful, inefficient or unnecessary consumption of energy

is minimized. The building standards code is designed to reduce the amount of energy needed to heat or cool a building and reduce energy usage for lighting and appliances.

The proposed Project is anticipated to have a less than significant impact on energy. The following recommended energy design features (DF) are provided to further reduce wasteful, inefficient and unnecessary consumption of energy. Design features are consistent with the recommended design features provided with Air/GHG study. These DF are not considered mitigation measures.

Construction Energy Design Features

E-DF-1 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

Operational Design Features

E-DF-2 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

E-DF-3 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

E-DF-4 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

E-DF-5 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

E-DF-6 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawnmowers and leaf blowers, wherever feasible.

E-DF-7 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

E-DF-8 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e., sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).
2. Provide traffic calming measures (i.e., marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)
3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

E-DF-9 Provide electric vehicle charging stations per the requirements of CALGreen.

A less than significant impact would occur.

Mitigation: None required.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficient:

Discussion of Effects: The proposed Project's impact is considered less than significant as the Project would purchase electricity through Southern California Edison which is subject to the requirements of California Senate Bill 100 (SB 100). SB 100 is the most stringent and current energy legislation in California; requiring that renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045.1 The Project would further comply with the mandatory requirements of California's Green Building and Building Energy Efficiency standards that promote renewable energy and energy efficiency. A less than significant impact would occur.

Mitigation: None required.

7. GEOLOGY & SOILS

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Discussion of Effects: There are no active faults known on the site and the Project site is located outside the Fault Rapture Hazard Zone (formerly Alquist-Priolo Zone). The Ontario Plan FEIR (Section 5.7/ Figure 5.7-2) identifies eight active or potentially active fault zones near the City. Given that the closest fault zone is located more than ten miles from the Project site, fault rupture within the Project area is not likely. All development would comply with the UBC seismic design standards to reduce geologic hazard susceptibility. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

ii) Strong seismic ground shaking?

Discussion of Effects: There are no active faults known on the site and the Project site is located outside the Fault Rapture Hazard Zone (formerly Alquist-Priolo Zone). The Land Use Plan (Figure LU-6) of the Policy Plan (General Plan) FEIR (Section 5.7/Figure 5.7-2) identifies eight active or potentially active fault zones near the City. The closest fault zone is located more than ten miles from the Project site. The proximity of the site to the active faults would result in ground shaking during moderate to severe seismic events. All construction would be in compliance with the California Building Code (CBC), the Ontario Municipal Code, The Ontario Plan and all other ordinances adopted by the City related to construction and safety. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

iii) Seismic-related ground failure, including liquefaction?

Discussion of Effects: As identified in the TOP FEIR (Section 5.7), groundwater saturation of sediments is required for earthquake induced liquefaction. In general, groundwater depths shallower than 10 feet to the surface can cause the highest liquefaction susceptibility. According to the POOC MND, depth to ground water at the Project site during the winter months is estimated to be between 250 to 450 feet below ground surface. Therefore, the liquefaction potential within the Project area is minimal.

Implementation of The Ontario Plan strategies, UBC and Ontario Municipal Code would reduce impacts to a less than significant level.

Mitigation: None required.

iv) Landslides?

Discussion of Effects: The proposed Project would not expose people or structures to potential adverse effects, including the risk of loss, injury, or death involving landslides because the relatively flat topography of the Project site (less than two percent slope across the City) makes the chance of landslides remote. Implementation of The Ontario Plan strategies, UBC and OMC would reduce impacts to a less than significant level.

Mitigation: None required.

b) Result in substantial soil erosion or the loss of topsoil?

Discussion of Effects: The proposed Project would not result in significant soil erosion or loss of topsoil because of the previously disturbed and developed nature of the Project site and the limited size and scope of the Project. Grading increases the potential for erosion by removing protective vegetation, changing natural drainage patterns, and constructing slopes. However, compliance with the CBC and review of grading plans by the City Engineer would ensure no significant impacts would occur. In addition, the City requires an erosion/dust control plan for projects located within this area. Implementation of a NPDES program, the Environmental Resource Element of the General Plan strategies, UBC, and OMC would reduce impacts to a less than significant level.

Mitigation: None required.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Discussion of Effects: The Project site would not result in the location of development on a geologic unit or soil that is unstable, or that would become unstable because as previously discussed, the potential for liquefaction and landslides associated with the Project site is less than significant. The Ontario Plan FEIR (Section 5.7) indicates that subsidence is generally associated with large decreases or withdrawals of water from the aquifer. The Project would not withdraw water from the existing aquifer. Further, implementation of The Ontario Plan strategies, UBC and OMC would reduce impacts to a less than significant level.

Mitigation: None required.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Discussion of Effects: The majority of Ontario, including the Project site, is located on alluvial soil deposits. These types of soils are not considered to be expansive. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Discussion of Effects: The area is served by the local sewer system and the use of alternative systems is not necessary. There would be no impact to the sewage system.

Mitigation: None required.

8. GREENHOUSE GAS EMISSIONS

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Discussion of Effects: The impact of buildout of The Ontario Plan on the environment due to the emission of greenhouse gases ("GHGs") was analyzed in the Environmental Impact Report ("EIR") for the Policy Plan (General Plan). According to the EIR, this impact would be significant and unavoidable. (Recirculated Portions of the Ontario Plan Draft Environmental Impact Report, p. 2-118). This EIR was certified by the City on January 27, 2010, at which time a statement of overriding considerations was also adopted for The Ontario Plan's significant and unavoidable impacts, including that concerning the emission of GHGs.

Pursuant to Public Resources Code section 21083.3, this impact need not be analyzed further, because (1) the proposed project would result in an impact that was previously analyzed in The Ontario Plan EIR, which was certified by the City; (2) the proposed project would not result in any greenhouse gas impacts that were not addressed in The Ontario Plan EIR; (3) the proposed project is consistent with The Ontario Plan.

A Project-specific Air Quality and Greenhouse Gas Impact Study was prepared. The results are provided herein, and the technical study is included as Appendix B of this Addendum. For purposes of this Project, the City of Ontario, Ontario County Climate Action Plan (CCAP) establishes the requirements for determining whether a project would have a significant impact to GHG emissions under CEQA.

The CCAP uses Screening Tables, which are setup similar to a checklist, with points allocated to certain elements of the Project to reduce GHG emissions. If a project garners 100 points (by including enough GHG reducing elements), then the project is consistent with CCAP and the impact may be considered less than significant for purposes of CEQA.

The proposed Project is expected to comply with the CCAP by implementing the Screening Table requirements into the Project design. To help ensure the Project adheres to the CCAP requirements, the following GHG Project DFs GHG-DF-10 through GHG-DF-17 are provided:

Design Features

GHG-DF-10 Implement the GHG Reduction Measures from the CCAP Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

As described in Appendix B of the CCAP, for mixed use projects, both the residential and non-residential screening tables shall be completed. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City's CAP and are considered less than significant for GHG emissions.

Therefore, with the implementation of the CCAP Screening Tables, the Project is not expected to generate GHG emissions, either directly or indirectly, that would cause a significant impact on the environment.

Also, by complying with the CCAP, the Project will not conflict with an applicable plan, policy or regulation for the purpose of reducing the emissions of greenhouse gases and the impact is considered less than significant.

Furthermore, since the purpose of the City's CCAP is to ensure compliance with the state's climate initiatives for reducing GHG emissions, by complying with the CCAP, the Project will also be in compliant with the broader statewide goals for combating climate change; such as those required in the CARB Scoping Plan and AB 32.

The mixed-use Project is also located within close proximity to high quality transit, located in a low VMT zone, and offers high-density residential development near commercial uses. The Project will include pedestrian friendly and walkable design that will encourage fewer auto-based trips. The following Project design features will be provided to further help reduce GHG emissions:

GHG-DF-11 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

GHG-DF-12 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

GHG-DF-13 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

GHG-DF-14 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

GHG-DF-15 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

GHG-DF-16 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e., sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).
2. Provide traffic calming measures (i.e., marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)
3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

GHG-DF-17 Provide electric vehicle charging stations per the requirements of CALGreen.

The Project is anticipated to have a less than significant impact. Additionally, with implementation of the Project DF, the Project would continue to have a less than significant impact on GHG.

9. HAZARDS & HAZARDOUS MATERIALS

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?

Discussion of Effects: The Project is not anticipated to involve the transport, use or disposal of hazardous materials during either construction or Project implementation. Typical construction activities involve the use and handling of solvents, paints, and other chemicals. However, none of the proposed uses involve the use or handling of dangerous chemicals that could create a significant hazard to the public or the environment. Additionally, the Project site have been previously graded, and no hazardous materials exist onsite. Therefore, no adverse impacts are anticipated. However, in the unlikely event of an accident, implementation of the strategies included in The Ontario Plan would decrease the potential for health and safety risks from hazardous materials to a less than significant impact.

Mitigation: None required.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Discussion of Effects: The proposed Project does not include the use of hazardous materials or volatile fuels. In addition, there are no known stationary commercial or industrial land uses within close proximity to the subject site, which use/store hazardous materials to the extent that they would pose a significant hazard to visitors/occupants to the subject site, in the event of an upset condition resulting in the release of a hazardous material. No impacts are anticipated.

Mitigation: None required

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?

Discussion of Effects: The proposed Project does not include the use, emissions or handling of hazardous or acutely hazardous materials, substances or waste. Therefore, no impacts are anticipated.

Mitigation: None required.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Discussion of Effects: The proposed Project site is not listed on the hazardous materials site compiled pursuant to Government Code Section 65962.5. Therefore, the Project would not create a hazard to the public or the environment and no impact is anticipated.

Mitigation: None required.

e) For a project located within the safety zone of the airport land use compatibility plan for ONT or Chino Airports, would the project result in a safety hazard for people residing or working in the project area?

Discussion of Effects: According to Land Use Element (Exhibit LU-06 Airport Environs) of the General Plan, the Project site is located within the airport land use plan. However, the Project would not result in a safety hazard for people working or residing in the Project area because it would not obstruct aircraft maneuvering because of the Project's low elevation and the architectural style of the Project. Additionally, the Land Use Compatibility Guidelines for Noise Impacts (Table LU-08) shows the proposed use as normally accepted in the 65 CNEL. The proposed use would comply with standards for mitigating noise. Therefore, no impacts are anticipated.

Mitigation: None required.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

Discussion of Effects: The Project site is not located within the vicinity of a private airstrip. Therefore, no impacts are anticipated.

Mitigation: None required.

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Discussion of Effects: The City's Safety Element, as contained within The Ontario Plan, includes policies and procedures to be administered in the event of a disaster. The Ontario Plan seeks interdepartmental and inter-jurisdictional coordination and collaboration to be prepared for, respond to, and recover from everyday and disaster emergencies. In addition, the Project would comply with the requirements of the Ontario Fire Department and all City requirements for fire and other emergency access. Because the Project is required to comply with all applicable City codes, any impacts would be reduced to a less than significant level.

Mitigation: None required.

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Discussion of Effects: The Project site is not located in or near wildlands. Therefore, no impacts are anticipated.

Mitigation: None required.

10. HYDROLOGY & WATER QUALITY

Would the project:

a) Violate any other water quality standards or waste discharge requirements or potential for discharge of storm water pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work areas?

Discussion of Effects: The Project site is served by City water and sewer service and would not affect water quality standards or waste discharge requirements. Discharge of storm water pollutants from areas of

materials storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing, waste handling, hazardous materials handling or storage, delivery areas or loading docks, or other outdoor work) areas could result in a temporary increase in the amount of suspended solids, trash and debris, oil and grease, organic compounds, pesticides, nutrients, heavy metals and bacteria pathogens in surface flows during a concurrent storm event, thus resulting in surface water quality impacts. The site is required to comply with the statewide National Pollutant Discharge Elimination System (NPDES) General Industrial Activities Stormwater Permit, the San Bernardino County Area-Wide Urban Runoff Permit (MS4 permit) and the City of Ontario's Municipal Code (Title 6, Chapter 6 (Stormwater Drainage System)). In addition to the NPDES, MS4, and other permits listed in this section, this site is required to comply with the latest trash capture requirements from the State and RWQCB. This would reduce any impacts to below a level of significance. However, as part of the Certified EIR, the following Mitigation Measures (MMs) were imposed as part of the development of the OCSP:

Mitigation: Hydrology

MM-HYD-1 On-site drainage plans will be designed, submitted to, and approved by the City of Ontario prior to the issuance of a grading permit.

MM-HYD-2 Proposed storm drainage facilities to be installed as The Ontario Center develops, will be placed in public streets. W here storm drains must be placed in areas other than public streets, a drainage easement will be dedicated as needed.

MM-HYD-3 Some modification will be necessary to existing drainage facilities. No existing facility will be removed without replacement by another structure to serve the particular condition.

MM-HYD-4 As development proceeds, there will be a need for temporary siltation basins to reduce sedimentation from construction activities. These will be located in specific areas of construction and sized in accordance with City of Ontario criteria.

With implementation of the applicable Certified EIR MMs, the Project would have a less than significant impact.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Discussion of Effects: No increases in the current amount of water flow to the Project site are anticipated, and the proposed Project would not deplete groundwater supplies, nor will it interfere with recharge. The water use associated with the proposed use of the property would be negligible. The development of the site would require the grading of the site and excavation is expected to be less than three feet and would not affect the existing aquifer, estimated to be about 230 to 250 feet below the ground surface. No adverse impacts are anticipated.

Mitigation: None required.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site or volume of storm water runoff to cause environmental

harm or potential for significant increases in erosion of the project site or surrounding areas?

Discussion of Effects: It is not anticipated that the Project would alter the drainage pattern of the site or area, in a manner that would result in erosion, siltation or flooding on-or-off site nor would the proposed Project increase the erosion of the subject site or surrounding areas. The existing drainage pattern of the Project site would not be altered, and it would have no significant impact on downstream hydrology. Stormwater generated by the Project would be discharged in compliance with the statewide NPDES General Construction Activities Stormwater Permit and San Bernardino County MS4 permit requirements. With the full implementation of a Storm Water Pollution Prevention Plan (SWPPP) developed in compliance with the General Construction Activities Permit requirements, the BMPs included in the SWPPP, and a stormwater monitoring program would reduce any impacts to below a level of significance. No streams or streambeds are present on the site. No changes in erosion off-site are anticipated.

Mitigation: None required.

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site or potential for significant changes in the flow velocity or volume of storm water runoff to cause environmental harm?

Discussion of Effects: The proposed Project is not anticipated to increase the flow velocity or volume of storm water runoff to cause environmental harm from the site and would not create a burden on existing infrastructure. Furthermore, with the implementation of an approved Water Quality Management Plan (WQMP) developed for the site, in compliance with the San Bernardino County MS4 Permit requirements, stormwater runoff volume shall be reduced to below a level of significance.

Mitigation: None required.

e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (a&b) during construction and/or post-construction activity?

Discussion of Effects: It is not anticipated that the Project would create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or create or contribute stormwater runoff pollutants during construction and/or post-construction activity. Pursuant to the requirements of The Ontario Plan, the City's Development Code, and the San Bernardino County MS4 Permit's WQMP, individual developments must provide site drainage and WQMP plans according to guidelines established by the City's Engineering Department. If master drainage facilities are not in place at the time of Project development, then standard engineering practices for controlling post-development runoff may be required, which could include the construction of on-site storm water detention and/or retention/infiltration facilities. Therefore, no impacts are anticipated.

Mitigation: None required.

f) Otherwise substantially degrade water quality or potential for discharge of storm water to affect the beneficial uses of receiving water?

Discussion of Effects: Activities associated with the construction period, could result in a temporary increase in the amount of suspended solids in surface flows during a concurrent storm event, thus resulting in surface water quality impacts. The site is required to comply with the statewide NPDES General Construction Permit and the City of Ontario's Municipal Code (Title 6, Chapter 6 (Stormwater Drainage System)) to minimize water pollution. Thus, it is anticipated that there is no potential for discharges of stormwater during construction that would affect the beneficial uses of the receiving waters. However, with the General Construction Permit requirement and implementation of the policies in The Ontario Plan, any impacts associated with the Project would be less than significant. However, as part of the Certified EIR, the following MMs were imposed as part of the development of the OCSP:

Mitigation: Water Quality

MM-WQ-1 During construction, a variety of temporary structural measures such as velocity dissipators, siltation fences or basins and. vegetative buffer zones will be used to reduce siltation and sedimentation runoff from construction sites.

MM-WQ-2 Periodic cleaning of storm drains and inlets, construction of pervious pavement surfaces in areas designated by the City, periodic street sweeping.

MM-WQ-3 Periodic street sweeping will be conducted by the City of Ontario for streets dedicated to the City. Periodic vacuum sweeping will be conducted by the owners of individual sites.

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Discussion of Effects: The project site is not located within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. Therefore, no impacts are anticipated.

Mitigation: None required.

h) Place within a 100-year flood hazard area, structures that would impede or redirect flood flows?

Discussion of Effects: As identified in the Safety Element (Exhibit S-2) of the Policy Plan (General Plan), the site lies outside of the 100-year flood hazard area. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Discussion of Effects: As identified in the Safety Element (Exhibit S-2) of The Ontario Plan, the site lies outside of the 100-year flood hazard area. No levees or dams are located near the Project site. Therefore, no adverse impacts are anticipated.

Mitigation: None required.

j) Expose people or structures to inundation by seiche, tsunami or mudflow?

Discussion of Effects: There are no lakes or substantial reservoirs near the project site; therefore, impacts from seiche are not anticipated. The City of Ontario has relatively flat topography, less than two percent across the City, and the chance of mudflow is remote. Therefore, no impacts are anticipated.

Mitigation: None required.

11. LAND USE & PLANNING

Would the project:

a) Physically divide an established community?

Discussion of Effects: The Project site is located in an area that is currently developed with urban land uses. This Project would be of similar design and size to surrounding development. The Project would become a part of the larger commercial, entertainment retail, office, and high-density residential communities, which surround the Project site. No adverse impacts are anticipated.

Mitigation: None required.

b) Conflict with applicable land use plan, policy or regulation of agencies with jurisdiction over the project (including, but not limited to general plan, airport land use compatibility plan, specific plan, or development code) adopted for the purpose of avoiding or mitigation an environmental effect?

Discussion of Effects: The proposed Project is consistent with The Ontario Plan and does not interfere with any policies for environmental protection. As such, no impacts are anticipated.

Mitigation: None required.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

Discussion of Effects: There are no adopted habitat conservation plans in the Project area. As such no conflicts or impacts are anticipated.

Mitigation: None required.

12. MINERAL RESOURCES

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Discussion of Effects: The Project site is located within a mostly developed area surrounded by urban land uses. There are no known mineral resources in the area. Therefore, no impacts are anticipated.

Mitigation: None required.

b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

Discussion of Effects: There are no known mineral resources in the area. No impacts are anticipated.

Mitigation: None required.

13. NOISE

Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Discussion of Effects: As noted in Section 3.5.8, Noise, and as shown in Tables 3-8 and 3-9, the Project would not expose people to or generate noise levels in excess of standards as established in The Ontario Plan FEIR (Section 5.12). No additional analysis would be required at the time of site development review.

Mitigation: None required.

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Discussion of Effects: The uses associated with this Project normally do not induce groundborne vibrations. As such, no impacts are anticipated. Typical construction vibration is shown on Tables 3-10 and 3-11 which conclude that Project vibration would not expose persons or generate excessive groundborne vibration or noise levels.

Mitigation: None required.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Discussion of Effects: The Project would not be a significant permanent noise generator and would not cause a substantial permanent increase in ambient noise levels because of the limited size and scope of the Project. Moreover, the proposed use would be required to operate within the noise levels permitted for commercial development, pursuant to City of Ontario Development Code. The Project would create typical construction noise as shown in Tables 3-8 and 3-9. Therefore, no increases in noise levels within the vicinity of the project are anticipated.

Mitigation: None required.

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Discussion of Effects: Temporary construction activities would minimally impact ambient noise levels. All construction machinery would be maintained according to industry standards to help minimize the impacts. Normal activities associated with the Project are unlikely to increase ambient noise levels. As shown in Tables 3-12, 3-13, and 3-14 show that the Project would not create substantial temporary or periodic increase in ambient noise. A less than significant impact is anticipated.

Mitigation: None required.

e) For a project located within the noise impact zones of the airport land use compatibility plan for ONT and Chino Airports, would the project expose people residing or working in the project area to excessive noise levels?

Discussion of Effects: According to the Safety Element in The Ontario Plan and the Noise Impact Analysis, the proposed site is located within the airport land use plan. However, the Project is located outside of

the 60 CNEL noise contour. Therefore, the exterior noise impact from the airport would be within the allowable limits for residential land uses and the Project is considered compatible with the surrounding land use and noise environment. Noise from airport operations is expected to generate a less than significant on the proposed Project.

Mitigation: None required.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Discussion of Effects: The Project site is not located within the vicinity of a private airstrip. Therefore, no impacts are anticipated.

Mitigation: None required.

14. POPULATION & HOUSING

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of road or other infrastructure)?

Discussion of Effects: The Project is located in a developed area and would not induce population growth as the proposed multi-family DUs have been previously analyzed as part of the OCSP development in the Certified EIR and population growth as part of the OCSP has already been assumed and accounted for in the General Plan and regionally. Therefore, no impacts are anticipated

Mitigation: None required.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

Discussion of Effects: The Project site is currently undeveloped. Therefore, no impacts are anticipated.

Mitigation: None required.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

Discussion of Effects: The Project site is currently undeveloped. Therefore, no impacts are anticipated.

Mitigation: None required.

15. PUBLIC SERVICES

Would the project:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i) Fire protection?

Discussion of Effects: The site is in a developed area currently served by the Ontario Fire Department. As previously noted, the site has already been accounted for in the General Plan that it will be developed to include a greater amount of commercial SF and a larger amount of multi-family DUs. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities. No impacts are anticipated. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: Fire Protection

MM-PS-1 The developer will pay a fair share of "in-lieu" fees to subsidize additional facilities and equipment as mutually agreed upon by both the developer and the City of Ontario.

MM-PS-2 All new development will participate in updating the City of Ontario Water Master Plan and will contribute on a "fair share" basis toward implementation of Master Plan programs.

MM-PS-3 Ontario Fire Department and project developer Will provide, in writing, assurance of water supply adequacy from local water purveyor.

MM-PS-4 Design features at the site plan level will reduce risk of fire hazard. Site plan proposals will be reviewed during site plan review by Ontario Fire Department (OFD). Protection measures recommended by the OFD will be implemented by project proponent.

With implementation of MMs PS-1 through PS-4, a less than significant impact on fire services would occur.

ii) Police protection?

Discussion of Effects: The site is in a developed area, currently served by the Ontario Police Department. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities and no impact are anticipated on police protection services. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: Law Enforcement

MM-PS-5 If a proposed ordinance is adopted, the regional center builder/developer may be required to pay a one-time developer assessment fee to the Police Department at the time of issuance of a building permit. This developer fee will mitigate the fiscal impact incurred by the Police Department.

Due to the projected increase in police calls for service to be generated by the development. The amount of this fee will be established by the Ontario Police Department based on land use and projected calls-for-service from that use.

MM-PS-6 Each individual project within The Ontario Center will incorporate on-site security measures. These measures will be reviewed by the Ontario Police Department. They will include, but not be limited to, limited-height landscaping, exterior lighting, security hardware.

MM-PS-7 In addition to these physical security and lighting requirements, the Police Department requests that the developer submit a plan delineating which functions are to be addressed by on-site private security and what functions are to be served by the Police Department. This

plan may include personnel selection and training and physical security measures, i.e., video surveillance, emergency call boxes, communication and alarms. This plan shall be approved by the Police Department prior to implementation.

With implementation of MMs PS-5 through PS-7, a less than significant impact on police services would occur.

iii) Schools?

Discussion of Effects: The Project would be required to pay school fees as prescribed by state law prior to the issuance of building permits. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: School

MM-PS-8 Developers of residential projects within The Ontario Center will pay required school impact mitigation fees of $29,000 gross acre to Cucamonga School District per agreement reached between the District and the developer dated December 31, 1986.

MM-PS-9 Developers of projects within The Ontario Center will pay fees, as noted below, to the Chaffey Joint Unified School District:

Residential $.48/square foot

Commercial/Industrial/Office $.08/square foot

iv) Parks?

Discussion of Effects: The site is in a developed area, currently served by the City of Ontario. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities. However, as part of the development of the OCSP, the Certified EIR noted that the following MMs would be applicable to the development of the OCSP:

Mitigation: Parks and Recreation

MM-PS-10 Regional Parks: The responsibility for rehabilitating existing regional parks and/or building new facilities, rests with the County of San Bernardino Parks Department. A Draft Ordinance has been prepared by the County Parks Department which will require developers to pay fees for future parks and open space. Developers within The Ontario Center shall comply with the City of Ontario's implementation of the County's fee ordinance for the collection of development fees for regional parks, trails, and open space if and when it is enacted.

MM-PS-11 Local Parks: A Park Development Fund Fee of $802/single family detached unit and $700/multiple family unit will be paid at the time of issuance of building permits.

MM-PS-12 Private recreational opportunities shall be encouraged for the commercial retail/industrial use areas.

v) Other public facilities?

Discussion of Effects: The site is in a developed area, currently served by the City of Ontario. The Project would not require the construction of any new facilities or alteration of any existing facilities or cause a decline in the levels of service, which could cause the need to construct new facilities. No impacts are anticipated.

Mitigation: None required.

16. RECREATION

Would the project:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that have an adverse physical effect on the environment?

Discussion of Effects: This Project is not proposing any significant new housing or large employment generator that would cause an increase in the use of neighborhood parks or other recreational facilities that have not already been analyzed as part of the OCSP or the Certified EIR and/or considered in the General Plan. Implementation of the proposed Project would not require the construction of neighborhood parks or other recreational facilities. No impacts are anticipated.

Mitigation: None required.

17. TRANSPORTATION/TRAFFIC

Would the project:

A Project-specific Traffic Impact Analysis was prepared by RK Engineering Group. The results are provided herein, and the technical study is included as Appendix A of this Addendum.

a) Conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

Discussion of Effects: The Project is in an area that is mostly developed with all street improvements existing. As noted in Table 3-3, the number of vehicle trips per day is forecast at 5,691 daily trips or 5.4 percent compared to the allowable 105,332 daily trips allowable per the OCSP for the site. Therefore, as noted in Section 3.5.5, Traffic and Circulation, the Project would not create a substantial increase in the number of vehicle trips, traffic volume or congestion at intersections and would not conflict with an applicable plan, ordinance, or policy addressing the circulation system, transit, roadway, bicycle, or pedestrian facilities. Less than significant impacts are anticipated. However, as part of the Certified EIR, the following MMs were imposed as part of the development of the OCSP:

Mitigation: Traffic and Transportation

MM-TRF-1 Buildout in the project vicinity of the proposed circulation system defined in the Specific Plan Amendment will occur.

MM-TRF-2 Development and implementation of a Transportation Systems Management (TSM) program with a goal of a ten percent reduction in peak hour trips will occur as defined the Specific Plan Amendment.

MM-TRF-3 Applicants for all future specific plans and specific plan amendments in the vicinity of The Ontario Center project will be required to complete traffic impact and mitigation studies to ensure that the forty (40) intersections studied this EIR will not exceed an intersection capacity utilization greater than Level of Service E.

With implementation of the applicable Certified EIR MMs, the Project would have a less than significant impact.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Discussion of Effects: As noted in Section 3.5.5.1, CEQA Vehicle Miles Traveled, the Project is found to have a less than significant impact regarding VMT.

Mitigation: None required.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Discussion of Effects: The Project would not create a substantial safety risk or interfere with air traffic patterns at Ontario International Airport as it either is outside of areas with FAA-imposed height restrictions or is under such height restrictions. No impacts are anticipated.

Mitigation: None required.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Discussion of Effects: The Project is in an area that is mostly developed. All street improvements are complete, and no alterations are proposed for adjacent intersections or arterials. The Project would, therefore, not create a substantial increase in hazards due to a design feature. No impacts are anticipated.

Mitigation: None required.

e) Result in inadequate emergency access?

Discussion of Effects: The Project would be designed to provide access for all emergency vehicles and would therefore not create an inadequate emergency access. No impacts are anticipated.

Mitigation: None required.

18. TRIBAL CULTURAL RESOURCES

Would the project:

a) Cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resources Code Section 21074?

Discussion of Effects: The proposed Project is in an area that has been previously disturbed by development. No known Tribal Cultural Resource sites exist within the Project area. Thus, tribal artifacts are not expected to be encountered during any excavation, grading, or construction activities.

Mitigation: None required.

19. UTILITIES AND SERVICE SYSTEMS

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Discussion of Effects: The proposed Project is served by the City of Ontario sewer system, which has waste treated by the Inland Empire Utilities Agency at the RP-1 and/or RP-5 treatment plant. The Project is required to meet the requirements of the Ontario Engineering Department regarding wastewater. Additionally, as noted in Section 2.3, Land Use and Development, the proposed Project would implement a Project at a much lower development intensity than the originally approved project under the OCSP and the Certified EIR. As such, no impacts are anticipated.

Mitigation: None required.

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Discussion of Effects: The proposed Project is served by the City of Ontario sewer system and which has waste treated by the Inland Empire Utilities Agency at the RP-1 and/or RP-5 treatment plant. RP-1 and/or RP-5 is not at capacity and this Project would not cause RP-1 and/or RP-5 to exceed capacity. The Project would, therefore, not require the construction of new wastewater treatment facilities, or the expansion of existing facilities. No impacts are anticipated.

Mitigation: None required.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Discussion of Effects: The proposed Project is served by the City of Ontario. The Project is required to meet the requirements of the Ontario Engineering Department regarding storm drain facilities. Because the Project is much less intense than the previously approved project on the same footprint, no impacts are anticipated.

Mitigation: None required.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? In making this determination, the City shall consider whether the project is subject to the water supply assessment requirements of Water Code Section 10910, et seq. (SB 610), and the requirements of Government Code Section 664737 (SB 221).

Discussion of Effects: The Project is served by the City of Ontario water system. There is currently a sufficient water supply available to the City of Ontario to serve this project. Additionally, as noted in Table 2-4, the Project is anticipated to require 316,027 GPD compared to the 727,888 GPD of the originally approved project and analyzed under Certified EIR. The proposed Project would require approximately 54 percent of the originally accounted for water demand. Although a less than significant impact is anticipated in this regard, the Certified EIR included the following MMs as part of the original OCSP analysis.

Mitigation: Water Supply

MM-UTL-1 All existing and future users will share in costs of supplemental city-wide water supply system.

MM-UTL-2 Reclaimed water, as it is available from CBMWD Regional Plant No. 4, will be used for open space irrigation when economically feasible.

MM-UTL-3 Cooperation between CBMWD, the City of Ontario, developers of The Ontario Center and other landowners will be necessary to ensure adequate capacity.

A less than significant impact would occur with implementation of MMs UTL-1 through UTL-3.

e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Discussion of Effects: The proposed Project is served by the City of Ontario sewer system, which has waste treated by the Inland Empire Utilities Agency at the RP-1 and/or RP-5 treatment plant. RP-1 and/or RP-5 is not at capacity and this project would not cause RP-1 and/or RP-5 to exceed capacity. Although no impact is anticipated in this regard, the Certified EIR included the following MMs as part of the original OCSP analysis.

Mitigation: Wastewater

MM-UTL-4 Design and construction of wastewater collection facilities within the Ontario Center will be completed under the jurisdiction of the City of Ontario.

MM-UTL-5 Any plans for use of the non-reclaim able waste line (NRW) system will be made known to the City and CBMWD.

MM-UTL-6 Wastewater collection facilities will be designed so that all parcels can be served by gravity mains without pumping.

MM-UTL-7 The Ontario Center project development will coordinate construction activities with the City of Ontario and CBMWD to assure adequate interceptor, trunk sewer and treatment plant capacity is available as development proceeds.

MM-UTL-8 Continued coordination between CBMWD, the City, developers of The Ontario Center, and other property owners/developers will occur to assure adequate capacity is available in the Cucamonga Interceptor as development occurs within the tributary area.

A less than significant impact would occur with implementation of MMs UTL-4 through UTL-8.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Discussion of Effects: City of Ontario serves the proposed Project. Currently, the City of Ontario contracts with a waste disposal company that transports trash to a landfill with sufficient capacity to handle the City's solid waste disposal needs. No impacts are anticipated. Although no impact is anticipated in this regard, the Certified EIR included the following MM as part of the original OCSP analysis.

Mitigation: Solid Waste

MM-UTL-9 Solid waste will be disposed of in Milliken Landfill. Upon closing of the Milliken Landfill, waste will be disposed of at the San Timoteo Landfill. A transfer station for the City will be constructed by the City in the next 2 to 3 years to transport waste from Ontario to the San Timoteo Landfill.

A less than significant impact would occur with implementation of MM UTL-9.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

Discussion of Effects: This Project would comply with federal, state, and local statutes and regulations regarding solid waste. Therefore, no impacts are anticipated.

Mitigation: None required.

20. Wildfire

Would the project:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

Discussion of Effects: According to the General Plan and CAL FIRE, the Project site is not located within a Very High, High, or Medium Fire Hazard area. The Project would not interfere with the City's Emergency Management Plan because it does not contain any features that would prohibit the execution of such plans. The Project would maintain the existing ingress and egress which were designed to accommodate existing and future growth of the site. No impacts are anticipated.

Mitigation: None required.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Discussion of Effects: Like most of southern California, the City of Ontario faces a diverse array of potential natural hazards. The General Plan notes that severe windstorms can pose a significant risk to property and life in the region by creating conditions that disrupt essential systems such as public utilities, telecommunications, and transportation routes. High winds, including Santa Ana winds, can cause damage to homes, businesses, landscaping, public property, and utilities, and pose threats to public safety, including accelerating a fire. The alluvial sand that underlies the majority of Ontario is generally granular, poorly consolidated, and very susceptible to erosion. In strong winds this sand can impact property, air quality and visibility. However, no special circumstances occur on the Project that do not occur in the rest of the City of region. No impact from wind hazards is anticipated to occur.

Mitigation: None required.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Discussion of Effects: All proposed Project components would be within the Project site property lines, and impacts associated with the development of the Project within this footprint area analyzed throughout this document and has been previously analyzed in the Certified EIR. No impacts are anticipated to occur.

Mitigation: None required.

d) Expose people or structures to significant risks, including downslope, or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Discussion of Effects: As previously analyzed in the Certified EIR, the Project site is not located in a landslide hazard area or a floodplain. No changes in findings in this regard would occur compared to those findings in the Certified EIR for the Project site. As such, no impact in this regard would occur.

Mitigation: None required.

21. MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat or a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Discussion of Effects: The site is located within an area that has been previously heavily disturbed, mass graded, and partially developed with various uses including multi-family residential DUs and commercial. The Project is not anticipated to have the potential to degrade the quality of the environment or reduce the overall habitat as there is no native habitat.

b) Does the project have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals?

Discussion of Effects: The Project does not have the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals. As shown throughout this addendum, the Project would not cause any more intense impacts than those already previously considered in the Certified EIR, CEA, POCA, and POOC environmental documents.

Mitigation: None required.

c) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current project, and the effects of probable future projects.)

Discussion of Effects: The Project does not have impacts that are cumulatively considerable that have not already been considered in the Certified EIR, CEA, POCA, and POOC environmental documents.

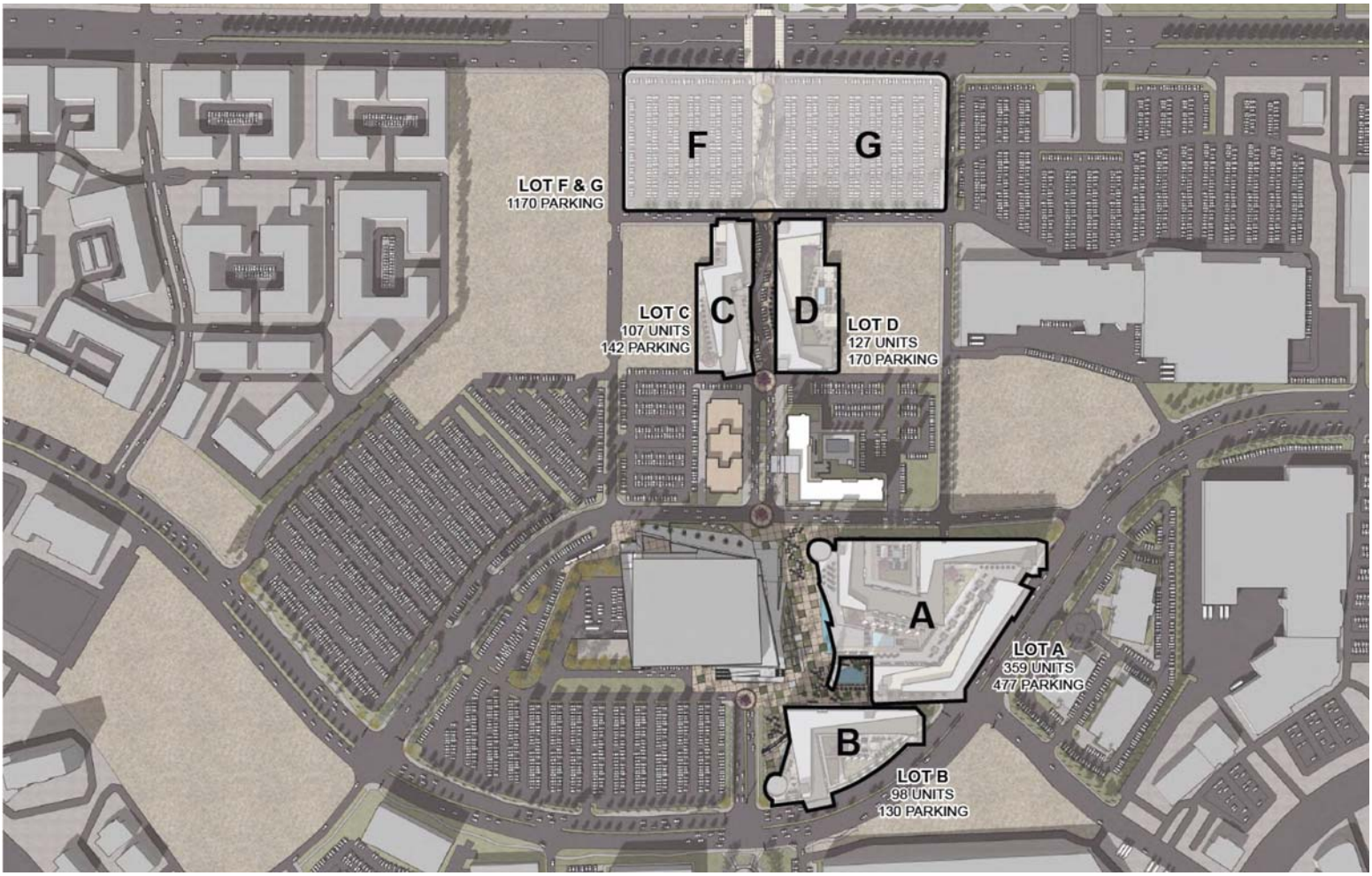
Mitigation: None required.

d) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

Discussion of Effects: The Project does not have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly.

Mitigation: None required.

TOYOTA ARENA MIXED-USE DEVELOPMENT
AIR QUALITY AND GREENHOUSE GAS IMPACT STUDY
City of Ontario



TOYOTA ARENA MIXED-USE DEVELOPMENT
AIR QUALITY AND GREENHOUSE GAS IMPACT STUDY
City of Ontario, California

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1.0 Introduction

The purpose of this air quality and greenhouse gas (GHG) impact study is to determine whether the estimated criteria air pollutants and greenhouse gas emissions generated from the construction and operation of the proposed Toyota Arena Mixed-Use Development (hereinafter referred to as project) would cause significant impacts to air resources.

This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The methodology follows the California Air Resources Board (CARB), the South Coast Air Quality Management District (SCAQMD), and City of Ontario recommendations for quantification of emissions and evaluation of potential impacts.

1.1 Site Location

The proposed project site is located adjacent to the Toyota Arena, north of Concourse Street and south of Fourth Street, in the City of Ontario.

The project site is located within the South Coast Air Basin (SCAB), the SCAQMD San Bernardino Valley General Forecast Area, and the Southwest San Bernardino Valley Air Monitoring Area-33.

The project site is located within the Ontario Center Specific Plan and zoned for Urban Commercial use. The City of Ontario General Plan land use map designates the project site as Mixed Use.

The project location map is provided in Exhibit A.

1.2 Project Description

The project consists of construction and operation of a mixed use town center development with residential and commercial/retail land use within four development lots.

The proposed project includes a total of 691 residential dwelling units, 71,200 square feet of commercial/retail uses and the demolition and relocation of approximately 1,170 surface parking spaces. The total project site area is approximately 18.73 acres.

The site plan used for this analysis, provided by the applicant, is illustrated in Exhibit B. Table 1 summarizes the land use assumptions used for this analysis.

Table 1
Land Use Summary

Lot	Dwelling Units	Retail (SF)[1]	Parking Spaces
A	359	25,256	477[2]
B	98	20,802	130[2]
C	107	11,047	142[2]
D	127	14,095	170[2]
E & F	--	--	1,170
Total	691	71,200	2,089

[1] S.F. – Square Feet
[2] Parking Structure

Construction of the project is estimated to begin in the year 2021 and last approximately 21 months. Construction activities are expected to consist of demolition, site preparation, grading, building construction, paving, and architectural coating. The project is expected to demolish an existing asphalt surface parking lot of approximately 7.48 acres within Lot A and Lot B.

The project is not expected to require the import or export of earthwork materials; preliminary grading estimates show a balanced site. The project is expected to be operational in the year 2023.

1.3 Sensitive Receptors

Sensitive receptors are considered land uses or other types of population groups that are more sensitive to air pollution exposure. Sensitive population groups include children, the elderly, the acutely and chronically ill, and those with cardio-respiratory diseases. For CEQA purposes, the SCAQMD considers a sensitive receptor to be a location where a sensitive individual could remain for 24-hours or longer, such as residences, hospitals, and schools (etc), as described in the Localized Significance Threshold Methodology (SCAQMD 2008a, page 3-2).

The nearest sensitive land uses to the project site include the following:

- Existing residential dwelling units located approximately 150 feet north of Lot G, across Fourth Street.

- Existing residential dwelling units located approximately 475 feet to the west of Lot F.

1.4 Summary of Air Quality and Greenhouse Gas Impacts

Table 2 provides a summary of the CEQA air quality impact analysis results.

Table 2
CEQA Air Quality Impact Criteria

Air Quality Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact
Would the project:				
a) Conflict with, or obstruct implementation of, the applicable air quality plan?			**X**	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard?			X	
d) Expose sensitive receptors to substantial pollutant concentrations?			**X**	
e) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			**X**	

Table 3 provides a summary of the CEQA GHG impact criteria analysis results.

Table 3
CEQA GHG Impact Criteria

GHG Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of greenhouse gases?			X	

1.5 Recommended Design Features

This section provides a summary of the recommended design features that are expected to be included as part of the project description and design and have been identified to help reduce the project's impact from air quality and GHG emissions. The recommended project design features include several standard rules and requirements, best practices, and common project design features for reducing air quality emissions.

Construction Design Features:

DF-1 Prepare and implement a Construction Management Plan which will include Best Available Control Measures to be submitted to the City of Ontario.

DF-2 Follow the standard SCAQMD rules and requirements with regards to fugitive dust control, which includes, but are not limited to the following:

1. All active construction areas shall be watered two (2) times daily.
2. Speed on unpaved roads shall be reduced to less than 15 mph.
3. Any visible dirt deposition on any public roadway shall be swept or washed at the site access points within 30 minutes.
4. Any on-site stockpiles of debris, dirt or other dusty material shall be covered or watered twice daily.
5. All operations on any unpaved surface shall be suspended if winds exceed 15 mph.
6. Access points shall be washed or swept daily.
7. Construction sites shall be sandbagged for erosion control.

8. Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
9. Cover all trucks hauling dirt, sand, soil, or other loose materials, and maintain at least 2 feet of freeboard space in accordance with the requirements of California Vehicle Code (CVC) section 23114.
10. Pave or gravel construction access roads at least 100 feet onto the site from the main road and use gravel aprons at truck exits.
11. Replace the ground cover of disturbed areas as quickly possible.
12. A fugitive dust control plan should be prepared and submitted to SCAQMD prior to the start of construction.

DF-3 All diesel construction equipment shall have Tier 4 low emission "clean diesel" engines (OEM or retrofit) that include diesel oxidation catalysts and diesel particulate filters that meet the latest CARB best available control technology.

DF-4 Construction equipment shall be maintained in proper tune.

DF-5 All construction vehicles shall be prohibited from excessive idling. Excessive idling is defined as five (5) minutes or longer.

DF-6 Minimize the simultaneous operation of multiple construction equipment units.

DF-7 The use of heavy construction equipment and earthmoving activity shall be suspended during Air Alerts when the Air Quality Index reaches the "Unhealthy" level.

DF-8 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

DF-9 Utilize zero VOC and low VOC paints and solvents, wherever possible.

Operational Design Features:

DF-10 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

DF-11 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-12 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-13 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-14 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-15 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-16 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

DF-17 Provide electric vehicle charging stations per the requirements of CALGreen.

2.0 Air Quality Setting

The Federal Clean Air Act (§ 7602) defines air pollution as any agent or combination of such agents, including any physical, chemical, biological, or radioactive substance which is emitted into or otherwise enters the ambient air. Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution. Air pollution can cause disease, allergies and even death. It affects soil, water, crops, vegetation, manmade materials, animals, wildlife, weather, visibility, and climate. It can also cause damage to and deterioration of property, present hazards to transportation, and negatively impact the economy.

This section provides background information on criteria air pollutants, the applicable federal, state and local regulations concerning air pollution, and the existing physical setting of the project within the context of local air quality.

2.1 Description of Air Pollutants[1].

The following section describes the air pollutants of concern related to the project. Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health. The following descriptions of criteria air pollutants have been provided by the SCAQMD.

- **Carbon Monoxide (CO)** is a colorless, odorless, toxic gas produced by incomplete combustion of carbon-containing fuels (e.g., gasoline, diesel fuel, and biomass). Sources include motor vehicle exhaust, industrial processes (metals processing and chemical manufacturing), residential wood burning, and natural sources. CO is somewhat soluble in water; therefore, rainfall and fog can suppress CO conditions. CO enters the body through the lungs, dissolves in the blood, and competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for carbon monoxide is intended to protect persons whose medical condition already compromises their circulatory system's ability to deliver oxygen. These medical conditions include certain heart ailments, chronic lung diseases, and anemia. Persons with these conditions have reduced exercise capacity even when exposed to relatively low levels of CO. Fetuses are at risk because their blood has an even greater affinity to bind with CO. Smokers are also at risk from ambient CO levels because smoking

[1] SCAQMD. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning (May 6, 2005)

increases the background level of CO in their blood. The South Coast basin has recently achieved attainment status for carbon monoxide by both USEPA and CARB.

- **Nitrogen Dioxide (NO_2)** is a byproduct of fuel combustion. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts quickly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_x. NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in young children has also been observed at concentrations below 0.3 parts per million (ppm). NO_2 absorbs blue light which results in a brownish red cast to the atmosphere and reduced visibility. Although NO_2 concentrations have not exceeded national standards since 1991 and the state hourly standard since 1993, NO_x emissions remain of concern because of their contribution to the formation of O_3 and particulate matter.

- **Ozone (O_3)** is one of several substances called photochemical oxidants that are formed when volatile organic compounds (VOC) and NO_x react in the presence of ultraviolet sunlight. O_3 concentrations in the South Coast basin are typically among the highest in the nation, and the damaging effects of photochemical smog, which is a popular name for a number of oxidants in combination, are generally related to the concentrations of O_3. Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the subgroups most susceptible to O_3 effects. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. In recent years, a correlation between elevated ambient O_3 levels and increases in daily hospital admission rates, as well as mortality, has also been reported. The South Coast Air Basin is designated by the USEPA as an extreme non-attainment area for ozone. Although O_3 concentrations have declined substantially since the early 1990s, the South Coast basin continues to have peak O_3 levels that exceed both state and federal standards.

- **Fine Particulate Matter (PM_{10})** consists of extremely small, suspended particles or droplets 10 microns or smaller in diameter that can lodge in the lungs, contributing to respiratory problems. PM_{10} arises from such sources as re-entrained road dust, diesel soot, combustion products, tire and brake abrasion, construction operations, and fires. It is also formed in the atmosphere from NO_x and SO_2 reactions with ammonia. PM_{10} scatters light and significantly reduces visibility. Inhalable particulates

pose a serious health hazard, alone or in combination with other pollutants. More than half of the smallest particles inhaled will be deposited in the lungs and can cause permanent lung damage. Inhalable particulates can also have a damaging effect on health by interfering with the body's mechanism for clearing the respiratory tract or by acting as a carrier of an absorbed toxic substance. The South Coast basin has recently achieved federal attainment status for PM_{10}, but is non-attainment based on state requirements.

- **Ultra-Fine Particulate Matter ($PM_{2.5}$)** is defined as particulate matter with a diameter less than 2.5 microns and is a subset of PM_{10}. $PM_{2.5}$ consists mostly of products from the reaction of NO_x and SO_2 with ammonia, secondary organics, finer dust particles, and the combustion of fuels, including diesel soot. $PM_{2.5}$ can cause exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease, declines in pulmonary function growth in children, and increased risk of premature death from heart or lung diseases in the elderly. Daily fluctuations in $PM_{2.5}$ levels have been related to hospital admissions for acute respiratory conditions, school absences, and increased medication use in children and adults with asthma. The South Coast basin is designated as non-attainment for $PM_{2.5}$ by both federal and state standards.

- **Sulfur dioxide (SO_2)** is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children. Individuals with asthma may experience constriction of airways with exposure to SO_2. Though SO_2 concentrations have been reduced to levels well below state and federal standards, further reductions in SO_2 emissions are needed because SO_2 is a precursor to sulfate and PM_{10}. The South Coast basin is considered a SO_2 attainment area by USEPA and CARB.

- **Lead (Pb)** is a toxic heavy metal that can be emitted into the air through some industrial processes, burning of leaded gasoline and past use of lead-based consumer products. Lead is a neurotoxin that accumulates in soft tissues and bones, damages the nervous system, and causes blood disorders. It is particularly problematic in children, in that permanent brain damage may result, even if blood levels are promptly normalized with treatment. Concentrations of lead once exceeded the state and federal air quality standards by a wide margin, but as a result of the removal of lead from motor vehicle gasoline, ambient air quality standards for lead have not been exceeded since 1982. Though special monitoring sites immediately downwind of lead sources recorded localized violations of the state standard in 1994, no violations have been recorded since. Consequently, the South Coast basin is designated as an attainment area for lead by both the USEPA and CARB. This report

does not analyze lead emissions from the project, as it is not expected to emit lead in any significant measurable quantity.

- **Volatile Organic Compounds (VOC),** although not actually a criteria air pollutant, VOCs are regulated by the SCAQMD because they cause chemical reactions which contribute to the formation of ozone. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM_{10} and lower visibility levels. Sources of VOCs include combustion engines, and evaporative emissions associated with fuel, paints and solvents, asphalt paving, and the use of household consumer products such as aerosols. Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOC. Some hydrocarbon components classified as VOC emissions are hazardous air pollutants. Benzene, for example, is a hydrocarbon component of VOC emissions that are known to be a human carcinogen. The term reactive organic gases (ROG) are often used interchangeably with VOC.

- **Toxic Air Contaminants (TACs)** are defined as air pollutants which may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health, and for which there is no concentration that does not present some risk. This contrasts with the criteria pollutants, in that there is no threshold level for TAC exposure below which adverse health impacts are not expected to occur. The majority of the estimated health risk from TACs can be attributed to a relatively few compounds, the most common being diesel particulate matter (DPM) from diesel engine exhaust. In addition to DPM, benzene and 1,3-butadiene are also significant contributors to overall ambient public health risk in California.

2.2 Federal and State Ambient Air Quality Standards

The Federal Clean Air Act, which was last amended in 1990, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for criteria pollutants considered harmful to public health and the environment. The State of California has also established additional and more stringent California Ambient Air Quality Standards (CAAQS) in addition to the seven criteria pollutants designated by the federal government.

AAQS are designed to protect the health and welfare of the populace with a reasonable margin of safety. The standards are divided into two categories, primary standards, and secondary standards. Primary standards are implemented to provide protection for the "sensitive" populations such as those with asthma, or the children and elderly. Secondary standards are to provide protection against visible pollution as well as damage to the surrounding environment, including animals, crops, and buildings.

Table 4 shows the Federal and State Ambient Air Quality Standards.

Table 4
Federal and State Ambient Air Quality Standards (AAQS)[1]

Air Pollutant	Averaging Time [2]	Federal Standard (NAAQS)[2]	California Standard (CAAQS)[2]
Ozone	1 Hour	--	0.09 ppm
	8 Hour	0.070 ppm	0.070 ppm
Carbon Monoxide (CO)	1 Hour	35 ppm	20 ppm
	8 Hour	9 ppm	9 ppm
Nitrogen Dioxide (NO_2)	1 Hour	0.100 ppm	0.18 ppm
	Annual	0.053 ppm	0.030 ppm
Sulfur Dioxide (SO_2)	1 Hour	0.075 ppm	0.25 ppm
	3 Hour	0.5 ppm[3]	--
	24 Hour	--	0.04 ppm
Particulate Matter (PM_{10})	24 Hour	150 μg/m^3	50 μg/m^3
	Mean	--	20 μg/m^3
Particulate Matter (PM2.5)	24 Hour	35 μg/m^3	--
	Annual	12 μg/m^3	12 μg/m^3
Lead	30-day	--	1.5 μg/m
	Quarter	1.5 μg/m	--
	3-month average	0.15 μg/m	--
Visibility reducing particles	8 Hour	--	0.23/km extinction coefficient. (10-mile visibility standard)
Sulfates	24 Hour	--	25 μg/m
Vinyl chloride	24 Hour	--	0.01 ppm
Hydrogen sulfide	24 Hour	--	0.03 ppm

[1] Source: USEPA: https://www.epa.gov/criteria-air-pollutants/naaqs-table and
CARB: https://ww2.arb.ca.gov/resources/california-ambient-air-quality-standards

[2] ppm = parts per million of air, by volume; µg/m3 = micrograms per cubic meter; Annual = Annual Arithmetic Mean; 30-day = 30-day average; Quarter = Calendar quarter.

[3] Secondary standards

Several pollutants listed in Table 4 are not addressed in this analysis. Lead is not included because the project is not anticipated to emit lead. Visibility-reducing particles are not explicitly addressed in this analysis because particulate matter is addressed. The project is not expected to generate or be exposed to vinyl chloride because proposed project uses do not utilize the chemical processes that create this pollutant and there are no such uses in the project vicinity. The proposed project is not expected to cause exposure to hydrogen sulfide because it would not generate hydrogen sulfide in any substantial quantity.

2.3 Attainment Status

The Clean Air Act requires states to prepare a State Implementation Plan (SIP) to ensure air quality meets the NAAQS. The California Air Resources Board (CARB) provides designations of attainment for air basins where AAQS are either met or exceeded. If the AAQS are met, the area is designated as being in "attainment", if the air pollutant concentrations exceed the AAQS, than the area is designated as being "nonattainment". If there is inadequate or inconclusive data to make a definitive attainment designation, the area is considered "unclassified."

National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the three-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard.

When a state submits a request to the EPA to re-designate a nonattainment area to attainment, the Clean Air Act (CAA) section 175A(a) requires that the state (or states, if the area is a multi-state area) submit a maintenance plan ensuring the area can maintain the air quality standard for which the area is to be re-designated for at least 10 years following the effective date of re-designation.

Table 5 lists the attainment status for the criteria pollutants in the South Coast Air Basin (SCAB).

Table 5
South Coast Air Basin Attainment Status[1]

Pollutant	State Status	National Status
Ozone	Nonattainment	Nonattainment (Extreme)[2]
Carbon monoxide	Attainment	Attainment (Maintenance)
Nitrogen dioxide	Attainment	Attainment (Maintenance)
PM_{10}	Nonattainment	Attainment (Maintenance)
$PM_{2.5}$	Nonattainment	Nonattainment
Lead	Attainment	Nonattainment (Partial)[3]

[1] Source: California Air Resources Board. http://www.arb.ca.gov/desig/adm/adm.htm
[2] 8-Hour Ozone.
[3] Partial Nonattainment designation – Los Angeles County portion of Basin only.

2.4 South Coast Air Quality Management District (SCAQMD)

The agency responsible for air pollution control for the South Coast Air Basin (SCAB) is the South Coast Air Quality Management District (SCAQMD). SCAQMD is responsible for controlling emissions primarily from stationary sources. SCAQMD maintains air quality monitoring stations throughout the SCAB. SCAQMD, in coordination with the Southern California Association of Governments, is also responsible for developing, updating, and implementing the Air Quality Management Plan (AQMP) for the SCAB. An AQMP is a plan prepared and implemented by an air pollution district for a county or region designated as nonattainment of the federal and/or California ambient air quality standards. The term nonattainment area is used to refer to an air SCAB where one or more ambient air quality standards are exceeded.

The latest version is the 2016 AQMP. The 2016 AQMP is a regional blueprint for achieving the federal air quality standards and healthful air. While air quality has dramatically improved over the years, the SCAB still exceeds federal public health standards for both ozone and particulate matter (PM) and experiences some of the worst air pollution in the nation. The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the NAAQS are not met on time.

According to the 2016 AQMP, the most significant air quality challenge in the SCAB is to reduce nitrogen oxide (NOx) emissions sufficiently to meet the upcoming ozone standard deadlines. Based on the inventory and modeling results, 522 tons per day (tpd) of total

SCAB NOx 2012 emissions are projected to drop to 255 tpd and 214 tpd in the 8-hour ozone attainment years of 2023 and 2031 respectively, due to continued implementation of already adopted regulatory actions ("baseline emissions"). The analysis suggests that total SCAB emissions of NOx must be reduced to approximately 141 tpd in 2023 and 96 tpd in 2031 to attain the 8-hour ozone standards. This represents an additional 45 percent reduction in NOx in 2023, and an additional 55 percent NOx reduction beyond 2031 levels.[2]

2.4.1 SCAQMD Rules and Regulations

The SCAQMD establishes a program of rules and regulations to obtain attainment of the state and federal standards in conjunction with the AQMP. Several of the rules and regulations that may be applicable to this project include, but are not limited to, the following:

- **SCAQMD Rule 402** prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

- **SCAQMD Rule 403** governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

- **SCAQMD Rule 445** restricts wood burning devices from being installed into any new development and is intended to reduce the emissions of particulate matter for wood burning devices.

- **SCAQMD Rule 1113** governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and

[2] SCAQMD. Final 2016 Air Quality Management Plan. http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp

solvents used during construction and operation of project must comply with Rule 1113.

- **SCAQMD Rule 1143** governs the manufacture, sale, and use of paint thinners and solvents used in thinning of coating materials, cleaning of coating application equipment, and other solvent cleaning operations by limiting their VOC content. This rule regulates the VOC content of solvents used during construction. Solvents used during the construction phase must comply with this rule.

- **SCAQMD Rule 1186** limits the presence of fugitive dust on paved and unpaved roads and sets certification protocols and requirements for street sweepers that are under contract to provide sweeping services to any federal, state, county, agency or special district such as water, air, sanitation, transit, or school district.

2.5 Local Climate and Meteorology

The project is located in the South Coast Air Basin (SCAB). Climatological data from the nearest weather station to the project site is summarized in Table 6.

Table 6
Meteorological Summary[1]

Month	Temperature (˚F)			Mean Precipitation (inches)
	Max.	Min.	Mean	
January	66.8	44.0	55.5	3.65
February	69.4	45.0	57.2	2.85
March	70.1	46.3	58.2	2.80
April	74.5	48.4	61.5	1.13
May	79.9	52.6	66.2	0.26
June	86.7	56.6	71.7	0.04
July	95.0	62.2	78.6	0.01
August	94.4	62.9	78.7	0.11
September	91.3	61.3	76.3	0.34
October	83.0	55.4	69.2	0.34
November	73.6	48.5	61.0	1.72
December	68.3	44.4	56.3	2.07
Annual	**79.4**	**52.3**	**65.9**	**15.32**

[1] Source: Western Regional Climate Center 2012. Averages derived from measurements recorded from 1951 to 1984 at Fontana Kaiser Station No. 043120.

2.6 Local Air Quality

The air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates of the existing emissions in the Basin provided in the Final 2016 Air Quality Management Plan, prepared by SCAQMD, March 2017, indicate that collectively, mobile sources account for 60 percent of the VOC, 90 percent of the NOx emissions, 95 percent of the CO emissions and 34 percent of directly emitted PM2.5, with another 13 percent of PM2.5 from road dust.

The SCAQMD has divided the SCAB into fourteen general forecasting areas and thirty eight Source Receptor Areas (SRA) for monitoring and reporting local air quality. The SCAQMD provides daily reports of the current air quality conditions in each general forecast area and SRA. The monitoring areas provide a general representation of the local meteorological, terrain, and air quality conditions within the SCAB.

The project is located within the San Bernardino Valley general forecasting area and Southwest San Bernardino Valley (SRA-33). The Southwest San Bernardino Valley has been divided into two (2) regions; I-10 Near Road and CA-60 Near Road. Due to the close proximity of the project site to the I-10 Road, published air quality monitoring data has been used from this location.

Table 7 summarizes the published air quality monitoring for the most recent 3-year period available. These pollutant levels were used to comprise a "background" for the project location and existing local air quality. For criteria pollutants not monitored near the site, data from the nearest monitoring station with a comparable setting were used.

Table 7
Local Air Quality

Air Pollutant Location	Averaging Time	Item	2017	2018	2019
Carbon Monoxide -- I-10 Near Road	1 Hour	Max 1-Hour (ppm)	4.2	1.6	1.5
		Exceeded State Standard (20 ppm)	No	No	No
		Exceeded National Standard (35 ppm)	No	No	No
	8 Hour	Max 8 Hour (ppm)	1.3	1.3	1.1
		Exceeded State Standard (9 ppm)	No	No	No
		Exceeded National Standard (9 ppm)	No	No	No
Ozone -- Central San Bernardino Valley-1	1 Hour	Max 1-Hour (ppm)	0.137	0.141	0.124
		Days > State Standard (0.09 ppm)	33	38	41
	8 Hour	Max 8 Hour (ppm)	0.118	0.116	0.114
		Days > State Standard (0.07 ppm)	49	69	67
		Days >National Standard (0.070 ppm)	49	69	67
Nitrogen Dioxide -- I-10 Near Road	1 Hour	Max 1-Hour (ppm)	0.086	0.0883	0.0863
		Exceeded State Standard (0.18 ppm)	No	No	No
	Annual	Annual Average (ppm)	0.0288	0.0272	0.0276
		Exceeded >State Standard (0.030 ppm)	No	No	No
		Exceeded >National Standard (0.053 ppm)	No	No	No
Sulfur Dioxide -- Central San Bernardino Valley-1	1 Hour	Max 1 Hour (ppm)	0.0039	0.0029	0.0024
		Exceed State Standard (0.25 ppm)	No	No	No
		Exceed National Standard (0.075 ppm)	No	No	No
Coarse Particles (PM10) -- Central San Bernardino Valley-1	24 Hour	Max 24-Hour ($\mu g/m^3$)	75	64	88
		Days > State Standard (50 $\mu g/m^3$)	2	9	12
		Days >National Standard (150 $\mu g/m^3$)	0	0	0
	Annual	Annual Average ($\mu g/m^3$)	39.3	34.1	34.8
		Exceeded State Standard (20 $\mu g/m^3$)	Yes	Yes	Yes
Fine Particulates (PM2.5) -- Central San Bernardino Valley-1	24 Hour	Max 24-Hour ($\mu g/m^3$)	39.2	29.2	46.5
		Days >National Standard (35 $\mu g/m^3$)	1	0	2
	Annual	Annual Average ($\mu g/m^3$)	12.04	11.13	10.84
		Exceeded State Standard (12 $\mu g/m^3$)	No	No	No
		Exceeded National Standard (15 $\mu g/m^3$)	No	No	No

Source : https://www.aqmd.gov/home/air-quality/historical-air-quality-data/historical-data-by-year
$\mu g/m^3$ = micrograms per cubic meter
ARB = California Air Resource Board
EPA= Environmental Protection Agency
ppm = part per million
(- -) = Data not provided

3.0 Global Climate Change Setting

Global climate change is the change in the average weather of the earth that is measured by such things as alterations in temperature, wind patterns, storms, and precipitation. Current data shows that the recent period of warming is occurring more rapidly than past geological events. The average global surface temperature has increased by approximately 1.4° Fahrenheit since the early 20th Century. 1.4° Fahrenheit may seem like a small change, but it's an unusual event in Earth's recent history, and as we are seeing, even small changes in temperature can cause enormous changes in the environment.

The planet's climate record, preserved in tree rings, ice cores, and coral reefs, shows that the global average temperature has been stable over long periods of time. For example, at the end of the last ice age, when the Northeast United States was covered by more than 3,000 feet of ice, average global temperatures were only 5° to 9° Fahrenheit cooler than today. The Intergovernmental Panel on Climate Change (IPCC), which includes more than 1,300 scientists from the United States and other countries, forecasts a temperature rise of 2.5° to 10° Fahrenheit over the next century. Therefore, significant changes to the environment are expected in the near future.

The consequences of global climate change include more frequent and severe weather, worsening air pollution by increasing ground level ozone, higher rates of plant and animal extinction, more acidic and oxygen depleted oceans, strain on food and water resources, and threats to densely populated coastal and low lying areas from sea level rise.

The impacts of climate change are already visible in the Southwest United States. In California, the consequences of climate change include;

- A rise in sea levels resulting in the displacement of coastal businesses and residencies
- A reduction in the quality and supply of water from the Sierra snowpack
- Increased risk of large wildfires
- Exacerbation of air quality problems
- Reductions in the quality and quantity of agricultural products
- An increased temperature and extreme weather events
- A decrease in the health and productivity of California's forests

3.1 Greenhouse Gases

GHGs comprise less than 0.1 percent of the total atmospheric composition, yet they play an essential role in influencing climate. Greenhouse gases include naturally occurring compounds such as carbon dioxide (CO_2), methane (CH_4), water vapor (H_2O), and nitrous oxide (N_2O), while others are synthetic. Man-made GHGs include the chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs), as well as sulfur hexafluoride (SF_6). Different GHGs have different effects on the Earth's warming. GHGs differ from each other in their ability to absorb energy (their "radiative efficiency") and how long they stay in the atmosphere, also known as the "lifetime".

The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of CO_2. The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period. The time period usually used for GWPs is 100 years. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases and allows policymakers to compare emissions reduction opportunities across sectors and gases.

Table 8 lists the 100-year GWP of GHGs from the Intergovernmental Panel on Climate Change (IPCC) fifth assessment report (AR5).

Table 8
Global Warming Potential of Greenhouse Gases[1, 2]

Gas Name	Formula	Lifetime (years)	GWP
Carbon Dioxide	CO_2		1
Methane	CH_4	12	28
Nitrous Oxide	N_2O	114	265
Sulphur Hexafluoride	SF_6	3200	23,500
Nitrogen Trifluoride	NF_3	740	16,100
Hexafluoroethane (PFC-116)	C_2F_6	10,000	11,100
Octafluoropropane (PFC-218)	C_3F_8	2,600	8,900
Octafluorocyclobutane (PFC-318)	C_4F_8	3,200	9,540
Tetrafluoromethane (PFC-14)	CF_4	50,000	6,630
Hydrofluorocarbon 125	HFC-125	29	3,170
Hydrofluorocarbon 134a	HFC-134a	14	1,300
Hydrofluorocarbon 143a	HFC-143a	52	4,800
Hydrofluorocarbon 152a	HFC-152a	1	138
Hydrofluorocarbon 227ea	HFC-227ea	34	3,350
Hydrofluorocarbon 23	HFC-23	270	12,400
Hydrofluorocarbon 236fa	HFC-236fa	240	8,060
Hydrofluorocarbon 245fa	HFC-245fa	8	858
Hydrofluorocarbon 32	HFC-32	5	677
Hydrofluorocarbon 365mfc	HFC-365mfc	9	804
Hydrofluorocarbon 43-10mee	HFC-43-10mee	16	1,650

[1] Source: IPCC Fifth Assessment Report (AR5)
https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter08_FINAL.pdf
[2] GWPs are used to convert GHG emission values to "carbon dioxide equivalent" (CO_2e) units

3.2 GHG Regulatory Setting – State of California

The State of California has been a leader in climate change legislation and has passed numerous bills to reduce greenhouse gas emissions across all sectors of the economy. Some of the key climate legislation in the State include the following:

- **Assembly Bill (AB) 32, California Global Warming Solutions Act of 2006.** AB 32 set the stage for the State's transition to a sustainable, low-carbon future. AB 32 was the first program in the country to take a comprehensive, long-term approach to addressing climate change.[3]

- **Senate Bill (SB) 375, Sustainable Communities & Climate Protection Act of 2008.** SB 375 requires the Air Resources Board to develop regional greenhouse gas emission reduction targets for passenger vehicles GHG reduction targets for 2020 and 2035 for each region covered by the State's 18 metropolitan planning organizations.[4]

- **Senate Bill (SB) 100, California Renewables Portfolio Standard Program.** SB 100 established a landmark policy requiring renewable energy and zero-carbon resources supply 100 percent of electric retail sales to end-use customers by 2045.[5]

3.3 GHG Emissions Inventory

Table 9 shows the latest GHG emission inventories at the national, state, regional and local levels.

Table 9
GHG Emissions Inventory[1]

United States (2018)[2]	State of California (2018)[3]	SCAG (2020)[4]	City of Ontario (2020)[5]
6,678 $MMTCO_2e$	425 $MMTCO_2e$	216.4 $MMTCO_2e$	3.12 $MMTCO_2e$

[1] $MMTCO_2e$ = Million Metric Tons of Carbon Dioxide Equivalent
[2] https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks
[3] https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2018/ghg_inventory_trends_00-18.pdf
[4] http://www.scag.ca.gov/programs/Pages/GreenhouseGases.aspx
[5] City of Ontario Community Climate Action Plan, November 2014. Estimated value.

[3] California Air Resources Board. AB 32 Global Warming Solutions Act of 2006. https://ww2.arb.ca.gov/resources/fact-sheets/ab-32-global-warming-solutions-act-2006
[4] California Air Resources Board. Sustainable Communities and Climate Protection Program. https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-climate-protection-program/about
[5] California Energy Commission. SB 100 Joint Agency Report. https://www.energy.ca.gov/sb100

4.0 Modeling Parameters and Assumptions

The California Emissions Estimator Model Version 2020.4.0 (CalEEMod) was used to calculate criteria air pollutants and GHG emissions from the construction and operation of the project. CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify criteria air pollutant and GHG emissions.

The model quantifies direct emissions from construction and operation activities (including vehicle use), as well as indirect emissions, such as GHG emissions from off-site energy generation, solid waste disposal, vegetation planting and/or removal, and water use. The model also identifies design features to reduce criteria pollutant and GHG emissions. The model was developed for the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the California air districts.

4.1 Construction Assumptions

Construction of the project is estimated to begin in the year 2021 and last approximately 21 months. Construction activities are expected to consist of demolition, site preparation, grading, building construction, paving, and architectural coating. The project is expected to be operational in the year 2023. For purposes of this analysis, construction phases are not expected to overlap.

The project is expected to demolish an existing asphalt surface parking lot of approximately 7.48 acres within Lot A and Lot B. The project is not expected to require the import or export any earthwork material during grading phase; preliminary earthwork estimates show a balanced site.

Assumptions for off-road equipment usage, soil disturbance area, worker and vendor trips, paving, and architectural coatings utilize the CalEEMod defaults.

The project will be required to comply with several standard fugitive dust control measures, per SCAQMD Rule 403. The following key inputs are utilized in CalEEMod and are based upon data provided from SCAQMD[6]:

- Utilize soil stabilizers - 30% PM_{10} and $PM_{2.5}$ reduction.

[6] SCAQMD. Fugitive Dust Mitigation Measures. http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

- Replace ground cover - 15% PM_{10} and $PM_{2.5}$ reduction.
- Water exposed areas 2x per day.
- Unpaved road moisture content – 25%.
- Unpaved road vehicle speed – 15 mph.

4.2 Operational Assumptions

Operational emissions occur over the life of the project and are considered "long-term" sources of emissions. Operational emissions include both direct and indirect sources. This section briefly describes the operational sources of emissions analyzed for the project.

4.2.1 Mobile Source Emissions

Mobile source emissions are the largest source of long-term air pollutants from the operation of the project. Mobile sources are direct sources of project emissions that are primarily attributed to tailpipe exhaust and road dust (tire, brake, clutch, and road surface wear) from motor vehicles traveling to and from the site.

Estimates of mobile source emissions require information on four parameters: trip generation, trip length, vehicle/fleet mix, and emission factors (quantity of emission for each mile traveled or time spent idling by each vehicle).

The trip generation rates, trip length and trip percentages for this project are based on the latest version of the Toyota Arena Mixed Use Development Traffic Impact Study Scoping Agreement, by RK, May 2021 and San Bernardino County Transportation Authority (SBCTA) VMT Tool[7].

The Emission Factors (EMFAC2017) 2017 model and off-model adjustments factors to account for the SAFE Vehicle Rule is used to estimate the mobile source emissions are embedded in the CalEEMod emissions model. No adjustments have been made to default emission factors.

The project's total vehicle miles traveled estimated by CalEEMod is shown in the Table 10 for this project.

[7] SBCTA VMT Screening Tool. https://devapps.fehrandpeers.com/sbctavmt/

Table 10
Operational Vehicle Miles Traveled

Land Use	Annual Vehicle Miles Traveled (VMT)
Multifamily Mid-Rise[1]	5,682,657
Commercial/Retail Center	4,539,098
Total	**10,221,754**

[1] The VMT estimates for residential home-based trips are based on estimates from the SBCTA VMT Tool, which shows daily home-based VMT per capita for TAZ 53690101 of 7.9 VMT per population for model year 2023.

The operational vehicle fleet mix has been adjusted to reflect vehicle types used for typical residential home-based trips and the commercial/retail and office trips generated by the project. The Southern California Association of Governments (SCAG) regional travel demand model does not include heavy-duty trucks, buses or other large vehicles that would require passenger car equivalent (PCE) adjustments for residential home-based trips. The project does not consist of land uses that would typically require PCE adjustments to account for large trucks, such as warehousing.

To be conservative, the Air Quality/GHG analysis has assumed that 2% of the total residential home-based trips and commercial/retail and office trips will include trucks with a gross vehicle weight rating (GVWR) of 10,000 pound or greater. This includes LHD2, MHD, HHD, OBUS, UBUS, and SBUS vehicles. The 2% mix is also consistent with the default Highway Capacity Manual (HCM) assumptions. The adjusted vehicle mix is proportioned according to the default CalEEMod vehicle mix.

Table 11 summarizes vehicle mix used for this project.

Table 11
Vehicle Mix for Trips[1]

YUY	Vehicle Mix (%)
Light Duty Automobile (LDA)	55.05%
Light Duty Truck (LDTI)	5.72%
Light Duty Truck (LDT2)	17.64%
Medium Duty Truck (MDV)	14.23%
Light Heavy Truck (LHD1)	2.76%
Light Heavy Truck (LHD2)	0.34%
Medium Heavy Truck (MHD)	0.53%
Heavy Heavy Truck (HHD)	0.81%
Other Bus (OBUS)	0.03%
Urban Bus (UBUS)	0.01%
Motorcycle (MCY)	2.59%
School Bus (SBUS)	0.04%
Motor Home (MH)	0.24%
Total	**100.0%**

[1] Adjusted fleet mix to include 2% total trucks over 10,000 lbs GVWR. (LHD2, MHD, HHD, OBUS, UBUS, SBUS, MH)

5.0 Significance Thresholds

5.1 Air Quality Regional Significance Thresholds

The SCAQMD has established air quality emissions thresholds for criteria air pollutants for the purposes of determining whether a project may have a significant effect on the environment per Section 15002(g) of the Guidelines for implementing CEQA. By complying with the thresholds of significance, the project would be in compliance with the SCAQMD Air Quality Management Plan (AQMP) and the federal and state air quality standards.

Table 12 lists the air quality significance thresholds for the six air pollutants analyzed in this report. Lead is not included as part of this analysis as the project is not expected to emit lead in any significant measurable quantity.

Table 12
SCAQMD Regional Significance Air Quality Thresholds

Pollutant	Construction (lbs/day)	Operation (lbs/day)
NO_X	100	55
VOC	75	55
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
CO	550	550

[1] Source: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf

5.2 City of Ontario General Plan

The City of Ontario describes several goals and policies for addressing air quality and greenhouse gas in the General Plan ER4 Air Quality. The following policy goals are aimed at providing guidance and policy direction in providing better indoor and outdoor air quality for Ontario and the air basin will improve the quality of life of residents, workers and visitors, decrease health care costs and make Ontario more prosperous by making the City a more desirable place to be.

GOAL ER4: Improved indoor and outdoor air quality and reduced locally generated pollutant emissions

ER4-1 *Land Use.* We reduce GHG and other local pollutant emissions through compact, mixed use, and transit-oriented development and development that improves the regional jobs-housing balance.

ER4-2 *Sensitive Land Uses.* We prohibit the future siting of sensitive land uses, within the distances defined by the California Air Resources Board for specific source categories, without sufficient mitigation.

ER4-3 *Greenhouse Gases (GHG) Emissions Reductions.* We will reduce GHG emissions in accordance with regional, state and federal regulations.

ER4-4 *Indoor Air Quality.* We will comply with State Green Building Codes relative to indoor air quality.

ER4-5 *Transportation.* We promote mass transit and non-motorized mobility options (e.g. walking, biking) to reduce air pollutant emissions.

ER4-6 Particulate Matter. We support efforts to reduce particulate matter to meet State and Federal Clean Air Standards.

ER4-7 *Other Agency Collaboration.* We collaborate with other agencies within the South Coast Air Basin to improve regional air quality at the emission source.

5.4 City of Ontario Community Climate Action Plan

The City of Ontario has adopted the Community Climate Action Plan (CCAP) to help reduce citywide GHG emissions and align the City with the statewide Scoping Plan GHG reduction efforts.

The CCAP has established Screening Tables, which are setup similar to a checklist, with points allocated to certain elements of the project that would contribute to reduced GHG emissions. If a project garners 100 points (by including enough GHG reducing elements), then the project is consistent with Ontario City's Community Climate Action Plan for reducing emissions and the impact may be considered less than significant for purposes of CEQA.

6.0 Air Quality Impact Analysis

Consistent with CEQA and the State CEQA Guidelines, a significant impact related to air quality would occur if the proposed project is determined to:

a) Conflict with or obstruct implementation of the applicable air quality plan.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard.

c) Expose sensitive receptors to substantial pollutant concentrations.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

6.1 Short Term Air Quality Impacts - Construction

6.1.1 Daily Emissions - Construction

Daily air quality emissions include both on-site and off-site emissions associated with construction of the project. Regional daily emissions of criteria pollutants are compared to the SCAQMD thresholds of significance.

As shown in Table 13, daily emissions of criteria pollutants are expected to be below the allowable thresholds of significance.

CalEEMod daily emissions outputs are provided in Appendix A.

Table 13
Daily Construction Emissions

Maximum Daily Emissions (lbs/day)[1, 2]						
Activity	**VOC**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Demolition	0.91	14.16	26.89	0.09	7.84	1.56
Site Preparation	0.55	2.08	21.68	0.04	7.78	3.98
Grading	0.85	3.36	33.90	0.06	3.85	1.56
Building Construction	4.86	17.12	60.88	0.16	11.46	3.28
Paving	1.29	1.25	17.86	0.02	0.21	0.08
Architectural Coating	70.26	0.56	8.39	0.02	1.96	0.53
Maximum[1]	**70.26**	**17.12**	**60.88**	**0.16**	**11.46**	**3.98**
SCAQMD Threshold	75	100	550	150	150	55
Exceeds Threshold (?)	**No**	**No**	**No**	**No**	**No**	**No**

[1] Maximum daily emission during summer or winter; includes both on-site and off-site project emissions.
[2] Includes fugitive dust control measures and Tier 4 engine requirements.

The project must follow mandatory SCAQMD rules and requirements with regards to fugitive dust control, as described in Section 6.1.3. Compliance with the standard dust control measures is considered to be part of the conditions of approval for the project and built into the design features.

Table 13 shows that, the project's daily construction emissions will be below the applicable SCAQMD air quality standards and thresholds of significance. As a result, the project would not contribute substantially to an existing or projected air quality violation.

Furthermore, by complying with the SCAQMD standards, the project would not contribute to a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

The project's short-term construction impact on regional air resources is less than significant.

6.1.2 Fugitive Dust - Construction

The Project is required to comply with regional rules that assist in reducing short-term air pollutant emissions associated with suspended particulate matter, also known as fugitive dust. Fugitive dust emissions are commonly associated with land clearing activities, cut-and-fill grading operations, and exposure of soils to the air and wind. SCAQMD Rule 403 requires that fugitive dust is controlled with best-available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rules 402 and 403 require implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site.

The following recommendations are listed to ensure full compliance with the applicable dust control standards.

DF-1 Prepare and implement a Construction Management Plan which will include Best Available Control Measures to be submitted to the City of Ontario.

DF-2 Follow the standard SCAQMD rules and requirements with regards to fugitive dust control, which includes, but are not limited to the following:

1. All active construction areas shall be watered two (2) times daily.
2. Speed on unpaved roads shall be reduced to less than 15 mph.
3. Any visible dirt deposition on any public roadway shall be swept or washed at the site access points within 30 minutes.
4. Any on-site stockpiles of debris, dirt or other dusty material shall be covered or watered twice daily.
5. All operations on any unpaved surface shall be suspended if winds exceed 15 mph.
6. Access points shall be washed or swept daily.
7. Construction sites shall be sandbagged for erosion control.
8. Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
9. Cover all trucks hauling dirt, sand, soil, or other loose materials, and maintain at least 2 feet of freeboard space in accordance with the requirements of California Vehicle Code (CVC) section 23114.
10. Pave or gravel construction access roads at least 100 feet onto the site from the main road and use gravel aprons at truck exits.
11. Replace the ground cover of disturbed areas as quickly possible.

12. A fugitive dust control plan should be prepared and submitted to SCAQMD prior to the start of construction.

6.1.3 Odors - Construction

Heavy-duty equipment in the project area during construction will emit odors; however, the construction activity would cease to occur after individual construction is completed. The project is required to comply with Rule 402 during construction, which states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. No other sources of objectionable odors have been identified for the proposed Project.

Therefore, the project impact from odor emissions is less than significant.

6.1.4 Asbestos - Construction

Asbestos is a carcinogen and is categorized as a hazardous air pollutant by the Environmental Protection Agency (EPA). Asbestos fibers imbedded within construction materials become a health hazard once they are disturbed and rendered airborne, such as through physical contact like building renovation and demolition activities. Asbestos is regulated through the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and SCAQMD is the local enforcement authority for asbestos.

The project is not expected to require the demolition of existing building or structures. Therefore, the potential risk from exposure to asbestos during construction is small.

Asbestos also occurs naturally in serpentine and ultramafic rock. Based on the California Division of Mines and Geology General Location Guide for Ultramafic Rocks in California - Areas More Likely to Contain Naturally Occurring Asbestos, naturally occurring asbestos has not been shown to occur within in the vicinity of the project site. Therefore, the potential risk for naturally occurring asbestos (NOA) during project construction is small.

In the event asbestos is found on the site, the project will be required to comply with SCAQMD and NESHAP standards and protocols. SCAQMD Rule 1403 establishes the survey requirements, notification, and work practice requirements to prevent asbestos emissions

during construction activities. By following the required asbestos abatement protocols, the project impact from asbestos would be less than significant.

6.1.5 Diesel Particulate Matter - Construction

The greatest potential for toxic air contaminant emissions from the project would be related to diesel particulate matter (DPM) emissions associated with heavy diesel equipment used during construction. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of "individual cancer risk". "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

The proposed project's construction activity is not expected to be a long-term (i.e., 30 years) source of toxic air contaminant emissions, thus the individual cancer risk is greatly reduced.

However, given the close proximity of the project to nearest sensitive receptors (residential homes to the north), several measures are provided to help ensure the potential health risk associated with DPM during construction is reduced to the maximum extent feasible. This includes a requirement for Tier 4 engines on all diesel-powered construction equipment. Tier 4 engines, along with the latest national fuel standards, have been shown to yield PM reductions of over 95% from the typical Tier 2 and Tier 3 engines[8].

It is presumed that with the recommended design features and Tier 4 engines in place that the potential short term construction health risks will be adequately reduced to be less than significant. It should be noted however, that a quantified diesel health risk assessment (HRA) has not been prepared as part of the scope of this analysis.

The following design features are recommended to help ensure the project does not expose receptors to substantial pollution concentrations during construction:

DF-3 All diesel construction equipment shall have Tier 4 low emission "clean diesel" engines (OEM or retrofit) that include diesel oxidation catalysts and diesel particulate filters that meet the latest CARB best available control technology.

[8] EPA. Control of Emissions of Air Pollution from Nonroad Diesel Engines and Fuel; Final Rule. (40 CFR Parts 9, 69, et al.)

DF-4 Construction equipment shall be maintained in proper tune.

DF-5 All construction vehicles shall be prohibited from excessive idling. Excessive idling is defined as five (5) minutes or longer.

DF-6 Minimize the simultaneous operation of multiple construction equipment units.

DF-7 The use of heavy construction equipment and earthmoving activity shall be suspended during Air Alerts when the Air Quality Index reaches the "Unhealthy" level.

DF-8 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

DF-9 Utilize zero VOC and low VOC paints and solvents, wherever possible.

6.2 Long Term Air Quality Impacts - Operation

6.2.1 Daily Emissions - Operation

Long-term operational air pollutant impacts from the project are shown in Table 14. The project is not expected to exceed any of the allowable daily emissions thresholds for criteria pollutants at the regional level. CalEEMod daily emissions outputs are provided in Appendix A.

The project's daily operational emissions will be below the applicable SCAQMD air quality thresholds of significance and the project would not contribute substantially to an existing or projected air quality violation. Furthermore, by complying with the SCAQMD standards, the project would not contribute to a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

The project related long-term air quality impacts are less than significant.

Table 14
Daily Operational Emissions

Maximum Daily Emissions (lbs/day)[1]						
Activity	**VOC**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Mobile Sources	17.27	14.68	127.09	0.24	23.87	6.46
Energy Sources	0.30	2.55	1.10	0.02	0.21	0.21
Area Sources	19.70	10.40	61.39	0.07	1.10	1.10
Total	**37.26**	**27.64**	**189.58**	**0.32**	**25.18**	**7.77**
SCAQMD Threshold	55	55	550	150	150	55
Exceeds Threshold (?)	No	No	No	No	No	No

[1] Maximum daily emission during summer or winter; includes both on-site and off-site project emissions.
[2] Daily emissions reports are provided in Appendix A.

6.2.2 Odors - Operation

Land uses that commonly receive odor complaints include agricultural uses (farming and livestock), chemical plants, composting operations, dairies, fiberglass molding facilities, food processing plants, landfills, refineries, rail yards, and wastewater treatment plants. The proposed project does not contain land uses that would typically be associated with significant odor emissions.

The project will be required to comply with standard building code requirements related to exhaust ventilation, as well as comply with SCAQMD Rule 402. Rule 402 requires that a person may not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. Project related odors are not expected to meet the criteria of being a nuisance. **The project's operation would result in less than significant odor impacts.**

6.2.3 Toxic Air Contaminants - Operations

The project would consist of commercial/retail and residential land uses. These types of projects do not include major sources of toxic air contaminants (TAC) emissions that would result in significant exposure of sensitive receptors to substantial pollutant concentrations. Therefore, **the project impact is considered less than significant.**

7.0 Greenhouse Gas Impact Analysis

Consistent with CEQA Guidelines, a significant impact related to greenhouse gas would occur if the proposed project is determined to:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing emissions of greenhouse gases.

For purposes of this project, the City of Ontario CCAP establishes the requirements for determining whether a project would have a significant impact to GHG emissions under CEQA.

The CCAP uses Screening Tables, which are setup similar to a checklist, with points allocated to certain elements of the project to reduce GHG emissions. If a project garners 100 points (by including enough GHG reducing elements), then the project is consistent with CCAP and the impact may be considered less than significant for purposes of CEQA.

The proposed project is expected to comply with the CCAP by implementing the Screening Table requirements into the project design. To help ensure the project adheres to the CCAP requirements, the following project design feature is provided:

DF-10 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

As described in Appendix B of the CCAP, for mixed use projects, both the residential and non-residential screening tables shall be completed. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City's CAP and are considered less than significant for GHG emissions.

Therefore, with the implementation of the CCAP Screening Tables, the project is not expected to generate GHG emissions, either directly or indirectly, that would cause a significant impact on the environment. Also, by complying with the CCAP, the project will not conflict with an applicable plan, policy or regulation for the purpose of reducing the emissions of greenhouse gases and the impact is considered less than significant.

Furthermore, since the purpose of the City's CCAP is to ensure compliance with the state's climate initiatives for reducing GHG emissions, by complying with the CCAP, the project will also be in compliant with the broader statewide goals for combating climate change; such as those required in the CARB Scoping Plan and AB 32.

The mixed use project is also located within close proximity to high quality transit, located in a low VMT zone, and offers high-density residential development near commercial uses. The project will include pedestrian friendly and walkable design that will encourage fewer auto-based trips. The following project design features will be provided to further help reduce GHG emissions:

DF-11 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-12 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-13 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-14 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-15 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-16 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb

extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

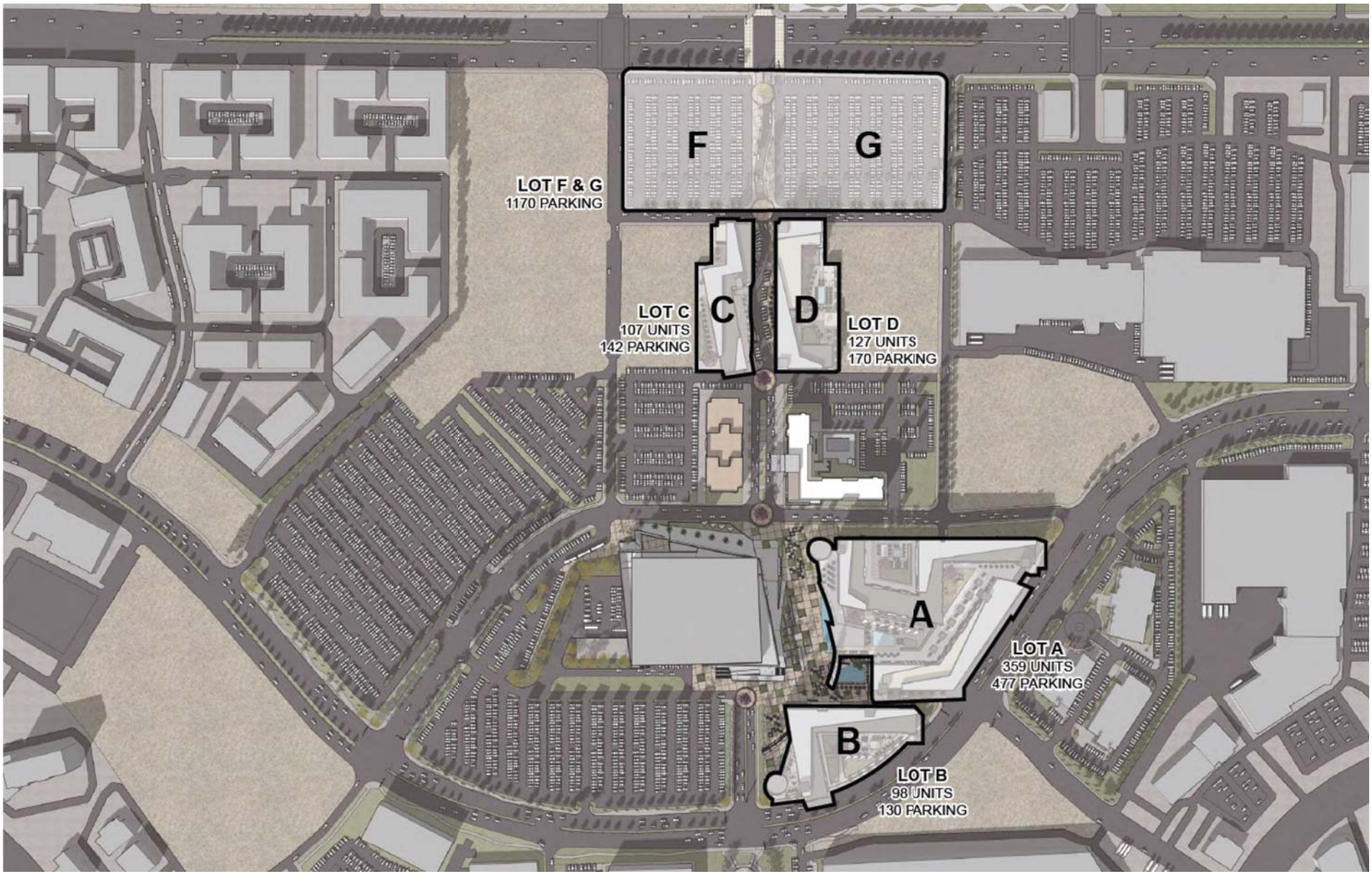
DF-17 Provide electric vehicle charging stations per the requirements of CALGreen.

Exhibits

Location Map

N

Exhibit B
Site Plan



N

Appendices

Appendix A

Daily Emissions Calculations Output
(CalEEMod)

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Toyota Arena Mixed Use Development

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	691.00	Dwelling Unit	11.47	691,000.00	1976
Enclosed Parking with Elevator	919.00	Space	0.00	367,600.00	0
Parking Lot	1,170.00	Space	7.26	468,000.00	0
Regional Shopping Center	71.20	1000sqft	0.00	71,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	531.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The proposed project consists of a mixed-use town center development with 691 multifamily DU and 71,200 square feet of commercial/retail land uses on approximately 18.73 acres.

Construction Phase - The project's architectural coating phase will be extended to 75 days.

Demolition - The project is proposing to demolish approximetely 326,026 square feet of surface asphalt parking lot.

Vehicle Trips - The trip generation rates have been updated to reflect Toyota Arena TIA Scoping Agreement, by RK, May 25, 2021 and Traffic Impact Study and SANBAG VMT Model.

Fleet Mix - Operational fleet mix adjusted to equal 2% trucks with GVWR > 10,000 lbs.

Woodstoves - SCAQMD Rule 445 restricts wood burning hearths/fireplaces from being installed in new development.

Construction Off-road Equipment Mitigation - Project will be required to comply with SCAQMD Rule 403 regarding fugitive dust control.

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	75.00
tblConstructionPhase	PhaseEndDate	4/13/2023	6/29/2023
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberWood	34.55	0.00
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	LHD2	0.00	7.1960e-003

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LHD2	0.00	7.1960e-003
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	UBUS	0.00	1.1900e-004
tblFleetMix	UBUS	0.00	2.5400e-004
tblFleetMix	UBUS	0.00	2.5400e-004

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	UBUS	0.00	1.1900e-004
tblLandUse	LotAcreage	18.18	11.47
tblLandUse	LotAcreage	8.27	0.00
tblLandUse	LotAcreage	10.53	7.26
tblLandUse	LotAcreage	1.63	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	4.37
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	4.37
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	4.37
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.91	5.17
tblVehicleTrips	ST_TR	46.12	36.38
tblVehicleTrips	SU_TR	4.09	5.17
tblVehicleTrips	WD_TR	5.44	5.17
tblVehicleTrips	WD_TR	37.75	29.77
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.4347	46.4611	59.9899	0.1622	19.8582	2.0456	21.9038	10.1558	1.8819	12.0378	0.0000	16,507.4778	16,507.4778	1.9489	0.9233	16,807.9157
2022	5.7820	27.6734	55.8128	0.1582	11.1581	0.9758	12.1338	2.9915	0.9189	3.9104	0.0000	16,137.5984	16,137.5984	0.9697	0.8848	16,425.5012
2023	70.4209	24.2267	52.3577	0.1536	11.1580	0.8064	11.9644	2.9915	0.7587	3.7502	0.0000	15,714.5265	15,714.5265	0.9318	0.8384	15,987.6709
Maximum	**70.4209**	**46.4611**	**59.9899**	**0.1622**	**19.8582**	**2.0456**	**21.9038**	**10.1558**	**1.8819**	**12.0378**	**0.0000**	**16,507.4778**	**16,507.4778**	**1.9489**	**0.9233**	**16,807.9157**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.8616	16.4282	60.8749	0.1622	11.1581	0.2990	11.4571	3.9176	0.2858	3.9807	0.0000	16,507.4778	16,507.4778	1.9489	0.9233	16,807.9157
2022	4.4036	14.2925	56.9096	0.1582	11.1581	0.2076	11.3656	2.9915	0.1985	3.1900	0.0000	16,137.5984	16,137.5984	0.9697	0.8848	16,425.5012
2023	70.2589	12.0766	53.5740	0.1536	11.1580	0.1474	11.3054	2.9915	0.1410	3.1326	0.0000	15,714.5265	15,714.5265	0.9318	0.8384	15,987.6709
Maximum	**70.2589**	**16.4282**	**60.8749**	**0.1622**	**11.1581**	**0.2990**	**11.4571**	**3.9176**	**0.2858**	**3.9807**	**0.0000**	**16,507.4778**	**16,507.4778**	**1.9489**	**0.9233**	**16,807.9157**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	3.77	56.49	-1.90	0.00	20.63	82.92	25.81	38.65	82.43	47.69	0.00	0.00	0.00	0.00	0.00	0.00

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618
Total	**37.2623**	**26.7575**	**189.5821**	**0.3178**	**23.6977**	**1.4792**	**25.1768**	**6.3029**	**1.4675**	**7.7704**	**0.0000**	**40,050.4429**	**40,050.4429**	**1.9954**	**1.3931**	**40,515.4682**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618
Total	**37.2623**	**26.7575**	**189.5821**	**0.3178**	**23.6977**	**1.4792**	**25.1768**	**6.3029**	**1.4675**	**7.7704**	**0.0000**	**40,050.4429**	**40,050.4429**	**1.9954**	**1.3931**	**40,515.4682**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2021	10/28/2021	5	20	
2	Site Preparation	Site Preparation	10/29/2021	11/11/2021	5	10	
3	Grading	Grading	11/12/2021	12/23/2021	5	30	
4	Building Construction	Building Construction	12/24/2021	2/16/2023	5	300	
5	Paving	Paving	2/17/2023	3/16/2023	5	20	
6	Architectural Coating	Architectural Coating	3/17/2023	6/29/2023	5	75	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 7.26

Residential Indoor: 1,399,275; Residential Outdoor: 466,425; Non-Residential Indoor: 106,800; Non-Residential Outdoor: 35,600; Striped Parking Area: 50,136 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,483.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	871.00	222.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	174.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.0493	0.0000	16.0493	2.4300	0.0000	2.4300			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**16.0493**	**1.5513**	**17.6006**	**2.4300**	**1.4411**	**3.8711**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3825	11.5481	2.9311	0.0448	1.2986	0.1738	1.4724	0.3561	0.1663	0.5224		4,874.0609	4,874.0609	0.2123	0.7723	5,109.5096
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0689	0.0459	0.6786	1.6000e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		161.8483	161.8483	4.5800e-003	4.2800e-003	163.2380
Total	**0.4515**	**11.5940**	**3.6097**	**0.0464**	**1.4662**	**0.1748**	**1.6410**	**0.4006**	**0.1672**	**0.5677**		**5,035.9092**	**5,035.9092**	**0.2169**	**0.7766**	**5,272.7476**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1388	0.0000	6.1388	0.9295	0.0000	0.9295			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		0.0616	0.0616		0.0616	0.0616	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**6.1388**	**0.0616**	**6.2005**	**0.9295**	**0.0616**	**0.9911**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3825	11.5481	2.9311	0.0448	1.2986	0.1738	1.4724	0.3561	0.1663	0.5224		4,874.0609	4,874.0609	0.2123	0.7723	5,109.5096
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0689	0.0459	0.6786	1.6000e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		161.8483	161.8483	4.5800e-003	4.2800e-003	163.2380
Total	**0.4515**	**11.5940**	**3.6097**	**0.0464**	**1.4662**	**0.1748**	**1.6410**	**0.4006**	**0.1672**	**0.5677**		**5,035.9092**	**5,035.9092**	**0.2169**	**0.7766**	**5,272.7476**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.6570**	**2.0445**	**21.7015**	**10.1025**	**1.8809**	**11.9834**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0827	0.0551	0.8143	1.9200e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		194.2180	194.2180	5.5000e-003	5.1300e-003	195.8856
Total	**0.0827**	**0.0551**	**0.8143**	**1.9200e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**194.2180**	**194.2180**	**5.5000e-003**	**5.1300e-003**	**195.8856**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.5188	0.0000	7.5188	3.8642	0.0000	3.8642			0.0000			0.0000
Off-Road	0.4656	2.0175	20.8690	0.0380		0.0621	0.0621		0.0621	0.0621	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**0.4656**	**2.0175**	**20.8690**	**0.0380**	**7.5188**	**0.0621**	**7.5809**	**3.8642**	**0.0621**	**3.9263**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0827	0.0551	0.8143	1.9200e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		194.2180	194.2180	5.5000e-003	5.1300e-003	195.8856
Total	**0.0827**	**0.0551**	**0.8143**	**1.9200e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**194.2180**	**194.2180**	**5.5000e-003**	**5.1300e-003**	**195.8856**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**9.2036**	**1.9853**	**11.1889**	**3.6538**	**1.8265**	**5.4803**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0919	0.0612	0.9048	2.1300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		215.7978	215.7978	6.1100e-003	5.7000e-003	217.6506
Total	**0.0919**	**0.0612**	**0.9048**	**2.1300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**215.7978**	**215.7978**	**6.1100e-003**	**5.7000e-003**	**217.6506**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.5204	0.0000	3.5204	1.3976	0.0000	1.3976			0.0000			0.0000
Off-Road	0.7616	3.3000	32.9991	0.0620		0.1015	0.1015		0.1015	0.1015	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**0.7616**	**3.3000**	**32.9991**	**0.0620**	**3.5204**	**0.1015**	**3.6219**	**1.3976**	**0.1015**	**1.4991**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0919	0.0612	0.9048	2.1300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		215.7978	215.7978	6.1100e-003	5.7000e-003	217.6506
Total	**0.0919**	**0.0612**	**0.9048**	**2.1300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**215.7978**	**215.7978**	**6.1100e-003**	**5.7000e-003**	**217.6506**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5310	11.5275	4.0099	0.0425	1.4223	0.2037	1.6261	0.4096	0.1949	0.6045		4,556.1208	4,556.1208	0.1292	0.6749	4,760.4663
Worker	4.0029	2.6661	39.4047	0.0928	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		9,397.9931	9,397.9931	0.2662	0.2485	9,478.6851
Total	**4.5338**	**14.1935**	**43.4147**	**0.1353**	**11.1581**	**0.2582**	**11.4163**	**2.9915**	**0.2451**	**3.2366**		**13,954.1139**	**13,954.1139**	**0.3954**	**0.9233**	**14,239.1514**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5310	11.5275	4.0099	0.0425	1.4223	0.2037	1.6261	0.4096	0.1949	0.6045		4,556.1208	4,556.1208	0.1292	0.6749	4,760.4663
Worker	4.0029	2.6661	39.4047	0.0928	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		9,397.9931	9,397.9931	0.2662	0.2485	9,478.6851
Total	**4.5338**	**14.1935**	**43.4147**	**0.1353**	**11.1581**	**0.2582**	**11.4163**	**2.9915**	**0.2451**	**3.2366**		**13,954.1139**	**13,954.1139**	**0.3954**	**0.9233**	**14,239.1514**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3869	9.7214	3.5677	0.0414	1.4223	0.1157	1.5380	0.4096	0.1107	0.5202		4,441.5281	4,441.5281	0.1200	0.6573	4,640.3962
Worker	3.6889	2.3364	35.8817	0.0899	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		9,141.7367	9,141.7367	0.2377	0.2275	9,215.4729
Total	**4.0757**	**12.0578**	**39.4494**	**0.1313**	**11.1581**	**0.1668**	**11.3248**	**2.9915**	**0.1577**	**3.1492**		**13,583.2648**	**13,583.2648**	**0.3577**	**0.8848**	**13,855.8690**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3869	9.7214	3.5677	0.0414	1.4223	0.1157	1.5380	0.4096	0.1107	0.5202		4,441.5281	4,441.5281	0.1200	0.6573	4,640.3962
Worker	3.6889	2.3364	35.8817	0.0899	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		9,141.7367	9,141.7367	0.2377	0.2275	9,215.4729
Total	**4.0757**	**12.0578**	**39.4494**	**0.1313**	**11.1581**	**0.1668**	**11.3248**	**2.9915**	**0.1577**	**3.1492**		**13,583.2648**	**13,583.2648**	**0.3577**	**0.8848**	**13,855.8690**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2599	7.7868	3.2674	0.0397	1.4223	0.0585	1.4808	0.4096	0.0560	0.4655		4,260.5836	4,260.5836	0.1114	0.6292	4,450.8606
Worker	3.4058	2.0551	32.8463	0.0870	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,898.7330	8,898.7330	0.2126	0.2093	8,966.4042
Total	**3.6656**	**9.8419**	**36.1137**	**0.1267**	**11.1580**	**0.1066**	**11.2647**	**2.9915**	**0.1003**	**3.0918**		**13,159.3166**	**13,159.3166**	**0.3239**	**0.8384**	**13,417.2648**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2599	7.7868	3.2674	0.0397	1.4223	0.0585	1.4808	0.4096	0.0560	0.4655		4,260.5836	4,260.5836	0.1114	0.6292	4,450.8606
Worker	3.4058	2.0551	32.8463	0.0870	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,898.7330	8,898.7330	0.2126	0.2093	8,966.4042
Total	**3.6656**	**9.8419**	**36.1137**	**0.1267**	**11.1580**	**0.1066**	**11.2647**	**2.9915**	**0.1003**	**3.0918**		**13,159.3166**	**13,159.3166**	**0.3239**	**0.8384**	**13,417.2648**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9838**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0587	0.0354	0.5657	1.5000e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		153.2503	153.2503	3.6600e-003	3.6000e-003	154.4157
Total	**0.0587**	**0.0354**	**0.5657**	**1.5000e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**153.2503**	**153.2503**	**3.6600e-003**	**3.6000e-003**	**154.4157**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2805	1.2154	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2315**	**1.2154**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0587	0.0354	0.5657	1.5000e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		153.2503	153.2503	3.6600e-003	3.6000e-003	154.4157
Total	**0.0587**	**0.0354**	**0.5657**	**1.5000e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**153.2503**	**153.2503**	**3.6600e-003**	**3.6000e-003**	**154.4157**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**69.7405**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6804	0.4105	6.5617	0.0174	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,777.7033	1,777.7033	0.0425	0.0418	1,791.2220
Total	**0.6804**	**0.4105**	**6.5617**	**0.0174**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,777.7033**	**1,777.7033**	**0.0425**	**0.0418**	**1,791.2220**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**69.5786**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6804	0.4105	6.5617	0.0174	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,777.7033	1,777.7033	0.0425	0.0418	1,791.2220
Total	**0.6804**	**0.4105**	**6.5617**	**0.0174**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,777.7033**	**1,777.7033**	**0.0425**	**0.0418**	**1,791.2220**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618
Unmitigated	17.2690	13.8038	127.0914	0.2363	23.6977	0.1690	23.8666	6.3029	0.1573	6.4602		24,255.5834	24,255.5834	1.5947	1.1054	24,624.8618

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	3,572.47	3,572.47	3572.47	5,682,657	5,682,657
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	2,119.62	2,590.26	1502.32	4,539,098	4,539,098
Total	5,692.09	6,162.73	5,074.79	10,221,754	10,221,754

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	4.37	4.37	4.37	100.00	0.00	0.00	100	0	0
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375
Enclosed Parking with Elevator	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Parking Lot	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Regional Shopping Center	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
NaturalGas Unmitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27227.6	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	429.151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27.2276	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	0.429151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

6.0 Area Detail

6.1 Mitigation Measures Area

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Unmitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

7.0 Water Detail

7.1 Mitigation Measures Water

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Toyota Arena Mixed Use Development

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	691.00	Dwelling Unit	11.47	691,000.00	1976
Enclosed Parking with Elevator	919.00	Space	0.00	367,600.00	0
Parking Lot	1,170.00	Space	7.26	468,000.00	0
Regional Shopping Center	71.20	1000sqft	0.00	71,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	531.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The proposed project consists of a mixed-use town center development with 691 multifamily DU and 71,200 square feet of commercial/retail land uses on approximately 18.73 acres.

Construction Phase - The project's architectural coating phase will be extended to 75 days.

Demolition - The project is proposing to demolish approximetely 326,026 square feet of surface asphalt parking lot.

Vehicle Trips - The trip generation rates have been updated to reflect Toyota Arena TIA Scoping Agreement, by RK, May 25, 2021 and Traffic Impact Study and SANBAG VMT Model.

Fleet Mix - Operational fleet mix adjusted to equal 2% trucks with GVWR > 10,000 lbs.

Woodstoves - SCAQMD Rule 445 restricts wood burning hearths/fireplaces from being installed in new development.

Construction Off-road Equipment Mitigation - Project will be required to comply with SCAQMD Rule 403 regarding fugitive dust control.

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	75.00
tblConstructionPhase	PhaseEndDate	4/13/2023	6/29/2023
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberWood	34.55	0.00
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	LHD2	0.00	7.1960e-003

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LHD2	0.00	7.1960e-003
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	UBUS	0.00	1.1900e-004
tblFleetMix	UBUS	0.00	2.5400e-004
tblFleetMix	UBUS	0.00	2.5400e-004

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	UBUS	0.00	1.1900e-004
tblLandUse	LotAcreage	18.18	11.47
tblLandUse	LotAcreage	8.27	0.00
tblLandUse	LotAcreage	10.53	7.26
tblLandUse	LotAcreage	1.63	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	4.37
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	4.37
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	4.37
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.91	5.17
tblVehicleTrips	ST_TR	46.12	36.38
tblVehicleTrips	SU_TR	4.09	5.17
tblVehicleTrips	WD_TR	5.44	5.17
tblVehicleTrips	WD_TR	37.75	29.77
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.2538	46.4642	53.0187	0.1535	19.8582	2.0456	21.9038	10.1558	1.8819	12.0378	0.0000	15,621.5062	15,621.5062	1.9489	0.9324	15,924.5846
2022	5.6217	28.2785	49.5312	0.1498	11.1581	0.9761	12.1342	2.9915	0.9192	3.9107	0.0000	15,280.3911	15,280.3911	0.9684	0.8933	15,570.8009
2023	70.3959	24.7705	46.6465	0.1455	11.1580	0.8066	11.9646	2.9915	0.7589	3.7504	0.0000	14,888.1518	14,888.1518	0.9311	0.8471	15,163.8676
Maximum	**70.3959**	**46.4642**	**53.0187**	**0.1535**	**19.8582**	**2.0456**	**21.9038**	**10.1558**	**1.8819**	**12.0378**	**0.0000**	**15,621.5062**	**15,621.5062**	**1.9489**	**0.9324**	**15,924.5846**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	4.6807	17.1150	53.9038	0.1535	11.1581	0.2995	11.4576	3.9176	0.2863	3.9807	0.0000	15,621.5062	15,621.5062	1.9489	0.9324	15,924.5846
2022	4.2433	14.8976	50.6281	0.1498	11.1581	0.2079	11.3660	2.9915	0.1988	3.1904	0.0000	15,280.3911	15,280.3911	0.9684	0.8933	15,570.8009
2023	70.2340	12.6203	47.8627	0.1455	11.1580	0.1477	11.3057	2.9915	0.1413	3.1328	0.0000	14,888.1518	14,888.1518	0.9311	0.8471	15,163.8676
Maximum	**70.2340**	**17.1150**	**53.9038**	**0.1535**	**11.1581**	**0.2995**	**11.4576**	**3.9176**	**0.2863**	**3.9807**	**0.0000**	**15,621.5062**	**15,621.5062**	**1.9489**	**0.9324**	**15,924.5846**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	3.78	55.15	-2.14	0.00	20.63	82.89	25.81	38.65	82.40	47.69	0.00	0.00	0.00	0.00	0.00	0.00

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089
Total	**34.6199**	**27.6361**	**179.2364**	**0.2996**	**23.6977**	**1.4793**	**25.1769**	**6.3029**	**1.4676**	**7.7705**	**0.0000**	**38,191.6001**	**38,191.6001**	**2.0809**	**1.4292**	**38,669.5153**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Energy	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
Mobile	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089
Total	**34.6199**	**27.6361**	**179.2364**	**0.2996**	**23.6977**	**1.4793**	**25.1769**	**6.3029**	**1.4676**	**7.7705**	**0.0000**	**38,191.6001**	**38,191.6001**	**2.0809**	**1.4292**	**38,669.5153**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2021	10/28/2021	5	20	
2	Site Preparation	Site Preparation	10/29/2021	11/11/2021	5	10	
3	Grading	Grading	11/12/2021	12/23/2021	5	30	
4	Building Construction	Building Construction	12/24/2021	2/16/2023	5	300	
5	Paving	Paving	2/17/2023	3/16/2023	5	20	
6	Architectural Coating	Architectural Coating	3/17/2023	6/29/2023	5	75	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 7.26

Residential Indoor: 1,399,275; Residential Outdoor: 466,425; Non-Residential Indoor: 106,800; Non-Residential Outdoor: 35,600; Striped Parking Area: 50,136 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,483.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	871.00	222.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	174.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					16.0493	0.0000	16.0493	2.4300	0.0000	2.4300			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**16.0493**	**1.5513**	**17.6006**	**2.4300**	**1.4411**	**3.8711**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3721	12.1085	2.9946	0.0448	1.2986	0.1740	1.4726	0.3561	0.1665	0.5226		4,876.6311	4,876.6311	0.2118	0.7727	5,112.1890
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0661	0.0483	0.5563	1.4500e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		146.5366	146.5366	4.5600e-003	4.4200e-003	147.9673
Total	**0.4382**	**12.1568**	**3.5508**	**0.0463**	**1.4662**	**0.1750**	**1.6412**	**0.4006**	**0.1674**	**0.5679**		**5,023.1677**	**5,023.1677**	**0.2163**	**0.7771**	**5,260.1563**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1388	0.0000	6.1388	0.9295	0.0000	0.9295			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		0.0616	0.0616		0.0616	0.0616	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**6.1388**	**0.0616**	**6.2005**	**0.9295**	**0.0616**	**0.9911**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3721	12.1085	2.9946	0.0448	1.2986	0.1740	1.4726	0.3561	0.1665	0.5226		4,876.6311	4,876.6311	0.2118	0.7727	5,112.1890
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0661	0.0483	0.5563	1.4500e-003	0.1677	9.4000e-004	0.1686	0.0445	8.6000e-004	0.0453		146.5366	146.5366	4.5600e-003	4.4200e-003	147.9673
Total	**0.4382**	**12.1568**	**3.5508**	**0.0463**	**1.4662**	**0.1750**	**1.6412**	**0.4006**	**0.1674**	**0.5679**		**5,023.1677**	**5,023.1677**	**0.2163**	**0.7771**	**5,260.1563**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.6570	0.0000	19.6570	10.1025	0.0000	10.1025			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.6570**	**2.0445**	**21.7015**	**10.1025**	**1.8809**	**11.9834**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0793	0.0580	0.6675	1.7400e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		175.8439	175.8439	5.4700e-003	5.3000e-003	177.5607
Total	**0.0793**	**0.0580**	**0.6675**	**1.7400e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**175.8439**	**175.8439**	**5.4700e-003**	**5.3000e-003**	**177.5607**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.5188	0.0000	7.5188	3.8642	0.0000	3.8642			0.0000			0.0000
Off-Road	0.4656	2.0175	20.8690	0.0380		0.0621	0.0621		0.0621	0.0621	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**0.4656**	**2.0175**	**20.8690**	**0.0380**	**7.5188**	**0.0621**	**7.5809**	**3.8642**	**0.0621**	**3.9263**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0793	0.0580	0.6675	1.7400e-003	0.2012	1.1300e-003	0.2023	0.0534	1.0400e-003	0.0544		175.8439	175.8439	5.4700e-003	5.3000e-003	177.5607
Total	**0.0793**	**0.0580**	**0.6675**	**1.7400e-003**	**0.2012**	**1.1300e-003**	**0.2023**	**0.0534**	**1.0400e-003**	**0.0544**		**175.8439**	**175.8439**	**5.4700e-003**	**5.3000e-003**	**177.5607**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2036	0.0000	9.2036	3.6538	0.0000	3.6538			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**9.2036**	**1.9853**	**11.1889**	**3.6538**	**1.8265**	**5.4803**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0881	0.0644	0.7417	1.9300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		195.3821	195.3821	6.0800e-003	5.8900e-003	197.2897
Total	**0.0881**	**0.0644**	**0.7417**	**1.9300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**195.3821**	**195.3821**	**6.0800e-003**	**5.8900e-003**	**197.2897**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.5204	0.0000	3.5204	1.3976	0.0000	1.3976			0.0000			0.0000
Off-Road	0.7616	3.3000	32.9991	0.0620		0.1015	0.1015		0.1015	0.1015	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**0.7616**	**3.3000**	**32.9991**	**0.0620**	**3.5204**	**0.1015**	**3.6219**	**1.3976**	**0.1015**	**1.4991**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0881	0.0644	0.7417	1.9300e-003	0.2236	1.2500e-003	0.2248	0.0593	1.1500e-003	0.0604		195.3821	195.3821	6.0800e-003	5.8900e-003	197.2897
Total	**0.0881**	**0.0644**	**0.7417**	**1.9300e-003**	**0.2236**	**1.2500e-003**	**0.2248**	**0.0593**	**1.1500e-003**	**0.0604**		**195.3821**	**195.3821**	**6.0800e-003**	**5.8900e-003**	**197.2897**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5177	12.0752	4.1438	0.0425	1.4223	0.2042	1.6266	0.4096	0.1954	0.6050		4,559.2529	4,559.2529	0.1286	0.6758	4,763.8543
Worker	3.8352	2.8050	32.2997	0.0840	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		8,508.8894	8,508.8894	0.2646	0.2566	8,591.9661
Total	**4.3529**	**14.8803**	**36.4435**	**0.1265**	**11.1581**	**0.2587**	**11.4168**	**2.9915**	**0.2456**	**3.2371**		**13,068.1423**	**13,068.1423**	**0.3932**	**0.9324**	**13,355.8204**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.5177	12.0752	4.1438	0.0425	1.4223	0.2042	1.6266	0.4096	0.1954	0.6050		4,559.2529	4,559.2529	0.1286	0.6758	4,763.8543
Worker	3.8352	2.8050	32.2997	0.0840	9.7357	0.0545	9.7902	2.5820	0.0502	2.6321		8,508.8894	8,508.8894	0.2646	0.2566	8,591.9661
Total	**4.3529**	**14.8803**	**36.4435**	**0.1265**	**11.1581**	**0.2587**	**11.4168**	**2.9915**	**0.2456**	**3.2371**		**13,068.1423**	**13,068.1423**	**0.3932**	**0.9324**	**13,355.8204**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3718	10.2054	3.6933	0.0415	1.4223	0.1160	1.5383	0.4096	0.1110	0.5206		4,446.4272	4,446.4272	0.1193	0.6584	4,645.6165
Worker	3.5437	2.4575	29.4745	0.0814	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		8,279.6303	8,279.6303	0.2371	0.2349	8,355.5522
Total	**3.9155**	**12.6629**	**33.1678**	**0.1229**	**11.1581**	**0.1671**	**11.3252**	**2.9915**	**0.1580**	**3.1496**		**12,726.0575**	**12,726.0575**	**0.3564**	**0.8933**	**13,001.1687**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.3718	10.2054	3.6933	0.0415	1.4223	0.1160	1.5383	0.4096	0.1110	0.5206		4,446.4272	4,446.4272	0.1193	0.6584	4,645.6165
Worker	3.5437	2.4575	29.4745	0.0814	9.7357	0.0511	9.7868	2.5820	0.0471	2.6290		8,279.6303	8,279.6303	0.2371	0.2349	8,355.5522
Total	**3.9155**	**12.6629**	**33.1678**	**0.1229**	**11.1581**	**0.1671**	**11.3252**	**2.9915**	**0.1580**	**3.1496**		**12,726.0575**	**12,726.0575**	**0.3564**	**0.8933**	**13,001.1687**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2418	8.2248	3.3683	0.0398	1.4223	0.0588	1.4811	0.4096	0.0562	0.4658		4,270.9160	4,270.9160	0.1105	0.6311	4,461.7532
Worker	3.2807	2.1608	27.0342	0.0788	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,062.0259	8,062.0259	0.2128	0.2160	8,131.7084
Total	**3.5225**	**10.3856**	**30.4025**	**0.1186**	**11.1580**	**0.1069**	**11.2649**	**2.9915**	**0.1005**	**3.0920**		**12,332.9419**	**12,332.9419**	**0.3233**	**0.8471**	**12,593.4615**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		0.0408	0.0408		0.0408	0.0408	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**0.0408**	**0.0408**		**0.0408**	**0.0408**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.2418	8.2248	3.3683	0.0398	1.4223	0.0588	1.4811	0.4096	0.0562	0.4658		4,270.9160	4,270.9160	0.1105	0.6311	4,461.7532
Worker	3.2807	2.1608	27.0342	0.0788	9.7357	0.0481	9.7838	2.5820	0.0443	2.6262		8,062.0259	8,062.0259	0.2128	0.2160	8,131.7084
Total	**3.5225**	**10.3856**	**30.4025**	**0.1186**	**11.1580**	**0.1069**	**11.2649**	**2.9915**	**0.1005**	**3.0920**		**12,332.9419**	**12,332.9419**	**0.3233**	**0.8471**	**12,593.4615**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9838**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0565	0.0372	0.4656	1.3600e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		138.8409	138.8409	3.6600e-003	3.7200e-003	140.0409
Total	**0.0565**	**0.0372**	**0.4656**	**1.3600e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**138.8409**	**138.8409**	**3.6600e-003**	**3.7200e-003**	**140.0409**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2805	1.2154	17.2957	0.0228		0.0374	0.0374		0.0374	0.0374	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.9511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2315**	**1.2154**	**17.2957**	**0.0228**		**0.0374**	**0.0374**		**0.0374**	**0.0374**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0565	0.0372	0.4656	1.3600e-003	0.1677	8.3000e-004	0.1685	0.0445	7.6000e-004	0.0452		138.8409	138.8409	3.6600e-003	3.7200e-003	140.0409
Total	**0.0565**	**0.0372**	**0.4656**	**1.3600e-003**	**0.1677**	**8.3000e-004**	**0.1685**	**0.0445**	**7.6000e-004**	**0.0452**		**138.8409**	**138.8409**	**3.6600e-003**	**3.7200e-003**	**140.0409**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**69.7405**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6554	0.4317	5.4006	0.0157	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,610.5540	1,610.5540	0.0425	0.0432	1,624.4745
Total	**0.6554**	**0.4317**	**5.4006**	**0.0157**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,610.5540**	**1,610.5540**	**0.0425**	**0.0432**	**1,624.4745**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	69.5489					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**69.5786**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.6554	0.4317	5.4006	0.0157	1.9449	9.6100e-003	1.9545	0.5158	8.8400e-003	0.5246		1,610.5540	1,610.5540	0.0425	0.0432	1,624.4745
Total	**0.6554**	**0.4317**	**5.4006**	**0.0157**	**1.9449**	**9.6100e-003**	**1.9545**	**0.5158**	**8.8400e-003**	**0.5246**		**1,610.5540**	**1,610.5540**	**0.0425**	**0.0432**	**1,624.4745**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089
Unmitigated	14.6266	14.6824	116.7457	0.2181	23.6977	0.1691	23.8667	6.3029	0.1574	6.4603		22,396.7406	22,396.7406	1.6802	1.1415	22,778.9089

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	3,572.47	3,572.47	3572.47	5,682,657	5,682,657
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	2,119.62	2,590.26	1502.32	4,539,098	4,539,098
Total	5,692.09	6,162.73	5,074.79	10,221,754	10,221,754

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	4.37	4.37	4.37	100.00	0.00	0.00	100	0	0
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375
Enclosed Parking with Elevator	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Parking Lot	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Regional Shopping Center	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725
NaturalGas Unmitigated	0.2983	2.5513	1.1031	0.0163		0.2061	0.2061		0.2061	0.2061		3,253.7371	3,253.7371	0.0624	0.0597	3,273.0725

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27227.6	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	429.151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	27.2276	0.2936	2.5092	1.0678	0.0160		0.2029	0.2029		0.2029	0.2029		3,203.2488	3,203.2488	0.0614	0.0587	3,222.2841
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	0.429151	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003		50.4883	50.4883	9.7000e-004	9.3000e-004	50.7883
Total		**0.2983**	**2.5513**	**1.1031**	**0.0163**		**0.2061**	**0.2061**		**0.2061**	**0.2061**		**3,253.7371**	**3,253.7371**	**0.0624**	**0.0597**	**3,273.0725**

6.0 Area Detail

6.1 Mitigation Measures Area

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340
Unmitigated	19.6950	10.4024	61.3876	0.0652		1.1041	1.1041		1.1041	1.1041	0.0000	12,541.1224	12,541.1224	0.3383	0.2280	12,617.5340

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.4291					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	15.3875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	1.1402	9.7431	4.1460	0.0622		0.7877	0.7877		0.7877	0.7877	0.0000	12,438.0000	12,438.0000	0.2384	0.2280	12,511.9128
Landscaping	1.7383	0.6593	57.2416	3.0300e-003		0.3164	0.3164		0.3164	0.3164		103.1224	103.1224	0.1000		105.6212
Total	**19.6950**	**10.4024**	**61.3876**	**0.0652**		**1.1041**	**1.1041**		**1.1041**	**1.1041**	**0.0000**	**12,541.1224**	**12,541.1224**	**0.3383**	**0.2280**	**12,617.5340**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

City of Ontario
Community Climate Action Plan Screening Table

Instructions for Residential, Commercial, or Industrial Projects

The Screening Table assigns points for each option incorporated into a project as mitigation or a project design feature (collectively referred to as "feature"). The point values correspond to the minimum emissions reduction expected from each feature. The menu of features allows maximum flexibility and options for how development projects can implement the GHG reduction measures. The point levels are based upon improvements compared to 2008 emission levels of efficiency. Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the City's CAP. As such, those projects that garner a total of 100 points or greater would not require quantification of project specific GHG emissions. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

Instructions for Mixed Use Projects

Mixed use projects provide additional opportunities to reduce emissions by combining complimentary land uses in a manner that can reduce vehicle trips. Mixed use projects also have the potential to complement energy efficient infrastructure in a way that reduces emissions. For mixed use projects, fill out both Screening Table 1 and Table 2, but proportion the points identical to the proportioning of the mix of uses. As an example, a mixed use project that is 50% commercial uses and 50% residential uses will show ½ point for each assigned point value in Table 1 and Table 2. Add the points from both tables. Mixed use Projects that garner at least 100 points will be consistent with the reduction quantities in the City's CAP and are considered less than significant for GHG emissions.

Those projects that do not garnish 100 points using the screening tables will need to provide additional analysis to determine the significance of GHG emissions. Nothing in this guidance shall be construed as limiting the City's authority to adopt a statement of overriding consideration for projects with significant GHG impacts. The following tables provides a menu of performance standards/options related to GHG mitigation measures and design features that can be used to demonstrate consistency with the reduction measures and GHG reduction quantities in the CAP.

Table 1: Screening Table for Implementation of GHG Reduction Measures for Residential Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS E1: Residential Energy Efficiency			
Building Envelope			
Insulation	2008 Baseline (walls R-13:, roof/attic: R-30)	0 points	12
	Modestly Enhanced Insulation (walls R-13:, roof/attic: R-38)	12 points	
	Enhanced Insulation (rigid wall insulation R-13, roof/attic: R-38)	15 points	
	Greatly Enhanced Insulation (spray foam wall insulated walls R-15 or higher, roof/attic R-38 or higher)	18 points	
Windows	2008 Baseline Windows (0.57 U-factor, 0.4 solar heat gain coefficient (SHGC)	0 points	06
	Modestly Enhanced Window Insulation (0.4 U-Factor, 0.32 SHGC)	6 points	
	Enhanced Window Insulation (0.32 U-Factor, 0.25 SHGC)	7 points	
	Greatly Enhanced Window Insulation (0.28 or less U-Factor, 0.22 or less SHGC)	9 points	
Cool Roof	Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance)	10 points	10
	Enhanced Cool Roof(CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	12 points	
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	14 points	
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.		10
	Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	10 points	
	Blower Door HERS Verified Envelope Leakage or equivalent	8 points	
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		
	Modest Thermal Mass (10% of floor or 10% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	2 points	
	Enhanced Thermal Mass (20% of floor or 20% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	4 points	

Feature	Description	Assigned Point Values	Project Points
Indoor Space Efficiencies			
Heating/ Cooling Distribution System	Minimum Duct Insulation (R-4.2 required)	0 points	07
	Modest Duct insulation (R-6)	7 points	
	Enhanced Duct Insulation (R-8)	8 points	
	Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	12 points	
Space Heating/ Cooling Equipment	2008 Minimum HVAC Efficiency (SEER 13/60% AFUE or 7.7 HSPF)	0 points	04
	Improved Efficiency HVAC (SEER 14/65% AFUE or 8 HSPF)	4 points	
	High Efficiency HVAC (SEER 15/72% AFUE or 8.5 HSPF)	7 points	
	Very High Efficiency HVAC (SEER 16/80% AFUE or 9 HSPF)	9 points	
Water Heaters	2008 Minimum Efficiency (0.57 Energy Factor)	0 points	12
	Improved Efficiency Water Heater (0.675 Energy Factor)	12 points	
	High Efficiency Water Heater (0.72 Energy Factor)	15 points	
	Very High Efficiency Water Heater (0.92 Energy Factor)	18 points	
	Solar Pre-heat System (0.2 Net Solar Fraction)	4 points	
	Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	8 points	
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours.		01
	All peripheral rooms within the living space have at least one window (required)	0 points	
	All rooms within the living space have daylight (through use of windows, solar tubes, skylights, etc.)	1 points	
	All rooms daylighted	2 points	
Artificial Lighting	2008 Minimum (required)	0 points	08
	Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt)	8 points	
	High Efficiency Lights (50% of in-unit fixtures are high efficacy)	10 points	
	Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	12 points	
Appliances	Energy Star Refrigerator (new)	1 points	01
	Energy Star Dish Washer (new)	1 points	01
	Energy Star Washing Machine (new)	1 points	01

Feature	Description	Assigned Point Values	Project Points
Miscellaneous Residential Building Efficiencies			
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes natural heating, cooling, and lighting.	5 point	
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	4 Points	
Energy Star Homes	EPA Energy Star for Homes (version 3 or above)	25 points	
Independent Energy Efficiency Calculations	Provide point values based upon energy efficiency modeling of the Project. Note that engineering data will be required documenting the energy efficiency and point values based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
Existing Residential Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing residential dwelling units to further the point value of their project. Retrofitting existing residential dwelling units within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Ontario Planning Department. The decision to allow applicants to ability to participate in this program will be evaluated based upon, but not limited to the following; Will the energy efficiency retrofit project benefit low income or disadvantaged residents? Does the energy efficiency retrofit project fit within the overall assumptions in reduction measures associated with existing residential retrofits? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.	TBD	
Reduction Measure PS E2: Residential Renewable Energy Generation			
Photovoltaic	Solar Photovoltaic panels installed on individual homes or in collective neighborhood arrangements such that the total power provided augments:		
	Solar Ready Homes (sturdy roof and solar ready service panel)	2 points	
	10 percent of the power needs of the project	10 points	
	20 percent of the power needs of the project	15 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	28 points	
	50 percent of the power needs of the project	35 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	42 points	
	80 percent of the power needs of the project	46 points	

Feature	Description	Assigned Point Values	Project Points
	90 percent of the power needs of the project	52 points	
	100 percent of the power needs of the project	58 points	
Wind turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the area's capability to support wind turbines should be evaluated prior to choosing this feature. Individual wind turbines at homes or collective neighborhood arrangements of wind turbines such that the total power provided augments:		
	10 percent of the power needs of the project	10 points	
	20 percent of the power needs of the project	15 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	28 points	
	50 percent of the power needs of the project	35 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	42 points	
	80 percent of the power needs of the project	46 points	
	90 percent of the power needs of the project	52 points	
	100 percent of the power needs of the project	58 points	
Off-site renewable energy project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing homes that will help implement renewable energy within the City. These off-site renewable energy retrofit project proposals will be determined on a case by case basis and must be accompanied by a detailed plan that documents the quantity of renewable energy the proposal will generate. Point values will be determined based upon the energy generated by the proposal.	TBD	
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure PS W1: Residential Water Conservation			
Irrigation and Landscaping			
Water Efficient Landscaping	Limit conventional turf to < 50% of required landscape area	0 points	08
	Limit conventional turf to < 25% of required landscape area	4 points	
	No conventional turf (warm season turf to < 50% of required landscape area and/or low water using plants are allowed)	6 points	
	Only California Native Plants that requires no irrigation or some supplemental irrigation	8 points	

Feature	Description	Assigned Point Values	Project Points
Water Efficient irrigation systems	Low precipitation spray heads < .75"/hr or drip irrigation Weather based irrigation control systems or moisture sensors (demonstrate 20% reduced water use)	2 point 3 points	02
Recycled Water	Recycled connections (purple pipe) to irrigation system on site	6 points	
Water Reuse	Gray water Reuse System collects Gray water from clothes washers, showers and faucets for irrigation use,	12 points	
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	As required by LID
Potable Water			
Showers	Water Efficient Showerheads (2.0 gpm)	3 points	03
Toilets	Water Efficient Toilets (1.5 gpm)	3 points	03
Faucets	Water Efficient faucets (1.28 gpm)	3 points	03
Dishwasher	Water Efficient Dishwasher (6 gallons per cycle or less)	1	01
Washing Machine	Water Efficient Washing Machine (Water factor <5.5)	1	01
WaterSense	EPA WaterSense Certification	12 points	
Reduction Measure PS T1: Land Use Based Trips and VMT Reduction			
Mixed Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon a Transportation Impact Analysis (TIA) demonstrating trip reductions and/or reductions in vehicle miles traveled. Suggested ranges: Diversity of land uses complementing each other (2-28 points) Increased destination accessibility other than transit (1-18 points) Increased transit accessibility (1-25 points) Infill location that reduces vehicle trips or VMT beyond the measures described above (points TBD based on traffic data).	TBD	
Residential Near Local Retail (Residential only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled (VMT)	TBD	

Feature	Description	Assigned Point Values	Project Points
Other Trip Reduction Measures	Other trip or VMT reduction measures not listed above with TIA and/or other traffic data supporting the trip and/or VMT for the project.	TBD	
Reduction Measure PS T2: Bicycle Master Plan			
Bicycle Infrastructure	Ontario's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways. Provide bicycle paths within project boundaries. Provide bicycle path linkages between residential and other land uses. Provide bicycle path linkages between residential and transit.	TBD 2 points 5 points	
Reduction Measure PS T3: Neighborhood Electric Vehicle Infrastructure			
Electric Vehicle Recharging	Provide circuit and capacity in garages of residential units for use by an electric vehicle. Charging stations are for on-road electric vehicles legally able to drive on all roadways including Interstate Highways and freeways. Install electric vehicle charging stations in the garages of residential units	1 point 8 points	08
Total Points Earned by Residential Project:			102

Without VMT or Mixed Use

Table 2: Screening Table for Implementation of GHG Reduction Measures for Commercial/Industrial Development

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS E3: Commercial/Industrial Energy Efficiency Development			
Building Envelope			
Insulation	2008 baseline (walls R-13; roof/attic R-30)	0 points	18
	Modestly Enhanced Insulation (walls R-13, roof/attic R-38))	15 points	
	Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38)	18 points	
	Greatly Enhanced Insulation (spray foam insulated walls R-15 or higher, roof/attic R-38 or higher)	20 points	
	(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)		
Windows	2008 Baseline Windows (0.57 U-factor, 0.4 solar heat gain coefficient [SHGC])	0 points	07
	Modestly Enhanced Window Insulation (0.4 U-factor, 0.32 SHGC)	7 points	
	Enhanced Window Insulation (0.32 U-factor, 0.25 SHGC)	8 points	
	Greatly Enhanced Window Insulation (0.28 or less U-factor, 0.22 or less SHGC)	12 points	
	(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)		
Cool Roof	Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance)	12 points	12
	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	14 points	
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	16 points	
Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.		12
	Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	12 points	
	Blower Door HERS Verified Envelope Leakage or equivalent	10 points	
	(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)		
Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		

Feature	Description	Assigned Point Values	Project Points
	Modest Thermal Mass (10% of floor or 10% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	4 points	04
	Enhanced Thermal Mass (20% of floor or 20% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	6 points	
	Enhanced Thermal Mass (80% of floor or 80% of walls 12" or more thick exposed concrete or masonry with no permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	24 points	
Indoor Space Efficiencies			
Heating/ Cooling Distribution System	Minimum Duct Insulation (R-4.2 required)	0 points	08
	Modest Duct insulation (R-6)	8 points	
	Enhanced Duct Insulation (R-8)	10 points	
	Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent) *(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)*	14 points	
Space Heating/ Cooling Equipment	2008 Minimum HVAC Efficiency (EER 13/60% AFUE or 7.7 HSPF)	0 points	07
	Improved Efficiency HVAC (EER 14/65% AFUE or 8 HSPF)	7 points	
	High Efficiency HVAC (EER 15/72% AFUE or 8.5 HSPF)	8 points	
	Very High Efficiency HVAC (EER 16/80% AFUE or 9 HSPF) *(Applies to the conditioned space, defined as those areas within the building that have air conditioning and heating.)*	12 points	
Commercial Heat Recovery Systems	Heat recovery strategies employed with commercial laundry, cooking equipment, and other commercial heat sources for reuse in HVAC air intake or other appropriate heat recovery technology. Point values for these types of systems will be determined based upon design and engineering data documenting the energy savings.	TBD	
Water Heaters	2008 Minimum Efficiency (0.57 Energy Factor)	0 points	14
	Improved Efficiency Water Heater (0.675 Energy Factor)	14 points	
	High Efficiency Water Heater (0.72 Energy Factor)	16 points	
	Very High Efficiency Water Heater (0.92 Energy Factor)	19 points	
	Solar Pre-heat System (0.2 Net Solar Fraction)	4 points	
	Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	8 points	
Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours.		

Feature	Description	Assigned Point Values	Project Points
	All peripheral rooms within building have at least one window or skylight	1 points	05
	All rooms within building have daylight (through use of windows, solar tubes, skylights, etc.)	5 points	
	All rooms daylighted	7 points	
Artificial Lighting	2008 Minimum (required)	0 points	09
	Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt)	9 points	
	High Efficiency Lights (50% of in-unit fixtures are high efficacy)	12 points	
	Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	14 points	
Appliances	Energy Star Commercial Refrigerator (new)	4 points	12
	Energy Star Commercial Dish Washer (new)	4 points	
	Energy Star Commercial Cloths Washing	4 points	
Miscellaneous Commercial/Industrial Building Efficiencies			
Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes conditions for natural heating, cooling, and lighting.	6 point	
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on June 21st.	6 Points	
Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	
Existing Commercial building Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing commercial buildings to further the point value of their project. Retrofitting existing commercial buildings within the City is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Ontario Planning Department. The decision to allow applicants the ability to participate in this program will be evaluated based upon, but not limited to the following:	TBD	

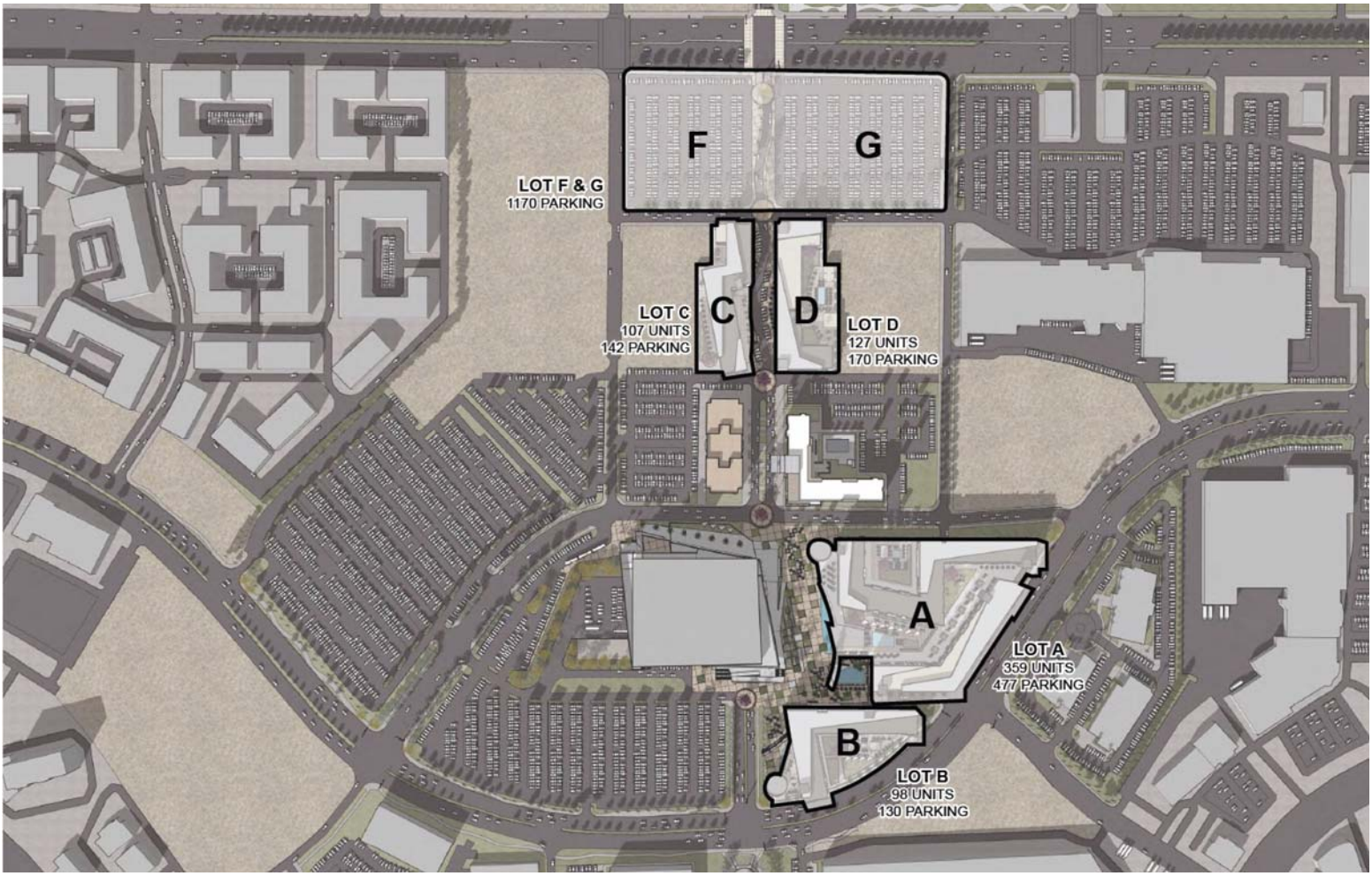
Feature	Description	Assigned Point Values	Project Points
	Will the energy efficiency retrofit project benefit low income or disadvantaged communities? Does the energy efficiency retrofit project fit within the overall assumptions in the reduction measure associated with commercial building energy efficiency retrofits? Does the energy efficiency retrofit project provide co-benefits important to the City? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.		
Reduction Measure PS E4: Commercial/Industrial Renewable Energy			
Photovoltaic	Solar Photovoltaic panels installed on commercial buildings or in collective arrangements within a commercial development such that the total power provided augments:		
	Solar Ready Roofs (sturdy roof and electric hookups)	2 points	
	10 percent of the power needs of the project	8 points	
	20 percent of the power needs of the project	14 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	26 points	
	50 percent of the power needs of the project	32 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	44 points	
	80 percent of the power needs of the project	50 points	
	90 percent of the power needs of the project	56 points	
	100 percent of the power needs of the project	60 points	
Wind turbines	Some areas of the City lend themselves to wind turbine applications. Analysis of the areas capability to support wind turbines should be evaluated prior to choosing this feature. Wind turbines as part of the commercial development such that the total power provided augments:		
	10 percent of the power needs of the project	8 points	
	20 percent of the power needs of the project	14 points	
	30 percent of the power needs of the project	20 points	
	40 percent of the power needs of the project	26 points	
	50 percent of the power needs of the project	32 points	
	60 percent of the power needs of the project	38 points	
	70 percent of the power needs of the project	44 points	

Feature	Description	Assigned Point Values	Project Points
	80 percent of the power needs of the project 90 percent of the power needs of the project 100 percent of the power needs of the project	50 points 56 points 60 points	
Off-site renewable energy project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing commercial/industrial that will help implement reduction measures associated with existing buildings. These off-site renewable energy retrofit project proposals will be determined on a case by case basis accompanied by a detailed plan documenting the quantity of renewable energy the proposal will generate. Point values will be based upon the energy generated by the proposal.	TBD	
Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	
Reduction Measure PS W2: Commercial/Industrial Water Conservation			
Irrigation and Landscaping			
Water Efficient Landscaping	Eliminate conventional turf from landscaping Only moderate water using plants Only low water using plants Only California Native landscape that requires no or only supplemental irrigation	0 points 3 points 4 points 8 points	08
Trees	Increase tree planting in parking areas 50% beyond City Code requirements	TBD	
Water Efficient irrigation systems	Low precipitation spray heads< .75"/hr or drip irrigation Weather based irrigation control systems combined with drip irrigation (demonstrate 20 reduced water use)	1 point 5 points	01
Recycled Water	Recycled water connection (purple pipe)to irrigation system on site	5 points	
Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	

Feature	Description	Assigned Point Values	Project Points
Potable Water			
Showers	Water Efficient Showerheads (2.0 gpm)	3 points	
Toilets	Water Efficient Toilets/Urinals (1.5gpm) Waterless Urinals (note that commercial buildings having both waterless urinals and high efficiency toilets will have a combined point value of 6 points)	3 points 4 points	07
Faucets	Water Efficient faucets (1.28gpm)	3 points	03
Commercial Dishwashers	Water Efficient dishwashers (20% water savings)	4 points	04
Commercial Laundry Washers	Water Efficient laundry (15% water savings) High Efficiency laundry Equipment that captures and reuses rinse water (30% water savings)	3 points 6 points	
Commercial Water Operations Program	Establish an operational program to reduce water loss from pools, water features, etc., by covering pools, adjusting fountain operational hours, and using water treatment to reduce draw down and replacement of water. Point values for these types of plans will be determined based upon design and engineering data documenting the water savings.	TBD	
Reduction Measure PS T1: Land Use Based Trips and VMT Reduction			
Mixed Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled	TBD	
Local Retail Near Residential (Commercial only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled	TBD	
Reduction Measure PS T2: Bicycle Master Plan			
Bicycle Infrastructure	Ontario's Bicycle Master Plan is extensive and describes the construction on 11.5 miles of Class I bike paths and 23 miles of Class II and Class III bikeways to build upon the current 8 miles of bikeways. Provide bicycle paths within project boundaries. Provide bicycle path linkages between project site and other land uses. Provide bicycle path linkages between project site and transit.	TBD TBD 2 points 5 points	

Feature	Description	Assigned Point Values	Project Points
Reduction Measure PS T3: Electric Vehicle Infrastructure			
Electric Vehicles	Provide public charging station for use by an electric vehicle. *(ten points for each charging station within the facility)*	10 points	10
Reduction Measure PS T4: Employee Based Trip &VMT Reduction Policy			
Compressed Work Week	Reduce the number of days per week that employees need to be on site will reduce the number of vehicle trips associated with commercial/industrial development. Compressed work week such that full time employees are on site: 5 days per week 4 days per week on site 3 days per week on site	TBD	
Car/Vanpools	Car/vanpool program Car/vanpool program with preferred parking Car/vanpool with guaranteed ride home program Subsidized employee incentive car/vanpool program Combination of all the above	TBD	
Employee Bicycle/ Pedestrian Programs	Complete sidewalk to residential within ½ mile Complete bike path to residential within 3 miles Bike lockers and secure racks Showers and changing facilities Subsidized employee walk/bike program (Note combine all applicable points for total value)	TBD	
Shuttle/Transit Programs	Local transit within ¼ mile Light rail transit within ½ mile Shuttle service to light rail transit station Guaranteed ride home program Subsidized Transit passes Note combine all applicable points for total value	TBD	
CRT	Employer based Commute Trip Reduction (CRT). CRTs apply to commercial, offices, or industrial projects that include a reduction of vehicle trip or VMT goal using a variety of employee commutes trip reduction methods. The point value will be determined based upon a TIA that demonstrates the trip/VMT reductions. Suggested point ranges: Incentive based CRT Programs (1-8 points) Mandatory CRT programs (5-20 points)	TBD	
Other Trip Reductions	Other trip or VMT reduction measures not listed above with TIA and/or other traffic data supporting the trip and/or VMT for the project.	TBD	
Total Points from Commercial/Industrial Project:			141

TOYOTA ARENA MIXED-USE DEVELOPMENT
ENERGY CONSERVATION ANALYSIS
City of Ontario



TOYOTA ARENA MIXED-USE DEVELOPMENT
ENERGY CONSERVATION ANALYSIS
City of Ontario, California

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1.0 Introduction

1.1 Purpose of Report and Study Objectives

The purpose of this energy conservation analysis is to review the energy implications of the proposed Toyota Arena Mixed-Use Development (project) and provide recommendations to reduce wasteful, inefficient and unnecessary consumption of energy during construction and operation. This analysis has been prepared within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.).

CEQA Guidelines, Appendix F, Energy Conservation, describes the framework within which energy conservation should be analyzed. Conserving energy implies the wise and efficient use of energy through decreasing overall per capita energy consumption, decreasing reliance on fossil fuels (such as coal, natural gas and oil), and increasing reliance on renewable energy sources. This analysis considers energy impacts to include:

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction and operation.

2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.

3. The effects of the project on peak and base period demands for electricity and other forms of energy.

4. The degree to which the project complies with existing energy standards.

5. The effects of the project on energy resources.

1.2 Site Location

The proposed project site is located adjacent to the Toyota Arena, north of Concourse Street and south of Fourth Street, in the City of Ontario.

The project site is located with Ontario Center Specific Plan and zoned for Urban Commercial within the Specific Plan. The City of Ontario General Plan land use map designates the project site as Mixed Use.

The project location map is provided in Exhibit A.

1.3 Project Description

The project consists of construction and operation of a mixed use town center development with residential and commercial/retail land use within four development lots.

The proposed project includes a total of 691 residential dwelling units, 71,200 square feet of commercial/retail uses and the demolition and relocation of approximately 1,170 surface parking spaces. The total project site area is approximately 18.73 acres.

The site plan used for this analysis, provided by the applicant, is illustrated in Exhibit B. Table 1 summarizes the land use assumptions used for this analysis.

Table 1
Land Use Summary

Lot	Dwelling Units	Retail (SF)[1]	Parking Spaces
A	359	25,256	477[2]
B	98	20,802	130[2]
C	107	11,047	142[2]
D	127	14,095	170[2]
E & F	--	--	1,170
Total	691	71,200	2,089

[1] S.F. – Square Feet
[2] Parking Structure

The site plan used in this analysis was provided by the applicant, and is illustrated in Exhibit B.

1.4 Utility Providers

The project will be served by the following utility providers, as shown in Table 2.

Table 2
Utility Providers

Utility	Provider
Electricity	Southern California Edison
Natural Gas	Southern California Gas Company
Water	Ontario Public Works & OMUC
Sewer	Ontario Public Works & OMUC
Telephone	Frontier Communications
Cable	Frontier Communications

1.5 Summary of CEQA Impacts

Table 3 provides a summary of the project's impact to Energy resources, per the impact criteria described in CEQA Guidelines, Appendix G.

Table 3
CEQA Energy Impact Criteria

Energy Impact Criteria	Potentially Significant	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

1.6 Project Design Features

The following project design features are considered standard building code requirements and best practices that will be included in the project design to will help reduce energy consumption. Design features are not typically considered mitigation under CEQA.

Construction Design Features

DF-1 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

Operational Design Features

DF-2 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

DF-3 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-4 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-5 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-6 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-7 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-8 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

DF-9 Provide electric vehicle charging stations per the requirements of CALGreen.

2.0 Regulatory Setting

Energy is controlled through various federal and state laws and regulations. This section provides a brief overview of key energy legislation and policies at the federal and state levels over the past 50 years.

2.1 Federal Regulations

Table 4
U.S. Energy Policy Legislative Acts

Date	Legislative Act and Description
1975	**Energy Policy and Conservation Act** Established the Strategic Petroleum Reserve and mandated vehicle fuel economy standards
1978	**National Energy Act** Established tax incentives and disincentives, alternative fuel programs, energy efficiency initiatives, and other regulatory and market-based initiatives in response to the oil crisis earlier in the decade. Comprised of 5 statutes: **Energy Tax Act** Created the Gas Guzzler tax for vehicles with mileage below specified levels and offered income tax credit for citizens using solar, wind, or geothermal energy sources at home **Natural Gas Policy Act** Set up wellhead pricing maximums, rules for allocating costs of high-cost gas to industrial consumers, and provided authority to high priority users in times of supply emergency; gave FERC jurisdiction over almost all natural gas production **National Energy Conservation Policy Act** Replaced Minimum Energy Performance Standards (MEPS) set forth in the EPCA of 1975, changed energy standards from voluntary to mandatory, Required federal agencies to do energy audits of their operations, Provided loans for families to purchase solar heating or cooling systems, and Established grants for schools, hospitals, local governments, and public housing authorities willing to use energy conservation measures **Power Plant and Industrial Fuel Use Act** Restricted construction of power plants fueled primarily by oil or natural gas and instead encouraged power plants fueled by coal, nuclear, and alternative fuels and restricted use of oil and natural gas in industrial boilers. Repealed in 1987 with the Natural Gas Utilization Act **Public Utility Regulatory Policies Act** Promoted use of renewable energy, encouraged cogeneration plants.
1980	**Energy Security Act** Title I: US Synthetic Fuels Corporation Act Established the Synthetic Fuels Corporation (which only existed until 1985) for the purpose of partnering with industry for the creation of a market for domestically-produced synthetic liquid fuels; moved research and development for synthetic fuels away from the Department of Energy and into this public-private partnership with the hopes of speeding up results. Title II: Biomass Energy and Alcohol Fuels Act Provided loan guarantees for small-scale biomass energy projects; established the Office of Alcohol Fuels, the Office of Energy from Municipal Waste.

Table 4
U.S. Energy Policy Legislative Acts

Date	Legislative Act and Description
	Title III: Energy Targets Required the submission of energy targets for net imports. Title IV: Renewable Initiatives Established incentives for the use of renewable energy resources Title V: Solar Energy and Energy Conservation Encouraged energy conservation and the use of solar energy, reducing dependence on foreign energy supplies. Title VI: Geothermal Energy Act Authorized loans from the Geothermal Resources Development Fund for exploration and determination of economic viability of a geothermal reservoir, cancels loan if reservoir is deemed unacceptable for development. Title VII: Acid Precipitation Program Established a task force to study the causes and risks of acid precipitation Title VIII: Strategic Petroleum Reserve Established that 500,000,000 barrels of crude oil must be in storage before any can be sold and calls for the reserve to increase its supply 100,000 barrels per day until the storage capacity is reached
1992	**Energy Policy Act** Amended the National Energy Conservation Policy Act of 1978. Created framework for wholesale electricity generation. Provided financial incentives to users/developers of clean-fuel vehicles; repealed alternative minimum tax for some producers. Intended to expand the use of natural gas.
2002	**Farm Security and Rural Investment Act (Farm Bill)** Included $405 million in mandatory funding over the following 5 years for the procurement of bio-based products, grants and loans for renewable energy and energy efficiency projects, research and development and the bioenergy program. Included, for reasons of national energy and security, rural economic development, and environmental sustainability in light of climate change impacts.
2005	**Energy Policy Act** Offers tax benefits to individuals who increase energy efficiency in existing homes, buy or lease hybrid/alternative vehicles, required all public utilities to offer net metering on request, increased required amounts of renewable fuel in gasoline sold in the US, and encourages more domestic energy production
2007	**Energy Independence and Security Act** Increased CAFE standards to 35 mpg (fleet-wide for passenger autos and light trucks) by 2020; instituted new conservation measures for federal fleet vehicles; authorized increased taxpayer-funded biofuel production (36 billion gallons by 2022 - 21 billion of which must be derived from non-cornstarch products). Revised standards for appliances and lighting; all federal buildings must use Energy Star lighting products; training for green jobs; loans for small business energy efficiency improvements.
2008	**Food, Conservation, and Energy Act (Farm Bill)** Includes provisions for loan guarantees for bio-refineries, payments to support expansion of advanced biofuels, expands the existing Rural Energy for America Program, provides grant monies for biofuel and bio-based product research and development
2009	**The American Recovery and Reinvestment Act of 2009**

Table 4
U.S. Energy Policy Legislative Acts

Date	Legislative Act and Description
	$800 billion economic stimulus package aimed at job creation and the promotion of investment and consumer spending; included $4.3 billion in tax credits to homeowners for energy efficiency improvements in 2009-2010, $300 million for reducing diesel engine emissions, $21.5 billion for energy infrastructure, $27.2 billion for energy efficiency and renewable energy research and investment, $2 billion in research for DOE, $600 million in research for NOAA
2015	**The Clean Power Plan** The first comprehensive plan to reduce carbon emissions from power plants by 32% in 2030, compared to 2005 levels. The plan was repealed under the Trump Administration. The Biden Administration has recently said it will not try to resurrect the plan, but will instead be proposing a new rule aimed at limiting GHG emissions from power plants.

[1] Source: Robinson, Brandi. Penn State University. https://www.e-education.psu.edu/geog432/node/116

2.2 State of California Regulations

California has a long-standing history of support for energy conservation and renewable energy.

Table 5 provides a summary of some of the key legislative acts, policies and regulations in the State of California for encouraging energy conservation and renewable energy.

Table 5
California Energy Policy Legislative Acts and Regulations

Date	Legislative Act and Description
1974	**Warren-Alquist Act** Established the California Energy Commission (CEC) as the state's primary energy policy and planning agency. Responsible for preparing State Energy Plan. CEC's goals are to reduce energy costs and environmental impacts of energy use, while ensuring a safe, resilient, and reliable supply of energy.
1978	**Title 24 of the California Code of Regulations** Establishes the Renewable Portfolio Standard (RPS) program, requiring 20% of retail sales from renewable energy by 2017.
2002	**Senate Bill 1078** Required 20% of retail sales from renewable energy by 2017.
2003	**Energy Action Plan I** Accelerated the 20% renewable deadline to 2010.
2005	**Energy Action Plan II** Recommended further goal of 33% renewable by 2020.
2006	**Senate Bill 107** Codified the accelerated 20% renewable by 2010 deadline into law.
2008	**Executive Order S-14-08** Signed by Gov. Schwarzenegger, requires 33% renewables by 2020.
2009	**Executive Order S-21-09** Directs the California Air Resources Board, under its AB 32 authority, to adopt regulations by July 31, 2010, consistent with the 33% renewable energy target established in Executive Order S-14-08.
2011	**Senate Bill X1-2** Signed by Gov. Edmund G. Brown, Jr., codifies 33% renewable by 2020 RPS
2015	**Senate Bill 350 – Clean Energy and Pollution Reduction Act of 2015** Signed by Gov. Edmund G. Brown, Jr. codifies 50% by 2030 RPS
2018	**Senate Bill 100** Signed by Gov. Edmund G. Brown, Jr. codifies 60% by 2030 & 100% by 2045 RPS

[1] Source: California Energy Commission. https://www.energy.ca.gov/renewables/index.html

3.0 Project Energy Consumption

3.1 Energy Consumption Methodology

The three (3) main types of energy expected to be consumed by the project include electricity, natural gas and petroleum products in the form of gasoline and diesel fuel. Energy usage for the proposed project is calculated based on the *CalEEMod* and *Toyota Arena Mixed Use Development Air Quality and Greenhouse Gas Analysis, prepared by RK Engineering Group, Inc., dated June 2021* (Air/GHG Study).

The California Emissions Estimator Model Version 2020.4.0 (CalEEMod) is used to calculate energy usage from project construction and operational activities.

The CalEEMod Annual Reports for the project are provided in Appendix A.

3.2 Electricity Consumption

The project will use electricity for many different operational activities including, but not limited to, building heating and cooling, lighting, appliances, electronics, mechanical equipment, electric vehicle charging, and parking lot lighting. Indirect electricity usage will also be required to supply, distribute, and treat water and wastewater. Electricity will be provided to the site by Southern California Edison.

Temporary electricity usage for construction activities may include lighting, electric equipment and mobile office uses, however, CalEEMod does not calculate electricity usage during construction. Electricity usage during construction is expected to be short-term and relatively minor compared to the operational demand, and therefore electricity usage during construction is not counted in this analysis.

Table 6 shows the project's estimated operational electricity consumption in kilowatt-hours per year (kWh/year) and millions of Btu per year.

Table 6
Project Electricity Consumption

Land Use/Activity	Electricity Consumption[1]	
	(kWhr/yr)[2]	(MBtu/yr)[2]
Apartments Mid Rise	2,736,370.00	9,336.49
Enclosed Parking with Elevator	1,999,740.00	6,823.11
Parking Lot	163,800.00	558.89
Regional Shopping Center	864,368.00	2,949.22
Water Supply and Treatment	1,066,561.70	3,639.11
Total	6,830,839.70	23,306.83

[1] Source: CalEEMod Defaults. Refer Appendix A

[2] kWhr/yr = Kilowatt Hours per Year
MBtu/yr = Million British Thermal Units per Year

3.3 Natural Gas Consumption

The project will use natural gas for such things as building heating and cooling, cooking, kitchen appliances, and gas water heaters. Natural gas is not expected to be used during construction in any significant quantities and is not included in the overall calculation of the project's natural gas consumption.

Table 7 shows the project's estimated operational natural gas consumption in millions of Btu per year.

Table 7
Project Natural Gas Consumption

Land Use/Activity	Natural Gas Consumption[1] (MBtu/yr)[2]
Apartments Mid Rise	9,938.08
Regional Shopping Center	156.64
Total	10,094.72

[1] Source: CalEEMod Defaults. Refer Appendix A

[2] MBtu/yr = Millions of British Thermal Units per Year

3.4 Petroleum Consumption

The project's energy consumption from petroleum products is primarily associated with transportation related activities. This includes gasoline and diesel fuel usage for auto and truck trips during construction and operation and off-road equipment usage during construction.

3.4.1 Petroleum Consumption - Construction

Construction of the project is estimated to last approximately 21 months and consist of demolition, site preparation, grading, building construction, paving, and architectural coating phases. Construction activities will consume energy in the form of motor vehicle fuel (gasoline and diesel) for off-road construction equipment and on-road vehicle trips. Vehicle trips include workers and vendors traveling to and from the job-site.

Table 8 shows the project's energy consumption for all off-road equipment during construction. For purposes of this analysis, all off-road equipment is assumed to run on diesel fuel. Table 9 shows the project's energy consumption from on-road vehicle trips during construction.

TABLE 8
Construction Off-Road Equipment Energy Consumption

Phase[1]	Phase Duration (Days)[1]	Equipment[1]	Amount[1]	Hours/ Day[1]	Horspower (HP)[1]	Load Factor[1]	HP-hrs[2]	Fuel Consumption Rate[3] (hp-hr/gal)	Diesel Fuel Consumption (gal.)	Diesel Fuel Consumption by Phase (gal.)	MBtu[4]
Demolition	20	Concrete/Industrial Saws	1	8	81	0.73	9,460.8	18.5	511.4	3,778.2	519.048
		Excavators	3	8	158	0.38	28,819.2		1,557.8		
		Rubber Tired Dozers	2	8	247	0.40	31,616.0		1,709.0		
Site Preparation	10	Rubber Tired Dozers	3	8	247	0.40	23,712.0		1,281.7	1,902.5	261.371
		Tractors/Loaders/Backhoes	4	8	97	0.37	11,484.8		620.8		
Grading	30	Excavators	2	8	158	0.38	28,819.2		1,557.8	9,336.0	1,282.589
		Graders	1	8	187	0.41	18,400.8		994.6		
		Rubber Tired Dozers	1	8	247	0.40	23,712.0		1,281.7		
		Scrapers	2	8	367	0.48	84,556.8		4,570.6		
		Tractors/Loaders/Backhoes	2	8	97	0.37	17,227.2		931.2		
Building Construction	300	Cranes	1	7	231	0.29	140,679.0		7,604.3	37,503.2	5,152.233
		Forklifts	3	8	89	0.20	128,160.0		6,927.6		
		Generator Sets	1	8	84	0.74	149,184.0		8,064.0		
		Tractors/Loaders/Backhoes	3	7	97	0.37	226,107.0		12,222.0		
		Welders	1	8	46	0.45	49,680.0		2,685.4		
Paving	20	Pavers	1	6	130	0.42	6,552.0		354.2	1,124.8	154.520
		Paving Equipment	1	8	132	0.36	7,603.2		411.0		
		Rollers	1	7	132	0.36	6,652.8		359.6		
Architectural Coating	75	Air Compressors	1	6	78	0.48	16,848.0		910.7	910.7	125.113
								Total Energy Requirements		**54,555.4**	**7,494.875**

[1] Source: Appendix A Annual Results Sheet. (CalEEMod v.2020.4.0)

[2] HP-hrs = Horsepower Hours.

[3] Source: Carl Moyer Program Guidelines. 2017 Revisions. Table D-21. https://www.arb.ca.gov/msprog/moyer/guidelines/current.htm

[4] Mbtu = Millions of Btu; assuming 1 gallon of diesel fuel = 137,381 Btu.

Table 9
Construction On-Road Trips Energy Consumption

Construction Phase[1]	Phase Duration (Days)[1]	Trips /Day[1]	Trip Length[1]	Phase VMT	Vehicle Class[1]	Vehicle Mix[1]	Average Fuel Economy (MPG)[2]	Gasoline			Diesel			Total MBtu[3]
								Fuel Split[2]	Fuel Consumption by Veh. Class (gal.)	Fuel Consumption by Phase (gal.)	Fuel Split[2]	Fuel Consumption by Veh. Class (gal.)	Fuel Consumption by Phase	
Worker Trips														
Demolition	20	15	14.7	4,410	LDA	0.50	32.59	0.9938	67.24		0.0062	0.42		
					LDT1	0.25	27.46	0.9996	40.13	150.21	0.0004	0.02	0.66	18.18
					LDT2	0.25	25.60	0.9947	42.84		0.0053	0.23		
Site Prerparation	10	18	14.7	2,646	LDA	0.50	32.59	0.9938	40.34		0.0062	0.25		
					LDT1	0.25	27.46	0.9996	24.08	90.13	0.0004	0.01	0.40	10.91
					LDT2	0.25	25.60	0.9947	25.70		0.0053	0.14		
Grading	30	20	14.7	8,820	LDA	0.50	32.59	0.9938	134.48		0.0062	0.84		
					LDT1	0.25	27.46	0.9996	80.27	300.42	0.0004	0.03	1.33	36.36
					LDT2	0.25	25.60	0.9947	85.68		0.0053	0.46		
Building Construction	300	871	14.7	3,841,110	LDA	0.50	32.59	0.9938	58,565.44		0.0062	365.37		
					LDT1	0.25	27.46	0.9996	34,956.06	130,833.53	0.0004	13.99	578.17	15,835.58
					LDT2	0.25	25.60	0.9947	37,312.03		0.0053	198.81		
Paving	20	15	14.7	4,410	LDA	0.50	32.59	0.9938	67.24		0.0062	0.42		
					LDT1	0.25	27.46	0.9996	40.13	150.21	0.0004	0.02	0.66	18.18
					LDT2	0.25	25.60	0.9947	42.84		0.0053	0.23		
Architectural Coating	75	174	14.7	191,835	LDA	0.50	32.59	0.9938	2,924.91		0.0062	18.25		
					LDT1	0.25	27.46	0.9996	1,745.80	6,534.17	0.0004	0.70	28.88	790.87
					LDT2	0.25	25.60	0.9947	1,863.46		0.0053	9.93		
Sub-Total Worker Trips Energy Consumption									Gasoline (gal.)	138,058.66		Diesel (gal.)	610.10	16,710.08
Vendor Trips														
Building Construction	300	222	6.9	459,540	MHDT	0.50	9.58	0.2679	6,425.41	6,458.51	0.7321	17,558.94	50,633.90	7,733.93
					HHDT	0.50	6.94	0.0010	33.11		0.9990	33,074.96		
Hauling Trips														
Demolition	20	1,483	20.0	593,200	HHDT	1.00	6.94	0.0010	85.48	85.48	0.9990	85,390.03	85,390.03	11,741.26
Total On-Road Construction Trips Energy Consumption									**Gasoline (gal.)**	**144,602.65**		**Diesel (gal.)**	**136,634.02**	**36,185.27**

1 Source: Appendix A Annual Results Sheet. (CalEEMod v.2020.4.0)
[2] Source: EMFAC2017 Web Database. https://www.arb.ca.gov/emfac/2017/. (See Appendix B for more details.)
[3] Mbtu = Millions of Btu; assuming 1 gallon of gasoline fuel = 120,429 Btu and 1 gallon of diesel fuel = 137,381 Btu

3.4.2 Petroleum Consumption - Operation

The project is expected to consume energy from auto and truck trips generated by the proposed land uses, as described in the Toyota Arena Mixed Use Development Traffic Impact Study Scoping Agreement, by RK, May 2021 and the Toyota Arena Mixed Use Development Air Quality and Greenhouse Gas Impact Study, prepared by RK Engineering Group, Inc., dated June 2021. Operational vehicle trips are associated with workers, customers and vendors/non-workers (i.e., delivery, service, maintenance vehicles, etc.) traveling to and from the site.

Table 10 shows the project's petroleum energy consumption for all operational trips generated by the project on an annual basis.

Table 10
Operational Trips Energy Consumption - Annual

Vehicle Class	Vehicle Mix	Average Fuel Economy (MPG)	Mitigated Annual VMT	Gasoline		Diesel		MBtu
				Fuel Split	Fuel Consumption (gal.)	Fuel Split	Fuel Consumption (gal.)	
LDA	55.05%	32.59		0.9938	171,606.07	0.0062	1,070.60	20,813.43
LDT1	5.72%	27.46		0.9996	21,269.87	0.0004	8.51	2,562.68
LDT2	17.64%	25.60		0.9947	70,077.78	0.0053	373.39	8,490.69
MDV	14.23%	20.81		0.9815	68,604.36	0.0185	1,293.10	8,439.60
LHD1	2.76%	13.81		0.7188	14,708.48	0.2812	5,754.07	2,561.83
LHD2	0.34%	14.18		0.5328	1,294.18	0.4672	1,134.84	311.76
MHD	0.53%	9.58	10,221,754	0.2679	1,524.84	0.7321	4,166.97	756.10
HHD	0.81%	6.94		0.0010	11.92	0.9990	11,909.43	1,637.56
OBUS	0.03%	5.11		1.0000	523.61	0.0000	0.00	63.06
UBUS	0.01%	5.18		0.9866	231.56	0.0134	3.15	28.32
MCY	2.59%	36.38		1.0000	7,278.11	0.0000	0.00	876.50
SBUS	0.04%	8.15		0.3076	172.34	0.6924	387.94	74.05
MH	0.24%	6.07		0.8447	3,377.72	0.1553	621.00	492.09
Total Operational Trips Energy Usage				Gasoline Consumption (gal.)	360,680.84	Diesel Consumption (gal.)	26,723.00	47,107.67

[1] Source: Toyota Arena Mixed Use Development Air Quality and Greenhouse Gas Analysis, by RK Engineering Group, Inc. (CalEEMod .2020.4.0)
[2] Source: EMFAC2017 Web Database. https://www.arb.ca.gov/emfac/2017/. (See Appendix B for more details.)
[3] MBtu/yr = Millions of Btu per year; assuming 1 gallon of gasoline fuel = 120,429 Btu and 1 gallon of diesel fuel = 137,381 Btu

3.5 Summary of Project Energy Consumption

Table 11 provides a summary of the project's annual operational energy consumption.

Table 11
Annual Energy Consumption

Activity	Energy Consumption (MBtu/yr)[1]
Total Annual Operational Energy Consumption	**80,509.21**
Electricity	23,306.83
Natural Gas	10,094.72
Petroleum	47,107.67

[1] MBtu/yr = Millions of Btu per year. Operational activities only.

4.0 Energy Impacts

4.1 Energy Impact Criteria

This analysis has been prepared within the context of the CEQA Guidelines, Appendix F, Energy Conservation, and Appendix G, Environmental Checklist Form. According to CEQA, the goal of conserving energy implies the wise and efficient use of energy through decreasing overall per capita energy consumption, decreasing reliance on fossil fuels (such as coal, natural gas and oil), and increasing reliance on renewable energy sources.

A significant environmental impact would result if the project would;

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation, or;

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.2 Energy Impact – 1

Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

The project's impact is considered less than significant with the inclusion of the mandatory requirements of California's Building Energy Efficiency Standards (Title 24, Part 6) and Green Building Standards (CALGreen, Title 24, Part 11). California's building energy efficiency standards are some of the strictest in the nation and the project's compliance with California's building code will ensure that wasteful, inefficient or unnecessary consumption of energy is minimized. The building standards code is designed to reduce the amount of energy needed to heat or cool a building, reduce energy usage for lighting and appliances.

The following recommended design features are provided to reduce wasteful, inefficient and unnecessary consumption of energy. Design features are consistent with the recommended design features provided with Air/GHG study.

Construction Design Features

DF-1 Establish an electricity supply to the construction site and use electric powered equipment instead of diesel-powered equipment or generators, where feasible.

Operational Design Features

DF-2 Implement the GHG Reduction Measures from the Ontario County Climate Action Plan (CAP) Screening Tables to achieve at least 100 points, per the requirements for Mixed Use Projects.

DF-3 Comply with the mandatory requirements of California Building Standards Code Title 24 Part 6 (Energy Code) and Title 24 Part 11 (CAL Green).

DF-4 Implement water conservation strategies, including low flow fixtures and toilets, water efficient irrigation systems, drought tolerant/native landscaping, and limit the amount of turf/sod, per CAL Green and City of Ontario requirements.

DF-5 Implement zero waste strategies, recycling and composting programs for residential and non-residential uses.

DF-6 Encourage residents and landscape maintenance crews to use electric landscaping equipment, such as lawn mowers and leaf blowers, wherever feasible.

DF-7 No natural gas or wood burning fireplaces shall be installed in any residential dwelling.

DF-8 Implement trip reduction measures that reduce the number of auto-based trips and encourage the use of transit, bicycling, and walking. Such as;

1. Improve the walkability and design of the project by including pedestrian and bicycling connections within the project site and to adjacent off-site facilities (i.e. sidewalks, crosswalks, foot paths, protected bike lanes, multi-purpose trails, direct parcel-to-parcel connections, wayfinding signage, etc.).

2. Provide traffic calming measures (i.e. marked crosswalks, raised crosswalks, raised intersections, count-down signal timers, curb extensions, speed tables, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, etc.)

3. Provide bicycle racks for the retail and commercial uses and secure bicycle parking areas for the office and residential uses.

DF-9 Provide electric vehicle charging stations per the requirements of CALGreen.

4.3 Energy Impact – 2

Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The project's impact is considered less than significant as the project will purchase electricity through Southern California Edison which is subject to the requirements of California Senate Bill 100 (SB 100). SB 100 is the most stringent and current energy legislation in California; requiring that renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045.[1]

The project will further comply with the mandatory requirements of California's Green Building and Building Energy Efficiency standards that promote renewable energy and energy efficiency.

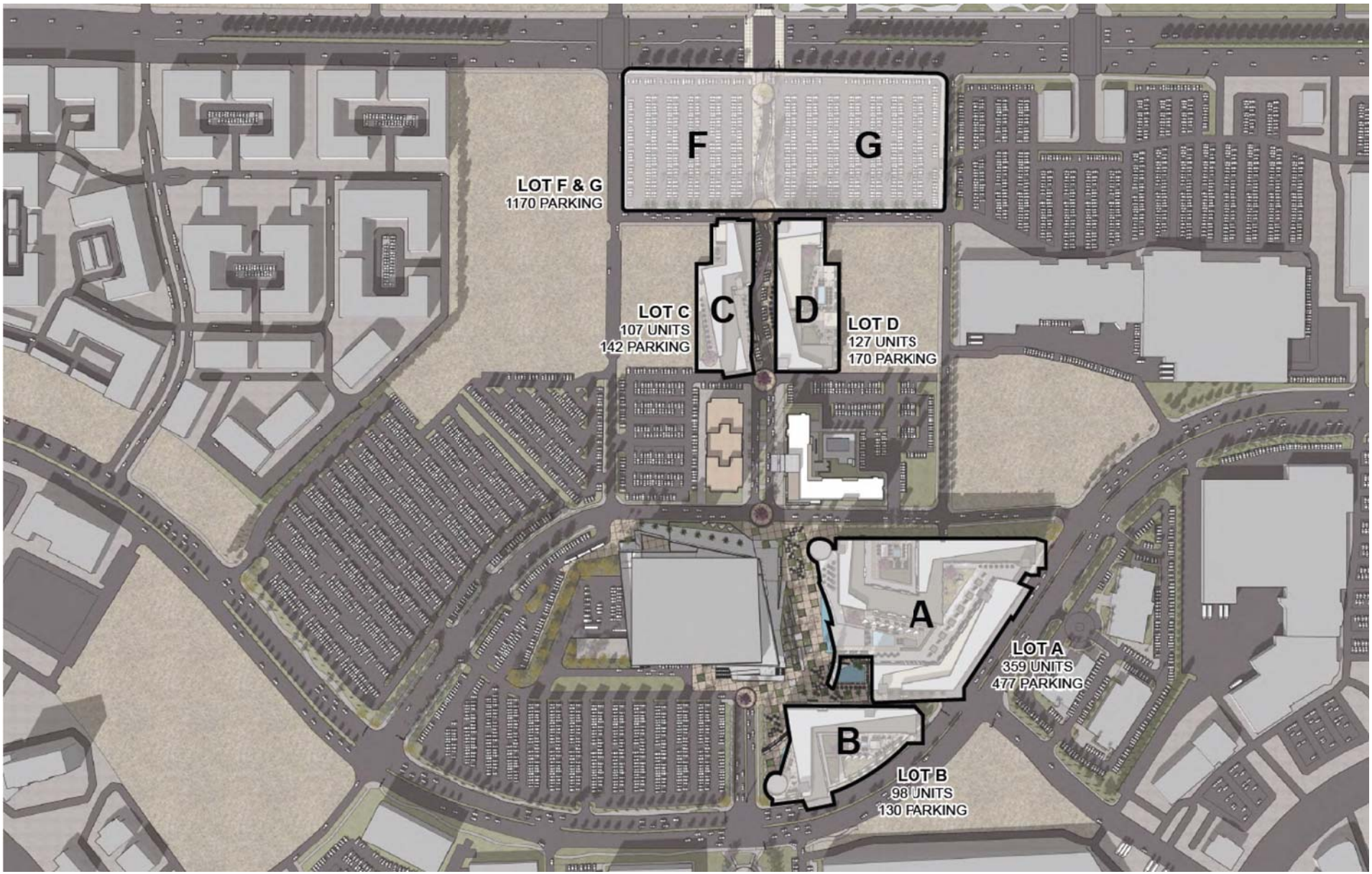
[1] SB-100 California Renewables Portfolio Standard Program. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100

Exhibits

Location Map

N

Exhibit B
Site Plan



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Appendices

Appendix A

CalEEMod Annual Emissions Output

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Toyota Arena Mixed Use Development

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	691.00	Dwelling Unit	11.47	691,000.00	1976
Enclosed Parking with Elevator	919.00	Space	0.00	367,600.00	0
Parking Lot	1,170.00	Space	7.26	468,000.00	0
Regional Shopping Center	71.20	1000sqft	0.00	71,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	531.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - The proposed project consists of a mixed-use town center development with 691 multifamily DU and 71,200 square feet of commercial/retail land uses on approximately 18.73 acres.

Construction Phase - The project's architectural coating phase will be extended to 75 days.

Demolition - The project is proposing to demolish approximetely 326,026 square feet of surface asphalt parking lot.

Vehicle Trips - The trip generation rates have been updated to reflect Toyota Arena TIA Scoping Agreement, by RK, May 25, 2021 and Traffic Impact Study and SANBAG VMT Model.

Fleet Mix - Operational fleet mix adjusted to equal 2% trucks with GVWR > 10,000 lbs.

Woodstoves - SCAQMD Rule 445 restricts wood burning hearths/fireplaces from being installed in new development.

Construction Off-road Equipment Mitigation - Project will be required to comply with SCAQMD Rule 403 regarding fugitive dust control.

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadMoistureContent	0	12
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	75.00
tblConstructionPhase	PhaseEndDate	4/13/2023	6/29/2023
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberWood	34.55	0.00
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	0.02
tblFleetMix	HHD	0.00	8.0940e-003
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.54
tblFleetMix	LDA	0.00	0.55
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT1	0.00	0.06
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.17
tblFleetMix	LDT2	0.00	0.18
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD1	0.00	0.03
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	LHD2	0.00	7.1960e-003

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	LHD2	0.00	7.1960e-003
tblFleetMix	LHD2	0.00	3.3700e-003
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MCY	0.00	0.03
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MDV	0.00	0.14
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	5.0710e-003
tblFleetMix	MH	0.00	2.3750e-003
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	0.01
tblFleetMix	MHD	0.00	5.3340e-003
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	5.5900e-004
tblFleetMix	OBUS	0.00	2.6200e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	9.5400e-004
tblFleetMix	SBUS	0.00	4.4700e-004
tblFleetMix	UBUS	0.00	1.1900e-004
tblFleetMix	UBUS	0.00	2.5400e-004
tblFleetMix	UBUS	0.00	2.5400e-004

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFleetMix	UBUS	0.00	1.1900e-004
tblLandUse	LotAcreage	18.18	11.47
tblLandUse	LotAcreage	8.27	0.00
tblLandUse	LotAcreage	10.53	7.26
tblLandUse	LotAcreage	1.63	0.00
tblVehicleTrips	DV_TP	11.00	0.00
tblVehicleTrips	HO_TL	8.70	4.37
tblVehicleTrips	HO_TTP	40.60	0.00
tblVehicleTrips	HS_TL	5.90	4.37
tblVehicleTrips	HS_TTP	19.20	0.00
tblVehicleTrips	HW_TL	14.70	4.37
tblVehicleTrips	HW_TTP	40.20	100.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	86.00	100.00
tblVehicleTrips	ST_TR	4.91	5.17
tblVehicleTrips	ST_TR	46.12	36.38
tblVehicleTrips	SU_TR	4.09	5.17
tblVehicleTrips	WD_TR	5.44	5.17
tblVehicleTrips	WD_TR	37.75	29.77
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1379	1.4343	0.9987	2.4700e-003	0.4484	0.0609	0.5093	0.1435	0.0564	0.1999	0.0000	224.5415	224.5415	0.0463	9.7200e-003	228.5934
2022	0.6978	3.6944	6.6165	0.0197	1.4235	0.1269	1.5504	0.3823	0.1195	0.5017	0.0000	1,821.1850	1,821.1850	0.1147	0.1062	1,855.7077
2023	2.7410	0.5904	1.2453	3.4500e-003	0.2593	0.0218	0.2812	0.0694	0.0206	0.0900	0.0000	318.7457	318.7457	0.0230	0.0147	323.7039
Maximum	**2.7410**	**3.6944**	**6.6165**	**0.0197**	**1.4235**	**0.1269**	**1.5504**	**0.3823**	**0.1195**	**0.5017**	**0.0000**	**1,821.1850**	**1,821.1850**	**0.1147**	**0.1062**	**1,855.7077**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0376	0.2555	1.0489	2.4700e-003	0.2033	5.1200e-003	0.2085	0.0635	5.0000e-003	0.0685	0.0000	224.5413	224.5413	0.0463	9.7200e-003	228.5933
2022	0.5186	1.9549	6.7591	0.0197	1.4235	0.0270	1.4506	0.3823	0.0258	0.4081	0.0000	1,821.1847	1,821.1847	0.1147	0.1062	1,855.7073
2023	2.7062	0.2501	1.2939	3.4500e-003	0.2593	3.4000e-003	0.2627	0.0694	3.2600e-003	0.0727	0.0000	318.7457	318.7457	0.0230	0.0147	323.7038
Maximum	**2.7062**	**1.9549**	**6.7591**	**0.0197**	**1.4235**	**0.0270**	**1.4506**	**0.3823**	**0.0258**	**0.4081**	**0.0000**	**1,821.1847**	**1,821.1847**	**0.1147**	**0.1062**	**1,855.7073**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**8.79**	**56.98**	**-2.72**	**0.00**	**11.50**	**83.06**	**17.91**	**13.45**	**82.65**	**30.62**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**10-1-2021**	**12-31-2021**	1.5660	0.2892
2	**1-1-2022**	**3-31-2022**	1.0897	0.6152
3	**4-1-2022**	**6-30-2022**	1.0873	0.6076
4	**7-1-2022**	**9-30-2022**	1.0992	0.6143
5	**10-1-2022**	**12-31-2022**	1.1139	0.6289
6	**1-1-2023**	**3-31-2023**	1.0104	0.6811
7	**4-1-2023**	**6-30-2023**	2.3186	2.2757
		Highest	2.3186	2.2757

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599
Energy	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	1,929.6251	1,929.6251	0.0966	0.0203	1,938.1000
Mobile	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668
Waste						0.0000	0.0000		0.0000	0.0000	79.6983	0.0000	79.6983	4.7100	0.0000	197.4492
Water						0.0000	0.0000		0.0000	0.0000	15.9564	242.7848	258.7412	1.6539	0.0405	312.1654
Total	**5.7552**	**3.1557**	**27.5037**	**0.0406**	**3.8326**	**0.1149**	**3.9475**	**1.0209**	**0.1130**	**1.1339**	**95.6547**	**5,726.3881**	**5,822.0429**	**6.7306**	**0.2377**	**6,061.1414**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599
Energy	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	1,929.6251	1,929.6251	0.0966	0.0203	1,938.1000
Mobile	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668
Waste						0.0000	0.0000		0.0000	0.0000	79.6983	0.0000	79.6983	4.7100	0.0000	197.4492
Water						0.0000	0.0000		0.0000	0.0000	15.9564	242.7848	258.7412	1.6539	0.0405	312.1654
Total	**5.7552**	**3.1557**	**27.5037**	**0.0406**	**3.8326**	**0.1149**	**3.9475**	**1.0209**	**0.1130**	**1.1339**	**95.6547**	**5,726.3881**	**5,822.0429**	**6.7306**	**0.2377**	**6,061.1414**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/1/2021	10/28/2021	5	20	
2	Site Preparation	Site Preparation	10/29/2021	11/11/2021	5	10	
3	Grading	Grading	11/12/2021	12/23/2021	5	30	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4	Building Construction	Building Construction	12/24/2021	2/16/2023	5	300	
5	Paving	Paving	2/17/2023	3/16/2023	5	20	
6	Architectural Coating	Architectural Coating	3/17/2023	6/29/2023	5	75	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 7.26

Residential Indoor: 1,399,275; Residential Outdoor: 466,425; Non-Residential Indoor: 106,800; Non-Residential Outdoor: 35,600; Striped Parking Area: 50,136 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,483.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	871.00	222.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	174.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use Soil Stabilizer

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1605	0.0000	0.1605	0.0243	0.0000	0.0243	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0317	0.3144	0.2157	3.9000e-004		0.0155	0.0155		0.0144	0.0144	0.0000	34.0008	34.0008	9.5700e-003	0.0000	34.2400
Total	**0.0317**	**0.3144**	**0.2157**	**3.9000e-004**	**0.1605**	**0.0155**	**0.1760**	**0.0243**	**0.0144**	**0.0387**	**0.0000**	**34.0008**	**34.0008**	**9.5700e-003**	**0.0000**	**34.2400**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.7800e-003	0.1221	0.0296	4.5000e-004	0.0128	1.7400e-003	0.0145	3.5100e-003	1.6600e-003	5.1700e-003	0.0000	44.2265	44.2265	1.9200e-003	7.0100e-003	46.3629
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.1000e-004	5.1000e-004	5.8300e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3559	1.3559	4.0000e-005	4.0000e-005	1.3693
Total	**4.3900e-003**	**0.1226**	**0.0354**	**4.6000e-004**	**0.0144**	**1.7500e-003**	**0.0162**	**3.9500e-003**	**1.6700e-003**	**5.6200e-003**	**0.0000**	**45.5824**	**45.5824**	**1.9600e-003**	**7.0500e-003**	**47.7322**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0614	0.0000	0.0614	9.2900e-003	0.0000	9.2900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.6200e-003	0.0200	0.2328	3.9000e-004		6.2000e-004	6.2000e-004		6.2000e-004	6.2000e-004	0.0000	34.0007	34.0007	9.5700e-003	0.0000	34.2400
Total	**4.6200e-003**	**0.0200**	**0.2328**	**3.9000e-004**	**0.0614**	**6.2000e-004**	**0.0620**	**9.2900e-003**	**6.2000e-004**	**9.9100e-003**	**0.0000**	**34.0007**	**34.0007**	**9.5700e-003**	**0.0000**	**34.2400**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.7800e-003	0.1221	0.0296	4.5000e-004	0.0128	1.7400e-003	0.0145	3.5100e-003	1.6600e-003	5.1700e-003	0.0000	44.2265	44.2265	1.9200e-003	7.0100e-003	46.3629
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.1000e-004	5.1000e-004	5.8300e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3559	1.3559	4.0000e-005	4.0000e-005	1.3693
Total	**4.3900e-003**	**0.1226**	**0.0354**	**4.6000e-004**	**0.0144**	**1.7500e-003**	**0.0162**	**3.9500e-003**	**1.6700e-003**	**5.6200e-003**	**0.0000**	**45.5824**	**45.5824**	**1.9600e-003**	**7.0500e-003**	**47.7322**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0194	0.2025	0.1058	1.9000e-004		0.0102	0.0102		9.4000e-003	9.4000e-003	0.0000	16.7179	16.7179	5.4100e-003	0.0000	16.8530
Total	**0.0194**	**0.2025**	**0.1058**	**1.9000e-004**	**0.0983**	**0.0102**	**0.1085**	**0.0505**	**9.4000e-003**	**0.0599**	**0.0000**	**16.7179**	**16.7179**	**5.4100e-003**	**0.0000**	**16.8530**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	3.0000e-004	3.5000e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8136	0.8136	3.0000e-005	2.0000e-005	0.8216
Total	**3.7000e-004**	**3.0000e-004**	**3.5000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8136**	**0.8136**	**3.0000e-005**	**2.0000e-005**	**0.8216**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0376	0.0000	0.0376	0.0193	0.0000	0.0193	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3300e-003	0.0101	0.1043	1.9000e-004		3.1000e-004	3.1000e-004		3.1000e-004	3.1000e-004	0.0000	16.7178	16.7178	5.4100e-003	0.0000	16.8530
Total	**2.3300e-003**	**0.0101**	**0.1043**	**1.9000e-004**	**0.0376**	**3.1000e-004**	**0.0379**	**0.0193**	**3.1000e-004**	**0.0196**	**0.0000**	**16.7178**	**16.7178**	**5.4100e-003**	**0.0000**	**16.8530**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	3.0000e-004	3.5000e-003	1.0000e-005	9.9000e-004	1.0000e-005	9.9000e-004	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8136	0.8136	3.0000e-005	2.0000e-005	0.8216
Total	**3.7000e-004**	**3.0000e-004**	**3.5000e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**9.9000e-004**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8136**	**0.8136**	**3.0000e-005**	**2.0000e-005**	**0.8216**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1381	0.0000	0.1381	0.0548	0.0000	0.0548	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0629	0.6960	0.4632	9.3000e-004		0.0298	0.0298		0.0274	0.0274	0.0000	81.7425	81.7425	0.0264	0.0000	82.4034
Total	**0.0629**	**0.6960**	**0.4632**	**9.3000e-004**	**0.1381**	**0.0298**	**0.1678**	**0.0548**	**0.0274**	**0.0822**	**0.0000**	**81.7425**	**81.7425**	**0.0264**	**0.0000**	**82.4034**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2300e-003	1.0100e-003	0.0117	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7118	2.7118	8.0000e-005	8.0000e-005	2.7386
Total	**1.2300e-003**	**1.0100e-003**	**0.0117**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7118**	**2.7118**	**8.0000e-005**	**8.0000e-005**	**2.7386**

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3.4 Grading - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0528	0.0000	0.0528	0.0210	0.0000	0.0210	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0114	0.0495	0.4950	9.3000e-004		1.5200e-003	1.5200e-003		1.5200e-003	1.5200e-003	0.0000	81.7424	81.7424	0.0264	0.0000	82.4033
Total	**0.0114**	**0.0495**	**0.4950**	**9.3000e-004**	**0.0528**	**1.5200e-003**	**0.0543**	**0.0210**	**1.5200e-003**	**0.0225**	**0.0000**	**81.7424**	**81.7424**	**0.0264**	**0.0000**	**82.4033**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2300e-003	1.0100e-003	0.0117	3.0000e-005	3.2900e-003	2.0000e-005	3.3100e-003	8.7000e-004	2.0000e-005	8.9000e-004	0.0000	2.7118	2.7118	8.0000e-005	8.0000e-005	2.7386
Total	**1.2300e-003**	**1.0100e-003**	**0.0117**	**3.0000e-005**	**3.2900e-003**	**2.0000e-005**	**3.3100e-003**	**8.7000e-004**	**2.0000e-005**	**8.9000e-004**	**0.0000**	**2.7118**	**2.7118**	**8.0000e-005**	**8.0000e-005**	**2.7386**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.7000e-003	0.0523	0.0497	8.0000e-005		2.8800e-003	2.8800e-003		2.7000e-003	2.7000e-003	0.0000	6.9491	6.9491	1.6800e-003	0.0000	6.9910
Total	**5.7000e-003**	**0.0523**	**0.0497**	**8.0000e-005**		**2.8800e-003**	**2.8800e-003**		**2.7000e-003**	**2.7000e-003**	**0.0000**	**6.9491**	**6.9491**	**1.6800e-003**	**0.0000**	**6.9910**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5700e-003	0.0364	0.0122	1.3000e-004	4.2000e-003	6.1000e-004	4.8100e-003	1.2100e-003	5.9000e-004	1.8000e-003	0.0000	12.4033	12.4033	3.5000e-004	1.8400e-003	12.9601
Worker	0.0107	8.8300e-003	0.1016	2.6000e-004	0.0287	1.6000e-004	0.0288	7.6100e-003	1.5000e-004	7.7600e-003	0.0000	23.6201	23.6201	7.3000e-004	7.2000e-004	23.8534
Total	**0.0123**	**0.0453**	**0.1138**	**3.9000e-004**	**0.0329**	**7.7000e-004**	**0.0336**	**8.8200e-003**	**7.4000e-004**	**9.5600e-003**	**0.0000**	**36.0234**	**36.0234**	**1.0800e-003**	**2.5600e-003**	**36.8135**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8000e-004	6.7000e-003	0.0524	8.0000e-005		1.2000e-004	1.2000e-004		1.2000e-004	1.2000e-004	0.0000	6.9491	6.9491	1.6800e-003	0.0000	6.9910
Total	**9.8000e-004**	**6.7000e-003**	**0.0524**	**8.0000e-005**		**1.2000e-004**	**1.2000e-004**		**1.2000e-004**	**1.2000e-004**	**0.0000**	**6.9491**	**6.9491**	**1.6800e-003**	**0.0000**	**6.9910**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5700e-003	0.0364	0.0122	1.3000e-004	4.2000e-003	6.1000e-004	4.8100e-003	1.2100e-003	5.9000e-004	1.8000e-003	0.0000	12.4033	12.4033	3.5000e-004	1.8400e-003	12.9601
Worker	0.0107	8.8300e-003	0.1016	2.6000e-004	0.0287	1.6000e-004	0.0288	7.6100e-003	1.5000e-004	7.7600e-003	0.0000	23.6201	23.6201	7.3000e-004	7.2000e-004	23.8534
Total	**0.0123**	**0.0453**	**0.1138**	**3.9000e-004**	**0.0329**	**7.7000e-004**	**0.0336**	**8.8200e-003**	**7.4000e-004**	**9.5600e-003**	**0.0000**	**36.0234**	**36.0234**	**1.0800e-003**	**2.5600e-003**	**36.8135**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0492	1.3293	0.4713	5.3900e-003	0.1820	0.0151	0.1971	0.0525	0.0144	0.0669	0.0000	524.0510	524.0510	0.0141	0.0776	547.5317
Worker	0.4268	0.3350	4.0179	0.0108	1.2415	6.6400e-003	1.2482	0.3297	6.1200e-003	0.3359	0.0000	995.8912	995.8912	0.0284	0.0286	1,005.1289
Total	**0.4760**	**1.6644**	**4.4892**	**0.0162**	**1.4236**	**0.0217**	**1.4452**	**0.3823**	**0.0205**	**0.4028**	**0.0000**	**1,519.9422**	**1,519.9422**	**0.0425**	**0.1062**	**1,552.6606**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0426	0.2905	2.2698	3.5000e-003		5.3000e-003	5.3000e-003		5.3000e-003	5.3000e-003	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.0426**	**0.2905**	**2.2698**	**3.5000e-003**		**5.3000e-003**	**5.3000e-003**		**5.3000e-003**	**5.3000e-003**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0492	1.3293	0.4713	5.3900e-003	0.1820	0.0151	0.1971	0.0525	0.0144	0.0669	0.0000	524.0510	524.0510	0.0141	0.0776	547.5317
Worker	0.4268	0.3350	4.0179	0.0108	1.2415	6.6400e-003	1.2482	0.3297	6.1200e-003	0.3359	0.0000	995.8912	995.8912	0.0284	0.0286	1,005.1289
Total	**0.4760**	**1.6644**	**4.4892**	**0.0162**	**1.4236**	**0.0217**	**1.4452**	**0.3823**	**0.0205**	**0.4028**	**0.0000**	**1,519.9422**	**1,519.9422**	**0.0425**	**0.1062**	**1,552.6606**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0267	0.2445	0.2762	4.6000e-004		0.0119	0.0119		0.0112	0.0112	0.0000	39.4068	39.4068	9.3700e-003	0.0000	39.6412
Total	**0.0267**	**0.2445**	**0.2762**	**4.6000e-004**		**0.0119**	**0.0119**		**0.0112**	**0.0112**	**0.0000**	**39.4068**	**39.4068**	**9.3700e-003**	**0.0000**	**39.6412**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.2600e-003	0.1392	0.0564	6.8000e-004	0.0238	1.0000e-003	0.0248	6.8700e-003	9.5000e-004	7.8200e-003	0.0000	65.7744	65.7744	1.7100e-003	9.7200e-003	68.7139
Worker	0.0516	0.0385	0.4818	1.3700e-003	0.1624	8.2000e-004	0.1632	0.0431	7.5000e-004	0.0439	0.0000	126.8010	126.8010	3.3300e-003	3.4400e-003	127.9095
Total	**0.0559**	**0.1778**	**0.5382**	**2.0500e-003**	**0.1862**	**1.8200e-003**	**0.1880**	**0.0500**	**1.7000e-003**	**0.0517**	**0.0000**	**192.5754**	**192.5754**	**5.0400e-003**	**0.0132**	**196.6233**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.5700e-003	0.0380	0.2968	4.6000e-004		6.9000e-004	6.9000e-004		6.9000e-004	6.9000e-004	0.0000	39.4068	39.4068	9.3700e-003	0.0000	39.6411
Total	**5.5700e-003**	**0.0380**	**0.2968**	**4.6000e-004**		**6.9000e-004**	**6.9000e-004**		**6.9000e-004**	**6.9000e-004**	**0.0000**	**39.4068**	**39.4068**	**9.3700e-003**	**0.0000**	**39.6411**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.2600e-003	0.1392	0.0564	6.8000e-004	0.0238	1.0000e-003	0.0248	6.8700e-003	9.5000e-004	7.8200e-003	0.0000	65.7744	65.7744	1.7100e-003	9.7200e-003	68.7139
Worker	0.0516	0.0385	0.4818	1.3700e-003	0.1624	8.2000e-004	0.1632	0.0431	7.5000e-004	0.0439	0.0000	126.8010	126.8010	3.3300e-003	3.4400e-003	127.9095
Total	**0.0559**	**0.1778**	**0.5382**	**2.0500e-003**	**0.1862**	**1.8200e-003**	**0.1880**	**0.0500**	**1.7000e-003**	**0.0517**	**0.0000**	**192.5754**	**192.5754**	**5.0400e-003**	**0.0132**	**196.6233**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0103	0.1019	0.1458	2.3000e-004		5.1000e-003	5.1000e-003		4.6900e-003	4.6900e-003	0.0000	20.0269	20.0269	6.4800e-003	0.0000	20.1888
Paving	9.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0198**	**0.1019**	**0.1458**	**2.3000e-004**		**5.1000e-003**	**5.1000e-003**		**4.6900e-003**	**4.6900e-003**	**0.0000**	**20.0269**	**20.0269**	**6.4800e-003**	**0.0000**	**20.1888**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.9000e-004	4.8800e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.4000e-004	0.0000	1.2845	1.2845	3.0000e-005	3.0000e-005	1.2958
Total	**5.2000e-004**	**3.9000e-004**	**4.8800e-003**	**1.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**1.2845**	**1.2845**	**3.0000e-005**	**3.0000e-005**	**1.2958**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.8000e-003	0.0122	0.1730	2.3000e-004		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	20.0268	20.0268	6.4800e-003	0.0000	20.1888
Paving	9.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0123**	**0.0122**	**0.1730**	**2.3000e-004**		**3.7000e-004**	**3.7000e-004**		**3.7000e-004**	**3.7000e-004**	**0.0000**	**20.0268**	**20.0268**	**6.4800e-003**	**0.0000**	**20.1888**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.9000e-004	4.8800e-003	1.0000e-005	1.6400e-003	1.0000e-005	1.6500e-003	4.4000e-004	1.0000e-005	4.4000e-004	0.0000	1.2845	1.2845	3.0000e-005	3.0000e-005	1.2958
Total	**5.2000e-004**	**3.9000e-004**	**4.8800e-003**	**1.0000e-005**	**1.6400e-003**	**1.0000e-005**	**1.6500e-003**	**4.4000e-004**	**1.0000e-005**	**4.4000e-004**	**0.0000**	**1.2845**	**1.2845**	**3.0000e-005**	**3.0000e-005**	**1.2958**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.6081					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.1900e-003	0.0489	0.0679	1.1000e-004		2.6600e-003	2.6600e-003		2.6600e-003	2.6600e-003	0.0000	9.5747	9.5747	5.7000e-004	0.0000	9.5890
Total	**2.6153**	**0.0489**	**0.0679**	**1.1000e-004**		**2.6600e-003**	**2.6600e-003**		**2.6600e-003**	**2.6600e-003**	**0.0000**	**9.5747**	**9.5747**	**5.7000e-004**	**0.0000**	**9.5890**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0227	0.0170	0.2123	6.0000e-004	0.0715	3.6000e-004	0.0719	0.0190	3.3000e-004	0.0193	0.0000	55.8774	55.8774	1.4700e-003	1.5200e-003	56.3659
Total	**0.0227**	**0.0170**	**0.2123**	**6.0000e-004**	**0.0715**	**3.6000e-004**	**0.0719**	**0.0190**	**3.3000e-004**	**0.0193**	**0.0000**	**55.8774**	**55.8774**	**1.4700e-003**	**1.5200e-003**	**56.3659**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.6081					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1100e-003	4.8300e-003	0.0687	1.1000e-004		1.5000e-004	1.5000e-004		1.5000e-004	1.5000e-004	0.0000	9.5747	9.5747	5.7000e-004	0.0000	9.5890
Total	**2.6092**	**4.8300e-003**	**0.0687**	**1.1000e-004**		**1.5000e-004**	**1.5000e-004**		**1.5000e-004**	**1.5000e-004**	**0.0000**	**9.5747**	**9.5747**	**5.7000e-004**	**0.0000**	**9.5890**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0227	0.0170	0.2123	6.0000e-004	0.0715	3.6000e-004	0.0719	0.0190	3.3000e-004	0.0193	0.0000	55.8774	55.8774	1.4700e-003	1.5200e-003	56.3659
Total	**0.0227**	**0.0170**	**0.2123**	**6.0000e-004**	**0.0715**	**3.6000e-004**	**0.0719**	**0.0190**	**3.3000e-004**	**0.0193**	**0.0000**	**55.8774**	**55.8774**	**1.4700e-003**	**1.5200e-003**	**56.3659**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668
Unmitigated	2.4002	2.4859	20.0954	0.0365	3.8326	0.0279	3.8605	1.0209	0.0260	1.0469	0.0000	3,401.2398	3,401.2398	0.2559	0.1743	3,459.5668

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	3,572.47	3,572.47	3572.47	5,682,657	5,682,657
Enclosed Parking with Elevator	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	2,119.62	2,590.26	1502.32	4,539,098	4,539,098
Total	5,692.09	6,162.73	5,074.79	10,221,754	10,221,754

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	4.37	4.37	4.37	100.00	0.00	0.00	100	0	0
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Regional Shopping Center	16.60	8.40	6.90	16.30	64.70	19.00	54	35	11

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375
Enclosed Parking with Elevator	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Parking Lot	0.537785	0.055838	0.172353	0.139003	0.027005	0.007196	0.011392	0.017285	0.000559	0.000254	0.025303	0.000954	0.005071
Regional Shopping Center	0.550545	0.057163	0.176442	0.142301	0.027646	0.003370	0.005334	0.008094	0.000262	0.000119	0.025903	0.000447	0.002375

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,390.9324	1,390.9324	0.0863	0.0105	1,396.2061
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,390.9324	1,390.9324	0.0863	0.0105	1,396.2061
NaturalGas Mitigated	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	538.6927	538.6927	0.0103	9.8800e-003	541.8939
NaturalGas Unmitigated	0.0544	0.4656	0.2013	2.9700e-003		0.0376	0.0376		0.0376	0.0376	0.0000	538.6927	538.6927	0.0103	9.8800e-003	541.8939

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	9.93808e+006	0.0536	0.4579	0.1949	2.9200e-003		0.0370	0.0370		0.0370	0.0370	0.0000	530.3338	530.3338	0.0102	9.7200e-003	533.4853
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	156640	8.4000e-004	7.6800e-003	6.4500e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.3589	8.3589	1.6000e-004	1.5000e-004	8.4086
Total		**0.0544**	**0.4656**	**0.2013**	**2.9700e-003**		**0.0376**	**0.0376**		**0.0376**	**0.0376**	**0.0000**	**538.6927**	**538.6927**	**0.0103**	**9.8700e-003**	**541.8939**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	9.93808e+006	0.0536	0.4579	0.1949	2.9200e-003		0.0370	0.0370		0.0370	0.0370	0.0000	530.3338	530.3338	0.0102	9.7200e-003	533.4853
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	156640	8.4000e-004	7.6800e-003	6.4500e-003	5.0000e-005		5.8000e-004	5.8000e-004		5.8000e-004	5.8000e-004	0.0000	8.3589	8.3589	1.6000e-004	1.5000e-004	8.4086
Total		**0.0544**	**0.4656**	**0.2013**	**2.9700e-003**		**0.0376**	**0.0376**		**0.0376**	**0.0376**	**0.0000**	**538.6927**	**538.6927**	**0.0103**	**9.8700e-003**	**541.8939**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	2.73637e+006	660.2910	0.0410	4.9600e-003	662.7945
Enclosed Parking with Elevator	1.99974e+006	482.5424	0.0299	3.6300e-003	484.3719
Parking Lot	163800	39.5253	2.4500e-003	3.0000e-004	39.6751
Regional Shopping Center	864368	208.5738	0.0129	1.5700e-003	209.3646
Total		**1,390.9324**	**0.0863**	**0.0105**	**1,396.2061**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	2.73637e+006	660.2910	0.0410	4.9600e-003	662.7945
Enclosed Parking with Elevator	1.99974e+006	482.5424	0.0299	3.6300e-003	484.3719
Parking Lot	163800	39.5253	2.4500e-003	3.0000e-004	39.6751
Regional Shopping Center	864368	208.5738	0.0129	1.5700e-003	209.3646
Total		**1,390.9324**	**0.0863**	**0.0105**	**1,396.2061**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599
Unmitigated	3.3006	0.2042	7.2070	1.1600e-003		0.0494	0.0494		0.0494	0.0494	0.0000	152.7384	152.7384	0.0140	2.5900e-003	153.8599

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2608					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.8082					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0143	0.1218	0.0518	7.8000e-004		9.8500e-003	9.8500e-003		9.8500e-003	9.8500e-003	0.0000	141.0446	141.0446	2.7000e-003	2.5900e-003	141.8827
Landscaping	0.2173	0.0824	7.1552	3.8000e-004		0.0396	0.0396		0.0396	0.0396	0.0000	11.6939	11.6939	0.0113	0.0000	11.9772
Total	**3.3006**	**0.2042**	**7.2070**	**1.1600e-003**		**0.0494**	**0.0494**		**0.0494**	**0.0494**	**0.0000**	**152.7384**	**152.7384**	**0.0140**	**2.5900e-003**	**153.8599**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2608					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.8082					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0143	0.1218	0.0518	7.8000e-004		9.8500e-003	9.8500e-003		9.8500e-003	9.8500e-003	0.0000	141.0446	141.0446	2.7000e-003	2.5900e-003	141.8827
Landscaping	0.2173	0.0824	7.1552	3.8000e-004		0.0396	0.0396		0.0396	0.0396	0.0000	11.6939	11.6939	0.0113	0.0000	11.9772
Total	**3.3006**	**0.2042**	**7.2070**	**1.1600e-003**		**0.0494**	**0.0494**		**0.0494**	**0.0494**	**0.0000**	**152.7384**	**152.7384**	**0.0140**	**2.5900e-003**	**153.8599**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	258.7412	1.6539	0.0405	312.1654
Unmitigated	258.7412	1.6539	0.0405	312.1654

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	45.0214 / 28.3831	231.8315	1.4805	0.0363	279.6546
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	5.27396 / 3.23243	26.9097	0.1734	4.2500e-003	32.5109
Total		**258.7412**	**1.6539**	**0.0405**	**312.1654**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	45.0214 / 28.3831	231.8315	1.4805	0.0363	279.6546
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	5.27396 / 3.23243	26.9097	0.1734	4.2500e-003	32.5109
Total		**258.7412**	**1.6539**	**0.0405**	**312.1654**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	79.6983	4.7100	0.0000	197.4492
Unmitigated	79.6983	4.7100	0.0000	197.4492

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	317.86	64.5227	3.8132	0.0000	159.8523
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	74.76	15.1756	0.8969	0.0000	37.5969
Total		**79.6983**	**4.7100**	**0.0000**	**197.4492**

Toyota Arena Mixed Use Development - San Bernardino-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	317.86	64.5227	3.8132	0.0000	159.8523
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	74.76	15.1756	0.8969	0.0000	37.5969
Total		**79.6983**	**4.7100**	**0.0000**	**197.4492**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number

11.0 Vegetation

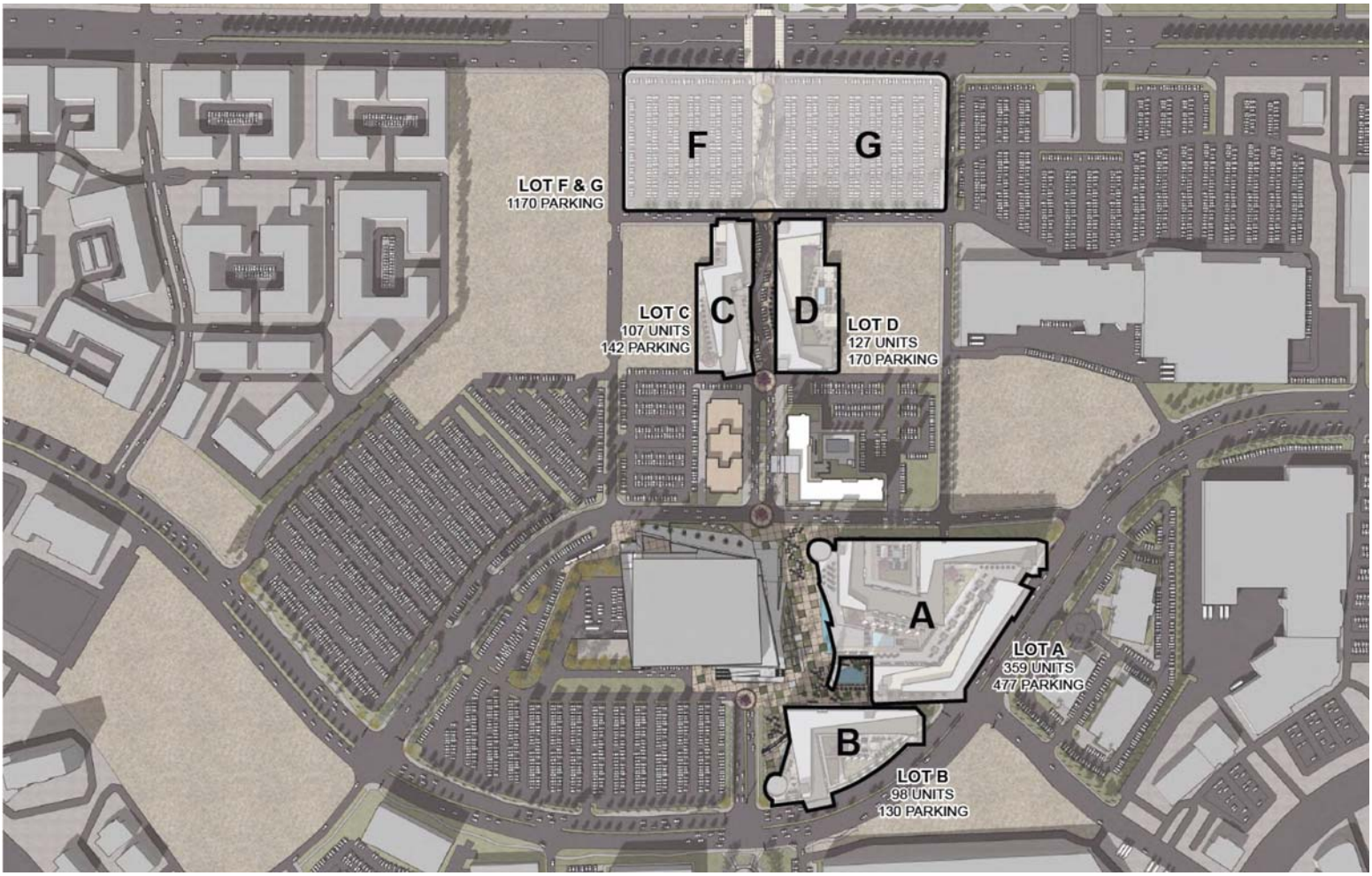
Appendix B

EMFAC2017 Vehicle Consumption Data

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2023
Season: Annual
Vehicle Classification: EMFAC2011Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	Fuel	Population	VMT	Fuel_Consumption	Fuel Split (Gas:Diesel)	MPG, by Fuel Type	MPG, Average
SOUTH COAST AQMD	2023	LDA	GAS	6635002.295	252710542.7	7971.24403	99.38%	31.70	32.59
South Coast AQMD	2023	LDA	DSL	62492.97958	2469815.67	49.3916685	0.62%	50.00	
South Coast AQMD	2023	LDA	ELEC	150700.3971	6237105.777	0			
South Coast AQMD	2023	LDT1	GAS	758467.6481	27812996.47	1023.913006	99.96%	27.16	27.46
South Coast AQMD	2023	LDT1	DSL	360.7799144	8408.618214	0.366459477	0.04%	22.95	
South Coast AQMD	2023	LDT1	ELEC	7122.93373	303507.5334	0			
South Coast AQMD	2023	LDT2	GAS	2285150.139	85272415.53	3338.798312	99.47%	25.54	25.6
South Coast AQMD	2023	LDT2	DSL	15594.68309	650362.8069	17.73812611	0.53%	36.66	
South Coast AQMD	2023	LDT2	ELEC	28809.63735	917592.8423	0			
South Coast AQMD	2023	MDV	GAS	1589862.703	55684188.36	2693.883526	98.15%	20.67	20.81
South Coast AQMD	2023	MDV	DSL	36128.1019	1425691.372	50.65281491	1.85%	28.15	
South Coast AQMD	2023	MDV	ELEC	16376.67653	537591.7438	0			
South Coast AQMD	2023	LHD1	GAS	174910.3847	6216642.74	583.3851736	71.88%	10.66	13.81
South Coast AQMD	2023	LHD1	DSL	125545.0822	4994753.051	228.1779285	28.12%	21.89	
South Coast AQMD	2023	LHD2	GAS	30102.75324	1034569.096	111.5753864	53.28%	9.27	14.18
South Coast AQMD	2023	LHD2	DSL	50003.13116	1935029.912	97.84811618	46.72%	19.78	
South Coast AQMD	2023	MHDT	GAS	25624.3151	1363694.415	265.2060557	26.79%	5.14	9.58
South Coast AQMD	2023	MHDT	DSL	122124.488	8120623.353	724.7695868	73.21%	11.20	
South Coast AQMD	2023	HHDT	GAS	75.10442936	8265.097091	1.936286145	0.10%	4.27	6.94
South Coast AQMD	2023	HHDT	DSL	115130.71	13671497.32	1970.514243	99.90%	6.94	
South Coast AQMD	2023	OBUS	GAS	5955.291639	245774.0168	48.07750689	100.00%	5.11	5.11
South Coast AQMD	2023	OBUS	DSL	0	0	0	0.00%	0.00	
South Coast AQMD	2023	UBUS	GAS	957.7686184	89782.63172	17.62416327	98.66%	5.09	5.18
South Coast AQMD	2023	UBUS	DSL	13.00046095	1416.621572	0.239500509	1.34%	5.91	
South Coast AQMD	2023	UBUS	ELEC	16.11693886	1320.163255	0			
South Coast AQMD	2023	SBUS	GAS	2783.643068	112189.6089	12.19474692	30.76%	9.20	8.15
South Coast AQMD	2023	SBUS	DSL	6671.825716	210853.9115	27.44411242	69.24%	7.68	
South Coast AQMD	2023	MCY	GAS	305044.5141	2104623.657	57.849018	100.00%	36.38	36.38
South Coast AQMD	2023	MH	GAS	34679.50542	330042.9197	63.26295123	84.47%	5.22	6.07
South Coast AQMD	2023	MH	DSL	13122.69387	124302.0239	11.63031832	15.53%	10.69	

TOYOTA ARENA MIXED-USE DEVELOPMENT
NOISE IMPACT STUDY
City of Ontario



TOYOTA ARENA MIXED-USE DEVELOPMENT
NOISE IMPACT STUDY
City of Ontario, California

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

The purpose of this report is to evaluate the potential noise impacts from the proposed Toyota Arena Mixed-Use Development (project) and provide recommendations, if necessary, to minimize any project noise impacts. The assessment was conducted within the context of the California Environmental Quality Act (CEQA) and utilizes the noise standards set forth by the applicable Federal, State, and local agencies.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- Identification of the regulatory setting and applicable noise standards
- Analysis of the existing noise environment
- Analysis of the project's operational noise impact to adjacent receptors
- Analysis of the project's construction noise and vibration impact to adjacent sensitive receptors
- Summary of recommended mitigation measures and project design features to reduce noise level impacts.

1.2 Site Location

The proposed Toyota Arena Mixed-Use Development project site is located adjacent to the Toyota Arena, north of Concourse Street and south of Fourth Street, in the City of Ontario. The project site is located approximately 1,013 feet above sea level and the topography is relatively flat.

The project site location map is provided in Exhibit A.

The project site is located within the Ontario Center Specific Plan and zoned for Urban Commercial use. The City of Ontario General Plan land use map designates the project site as Mixed Use.

1.3 Project Description

The project consists of construction and operation of a mixed use town center development with residential and commercial/retail land use within four development lots.

The proposed project includes a total of 691 residential dwelling units, 71,200 square feet of commercial/retail uses and the demolition and relocation of approximately 1,170 surface parking spaces. The total project site area is approximately 18.73 acres.

The site plan used for this analysis, provided by the applicant, is illustrated in Exhibit B. Table 1 summarizes the proposed project land uses.

Table 1
Land Use Summary

Lot	Dwelling Units	Retail (SF)[1]	Parking Spaces
A	359	25,256	477[2]
B	98	20,802	130[2]
C	107	11,047	142[2]
D	127	14,095	170[2]
F & G	--	--	1,170
Total	691	71,200	2,089

[1] S.F. – Square Feet
[2] Parking Structure

This report analyzes long-term and short-term noise impacts associated with the day-to-day operation of the project. The primary sources of long-term noise impacts would be on-site circulation and parking lot noise and HVAC units.

1.4 Summary of Analysis Results

Table 2 provides a summary of the noise analysis results, per the CEQA impact criteria checklist. With the implementation of the recommended mitigation measures, the project is not expected to result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Table 2
CEQA Noise Impact Criteria

Noise Impact Criteria	Potentially Significant	Potentially Significant Unless Mitigated	Less Than Significant Impact	No Impact
Would the project result in?				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?			X	

1.5 Recommended Project Design Features

The following recommended project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design. Design features are not typically considered mitigation under CEQA.

Operational Design Features

DF-1 Prior to the issuance of building permits, the project shall prepare a final acoustical study that demonstrates building construction will achieve the minimum interior noise standard of 45 dBA CNEL for all residential units located along arterial roadways and/or adjacent to industrial uses, per the California Building Standards Code. The following noise control measures may be required for dwelling units located near adjacent roadways and industrial uses:

- Install sound barriers between residences and noise sources.
- Install double-paned or similar sound rated windows.

- Provide sound insulating exterior walls and roofing systems.
- Locate and/or design attic vents to minimize sound propagation into each home.
- Provide forced-air ventilation systems.
- Place dwellings as far as practical from the noise source

DF-2 The project shall comply with California Title 24 building insulation requirements for exterior walls, roofs and common separating assemblies (e.g. floor/ceiling assemblies and demising walls).

DF-3 For proper acoustical performance, all exterior windows, doors, and sliding glass doors should have a positive seal and leaks/cracks must be kept to a minimum.

DF-4 The final building plans shall ensure that HVAC units are not located within an area of the project site that would contribute to a noise level exceedance at any adjacent property line, per the City of Ontario Municipal Code requirements. To meet the City's noise standards the following measures should be followed:

- All HVAC equipment shall be shielded or enclosed from the line of sight of adjacent residential uses.

Construction Design Features

DF-5 Prepare a construction management plan and obtain a construction work permit from the City of Ontario prior to starting construction. The construction management plan shall ensure all contractors implement construction best management practices to reduce construction noise levels. Best management practices shall include the following:

- All construction equipment shall be equipped with muffles and other suitable noise attenuation devices (e.g., engine shields).

- Grading and construction contractors shall use quieter equipment as opposed to noisier equipment (such as rubber-tired equipment rather than track equipment), to the maximum extent feasible.

- If feasible, electric hook-ups shall be provided to avoid the use of generators. If electric service is determined to be infeasible for the site, only whisper-quiet generators shall be used (i.e., inverter generators capable of providing variable load.

- Use electric air compressors and similar power tools rather than diesel equipment, where feasible.

- Locate staging area, generators and stationary construction equipment as far from the adjacent residential homes as feasible.

- Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 5 minutes.

- Provide notifications and signage in readily visible locations along the perimeter of construction sites that indicate the dates and duration of construction activities, as well as provide a telephone number where neighbors can enquire about the construction process and register complaints to a designated construction noise disturbance coordinator.

- Construction activities shall not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays and Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

DF-6 No impact pile driving or blasting activities shall be permitted on the project site during construction. If impact pile driving or blasting is required, a follow-up noise and vibration impact assessment shall be conducted prior to start of any activity.

2.0 Fundamentals of Noise

This section of the report provides basic information about noise and vibration and presents some of the terms used in the report.

2.1 Sound, Noise, and Acoustics

The sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. The sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting out at 20 Hz all the way to the high pitch of 20,000 Hz.

2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases, as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (μPa). One μPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels and abbreviated as dB.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two (2) sounds of equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3dB increase.

If two (2) sounds differ by approximately 10 dB the higher sound level is the predominant sound.

2.5 Human Response to Changes in Noise Levels[1]

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighing is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive the change in the noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway), would result in a barely perceptible change in sound level.

2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant, while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels. Following are the most commonly used noise descriptors along with brief definitions.

A-Weighted Sound Level

The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level

The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

[1] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

Community Noise Equivalent Level (CNEL)

The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB)

A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A)

A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ)

The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room

Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

L(n)

The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly, L50, L90, and L99, etc.

Noise

Any unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Percent Noise Levels

See L(n).

Sound Level (Noise Level)

The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

Sound Level Meter

An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL)

The dBA level which, if it lasted for one (1) second, would produce the same A-weighted sound energy as the actual event.

2.7 Sound Propagation

As sound propagates from a source it spreads geometrically. The sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

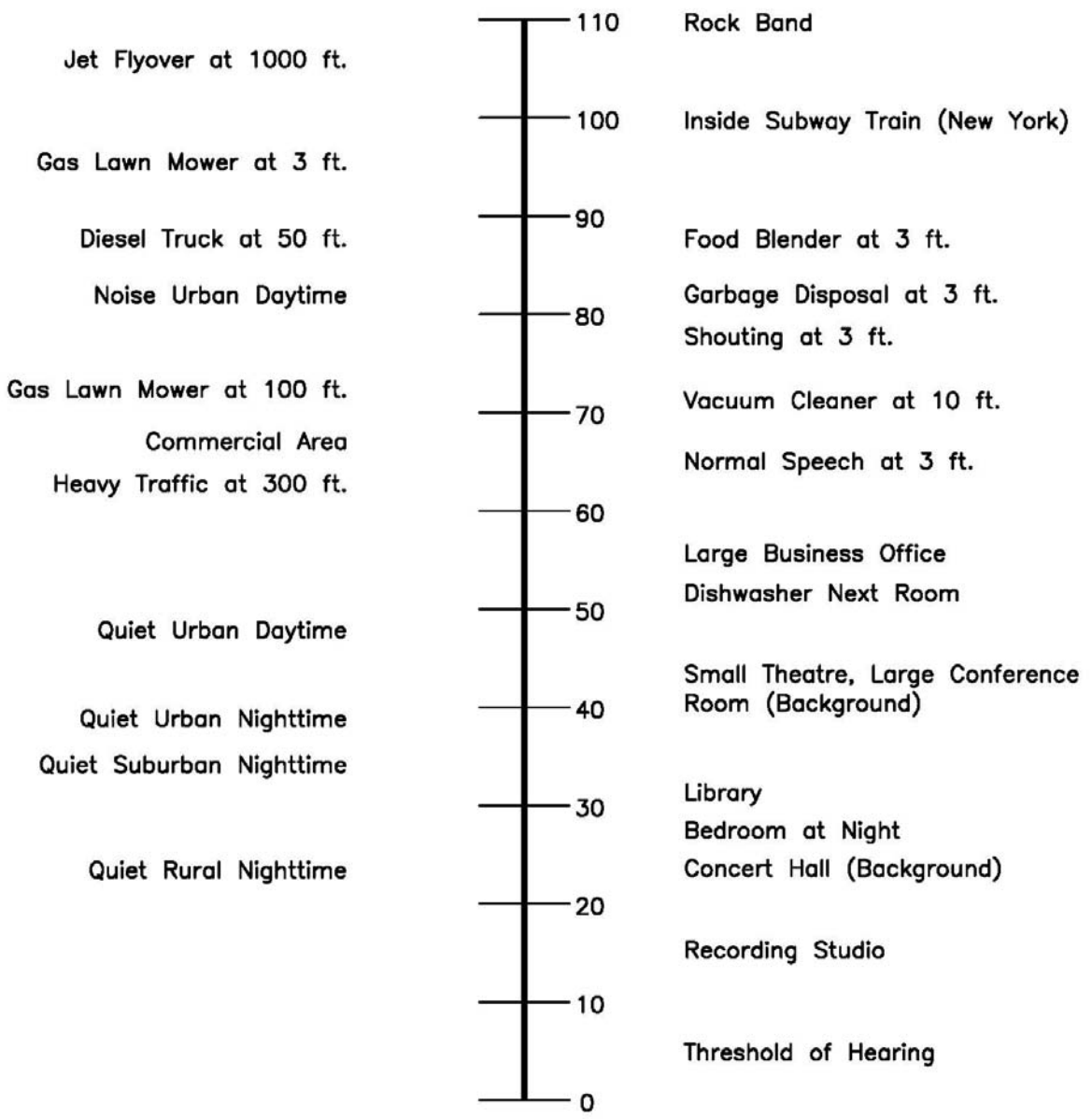
As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use the hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt or landscaping attenuate noise at an additional rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 6.0 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet and greater from a noise source. Wind, temperature, air humidity, and turbulence can further impact how far sound can travel.

Figure 1 shows typical sound levels from indoor and outdoor noise sources.

Figure 1[2]

TYPICAL SOUND LEVELS FROM
INDOOR AND OUTDOOR NOISE SOURCES



[2] Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

2.8 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV

Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS

Known as the root mean squared (RMS) can be used to denote vibration amplitude.

VdB

A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

2.9 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts.

2.10 Vibration Propagation

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

2.11 Construction Related Vibration Level Prediction[3]

Operational activities are separated into two different categories. The vibration can be transient or continuous in nature. Each category can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the project area site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. The thresholds from Caltrans Transportation and Construction Vibration Guidance Manual, April 2020, in the table below provide general guidelines as to the maximum vibration limits for when vibration becomes potentially annoying.

[3] Caltrans Transportation and Construction Vibration Guidance Manual, April 2020

Table 3
Vibration Annoyance Potential Criteria

Human Response	PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.90	0.10
Severe	2.00	0.40

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts. The table below provides general vibration damage potential thresholds:

Table 4
Vibration Damage Potential Threshold Criteria

Structure and Condition	PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings ruin ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Soil conditions have an impact on how vibration propagates through the ground. The Caltrans Transportation and Construction Vibration Guidance Manual, April 2020 provides suggested "n" values based on soil class. The table below outlines the manual's suggested values and description.

Table 5
Suggested "n" Values Based on Soil Classes

Soil Class	Description of Soil Material	Suggested Value of "n"
I	Weak or soft soils: loose soils, dry or partially saturated peat and muck, mud, loose beach sand, and dune sand.	1.4
II	Most sands, sandy clays, silty clays, gravel, silts, weathered rock.	1.3
III	Hard soils: densely compacted sand, dry consolidated clay, consolidated glacial till, some exposed rock.	1.1
IV	Hard, component rock: bedrock, freshly exposed hard rock.	1.0

3.0 Regulatory Setting

The proposed project is located in the City of Ontario and noise regulations are addressed through the various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

3.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three (3) purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was originally tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible to regulate noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible to regulate noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

The Federal government and the State advocate that local jurisdiction use their land use regulatory authority to arrange new development in such a way that "noise sensitive" uses are either prohibited from being constructed adjacent to a highway or, or alternatively that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the Federal government and the State have preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

3.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the "Land Use Compatibility for Community Noise Environments Matrix." The matrix allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Noise insulation design standards for residences have been established by the State of California Uniform Building Code (UBC) Chapter 12, Division II and by the Title 24 noise insulation standards of the California Administrative Code. The City is required by the State Housing Law to adopt these State codes as minimum performance standards. The City may enact stricter noise standards throughout the city or on a case-by-case basis if deemed necessary. In brief, the Title 24 noise standards require the following for multi-family dwellings:

1. Party wall and floor-ceiling assembly designs must provide a minimum STC of 50, based on lab tests. Field tested assemblies must provide a minimum noise isolation class (NIC) of 45.

2. Floor-ceiling assembly designs must provide for a minimum impact insulation class (IIC) of 50, based on lab tests. Field tested assemblies must provide a minimum FIIC of 45.

3. Entry doors from interior corridors must provide an STC of 26 or more.

4. Penetrations or openings in sound rated assemblies must be treated to maintain required ratings.

5. Interior noise levels due to exterior sources must not exceed a community noise equivalent level (CNEL) or a day-night level (LDN) of 45 dBA, in any habitable room.

Thus, the interior limit is 45 dBA CNEL between dwelling units and from exterior noise sources to interior living spaces.

3.3 City of Ontario Noise Regulations

The project is required to comply with the noise standards and thresholds established within the City of Ontario Municipal Code and the Ontario Plan. The noise standards from the Municipal Code and the Ontario Plan are provided in Appendix A.

3.3.1 City of Ontario Municipal Code Noise Standards

The City of Ontario Municipal Code, Chapter 29: Noise, requires that a project shall not create loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness.

Exterior Noise Standards:

Noise standards are defined in Section 5-29.04, Exterior Noise Standards of the Noise chapter of the Municipal Code and are applicable to the project site and surrounding noise sensitive uses.

Table 6 shows the exterior noise standards from the City of Ontario Municipal Code Chapter 29: Noise Exterior Noise Standards for the project site and surrounding residential land uses.

Table 6
City of Ontario Municipal Code Exterior Noise Standards

Land Use	7:00 AM – 10:00 PM	10:00 PM – 7:00 AM
	Leq (dBA)	Leq (dBA)
Multi-Family Residential	65	50
Residential Portion of Mixed Use	70	70
Commercial Property	65	60

[1]Applies to that portion of residential property falling within 100 feet of a commercial property use, if the noise originates from that commercial property use.

Interior Noise Standards:

Noise standards are defined in Section 5-29.05 Interior Noise Standards of the Noise chapter of the Municipal Code and are applicable to the project site and surrounding noise sensitive uses.

Table 7 shows the exterior noise standards from the City of Ontario Municipal Code Chapter 29: Noise Interior Noise Standards for the project land uses.

Table 7
City of Ontario Municipal Code Interior Noise Standards

Land Use	7:00 AM – 10:00 PM	10:00 PM – 7:00 AM
	Leq (dBA)	Leq (dBA)
Multi-Family Residential	45	40
Residential Portion of Mixed Use[1]	45	40

[1]Applies to that portion of residential property falling within 100 feet of a commercial property use, if the noise originates from that commercial property use.

Construction Noise Regulations

Chapter 29: Noise, Section 5-29.06 of the City's municipal code states that the following activities shall be exempted from the provisions of the noise code;

- Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the following provisions of § 5-29.09;

  i. No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

  ii. No landowner, construction company owner, contractor, subcontractor, or employer shall permit or allow any person or persons working under their

direction and control to operate any tool, equipment or machine in violation of the provisions of this section.

3.3.2 City of Ontario General Plan (The Ontario Plan)

The Ontario Plan establishes planning criteria for determining a development's noise/land use compatibility based on the community noise equivalent level (CNEL). CNEL noise levels are typically used to evaluate mobile source noise impacts such as from roadways, airports and rail lines.

Table 8 summarizes the City's Noise/Land Use Compatibility guidelines for the project and surrounding land uses.

Table 8
Noise/Land Use Compatibility Guidelines

Land Use	Noise Limit (CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential – Multiple Family	<60	60-65	65-75	>75
Commercial – Retail	<70	70-75	75-80	>80

Clearly Acceptable: No special noise insulation required, assuming buildings of normal conventional construction.

Normally Acceptable: Acoustical reports will be required for major new residential construction. Conventional construction with closed windows and fresh air supply systems of air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included.

Clearly Unacceptable: No new construction should be permitted.

4.0 Study Method and Procedures

The following section describes the measurement procedures, measurement locations, and noise modeling procedures and assumptions used in the noise analysis.

4.1 Measurement Procedures and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

RK conducted the sound level measurements in accordance with Caltrans technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4: Specification of Sound Level Meters, 1983).

A Piccolo-II Type 2 integrating-averaging level meter was used to conduct long-term (24-hour) noise measurements at the project site and property boundaries.

The Leq, Lmin, Lmax, L2, L8, L25, and L50 statistical data were recorded over the measurement time period intervals and the information was utilized to define the noise characteristics for the project. The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed five (5) feet above the ground for long-term noise measurements
- Sound level meters were calibrated before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Temperature and sky conditions were observed and documented

Appendix B includes photos, field sheets, and measured noise data.

4.2 Stationary Noise Modeling

The stationary noise was projected using a computer program that replicates the FHWA Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the reference energy noise level. For stationary source, the following noise level was applied to the model. The model outputs the projected noise level based on the following key parameters:

- Referenced noise level – (e.g. how loud a source is at a specific distance)
- Vertical and horizontal distances (sensitive receptor distance from noise source)
- Noise barrier vertical and horizontal distances (noise barrier distance from sound source and receptor).
- Typical noise source spectra
- Topography

Table 9 indicates the referenced noise level used in this analysis.

Table 9
Stationary Source Noise Level

Source	Distance from Source (feet)	Noise Levels (dBA)
		Leq
HVAC Condenser Unit	3.0	77.0
Parking Lot	6.0	63.8

To estimate the future noise levels during typical conditions, RK adjusted the reference noise levels from noise source to the nearest receptors. Adjusted noise levels are based on the distance of the receptor location relative to the noise source and local topography. The noise levels assume that the stationary sources are operating continuously when in reality not all noise sources will operate continuously throughout the day and night.

4.3 Construction Noise Modeling

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model, together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, and baseline

parameters for the project site. This study evaluates the potential exterior noise impacts during each phase of construction. Noise levels were projected at an average distance of 160 feet to the nearest residential (to the north of Log F and Lot G) sensitive receptor of equipment operating over an 8-hour period from to the nearest sensitive receptor property line

- Construction phasing and equipment usage assumptions are referenced from the Toyota Arena Mixed Use Development AQ & GHG Study, by RK Engineering, June 2021.

4.4 Interior Noise Modeling

The interior noise level is the difference between the projected exterior noise level at the structure's façade and the noise reduction provided by the structure itself. Typical building construction will provide a conservative 12 dBA noise level reduction with a "windows open" condition and a very conservative 20 dBA noise level reduction with "windows closed". RK estimated the interior noise level by subtracting the building shell design from the estimated exterior noise level.

The interior noise analysis is based on industry standards for building noise reduction established by the Federal Highway Administration (FHWA), the 2013 Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (TeNS), the California Office of Noise Control Catalog of STC and IIC Ratings for Wall and Floor/Ceiling Assemblies, and the California Building Standards Code, Title 24.

The TeNS manual shows that the noise reduction due to building exteriors with ordinary sash windows (windows closed) is at least 20 decibels. By providing upgraded STC rated windows, the project design is considered adequate to meet interior noise standards. The building's exterior walls will be constructed per the latest building code insulation requirements and provide occupants with the most protection from exterior noise. Insulated exterior walls, designed per the latest California Building Standards, would provide a minimum of STC 35-40. Windows, on the other hand, are one of the acoustically weakest parts of the structure. Therefore, for a conservative estimate of preliminary interior noise, the building's noise reduction potential is limited to the STC of the windows.

4.5 Construction Vibration Modeling

The construction vibration assessment is based on the methodology set-forth within the Caltrans Transportation and Construction Induced Vibration Guidance Manual. The

vibration impacts from vibratory rollers and compactors, heavy truck loading and bulldozer activity is analyzed. All vibratory activity is analyzed as a continuous and/or frequent event and is required to comply with the applicable guidance thresholds criteria. It is expected that vibration levels will be highest during paving phase. No impact pile driving is expected as part of this project.

Vibratory impacts were calculated from the site area property line to the closest sensitive receptors and structures using the reference vibration levels, soil conditions and the reference equation *PPV= PPV ref (25/D)^n (in/sec)* (from Caltrans Manual) where:

PPV = reference measurement at 25 feet from vibration source
D = distance from equipment to property line
n= vibration attenuation rate through ground (n=1.0 was utilized for this study)

5.0 Existing Noise Environment

The existing noise environment for the project site and surrounding area has been established based on noise measurement data collected by RK.

5.1 Long-Term (24-Hour) Noise Measurement Results

To determine the existing noise level environment, RK conducted four (4) 24-hour noise measurements at the project study area.

Noise levels were measured on April 7, 2021 using a Piccolo-II Type 2 integrating-averaging sound level meter. The information was utilized to establish the noise characteristics of the existing ambient environment.

The noise monitoring locations were selected based on the proximity and location to adjacent sensitive receptors. Exhibit C graphically illustrates the location of the long-term measurements.

- Long-term noise monitoring location one (LT-1) was taken along southwest corner of Fourth Street and Via Piemonte approximately 140 feet south of the centerline of Fourth Street.

- Long-term noise monitoring location two (LT-2) was taken east of Porsche Way, approximately 60 feet north of the La Quinta Inn property line.

- Long-term noise monitoring location three (LT-3) was taken northwest corner of Concours Street and Ferrari Street, approximately 110 feet to the west from the centerline of Concours Street.

- Long-term noise monitoring location four (LT-4) was taken in the parking lot, approximately 450 feet to the north from the centerline of Concours Street.

Long term noise monitoring locations represent the existing noise levels near the adjacent noise sensitive land uses. Long-term noise measurement results are summarized in Table 10, Table 11, Table 12 and Table 13. Appendix B includes photographs, field sheets and measured noise data.

Table 10
24 Noise Measurement Results LT-1[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	52.5	12:00 PM	58.9
1:00 AM	49.3	1:00 PM	59.5
2:00 AM	50.7	2:00 PM	57.4
3:00 AM	51.5	3:00 PM	58.4
4:00 AM	53.4	4:00 PM	62.6
5:00 AM	59.2	5:00 PM	59.9
6:00 AM	58.2	6:00 PM	59.8
7:00 AM	59.1	7:00 PM	58.6
8:00 AM	57.4	8:00 PM	58.2
9:00 AM	55.3	9:00 PM	56.2
10:00 AM	58.6	10:00 PM	55.1
11:00 AM	57.8	11:00 PM	51.8
24-Hour CNEL			**62.5**

[1] LT-1 was taken along southwest corner of Fourth Street and Via Piemonte approximately 140 feet south of the centerline of Fourth Street. LT-1 was recorded on 04/07/2021.

Table 11
24 Noise Measurement Results, LT-2[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	50.1	12:00 PM	50.2
1:00 AM	49.4	1:00 PM	50.8
2:00 AM	49.7	2:00 PM	52.3
3:00 AM	50.5	3:00 PM	52.8
4:00 AM	49.5	4:00 PM	53.8
5:00 AM	57.7	5:00 PM	53.4
6:00 AM	54.7	6:00 PM	52.1
7:00 AM	53.0	7:00 PM	52.6
8:00 AM	50.1	8:00 PM	56.1
9:00 AM	48.5	9:00 PM	49.7
10:00 AM	50.5	10:00 PM	50.8
11:00 AM	50.6	11:00 PM	50.3
24-Hour CNEL			**59.2**

[1] LT-2 was taken east of Porsche Way, approximately 60 feet north of La Quinta Inn property line. LT-2 was recorded on 04/07/2021.

Table 12
24 Noise Measurement Results, LT-3[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	52.5	12:00 PM	56.2
1:00 AM	45.8	1:00 PM	56.8
2:00 AM	49.0	2:00 PM	55.1
3:00 AM	49.8	3:00 PM	58.1
4:00 AM	51.7	4:00 PM	57.3
5:00 AM	52.3	5:00 PM	59.2
6:00 AM	54.8	6:00 PM	57.1
7:00 AM	55.8	7:00 PM	57.2
8:00 AM	55.0	8:00 PM	56.7
9:00 AM	57.6	9:00 PM	53.1
10:00 AM	58.1	10:00 PM	53.0
11:00 AM	55.7	11:00 PM	57.5
24-Hour CNEL			**60.6**

[1] LT-3 was taken northwest corner of Concours Street and Ferrari Street, approximately 110 feet to the west from the centerline of Concours Street. LT-2 was recorded on 04/07/2021.

Table 13
24 Noise Measurement Results, LT-4[1]

Time	Leq (dBA)	Time	Leq (dBA)
12:00 AM	39.2	12:00 PM	44.5
1:00 AM	38.8	1:00 PM	43.8
2:00 AM	40.0	2:00 PM	43.8
3:00 AM	39.1	3:00 PM	46.7
4:00 AM	38.6	4:00 PM	44.8
5:00 AM	40.5	5:00 PM	43.3
6:00 AM	44.0	6:00 PM	42.2
7:00 AM	44.8	7:00 PM	40.8
8:00 AM	48.4	8:00 PM	39.8
9:00 AM	59.3	9:00 PM	39.9
10:00 AM	50.7	10:00 PM	39.3
11:00 AM	44.9	11:00 PM	40.5
24-Hour CNEL			**49.9**

[1] LT-4 was taken in the parking lot, approximately 450 feet to the north from the centerline of Concours Street. LT-4 was recorded on 04/07/2021.

6.0 Operational Noise Impacts

This assessment analyzes the anticipated noise levels generated by the project. The main sources of noise generated by the project would include vehicular traffic noise along the adjacent roadways. Noise level impacts are compared to the City of Ontario noise standards.

The project must demonstrate that noise levels generated by the project site would not result in a permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

6.1 Stationary Source Noise Impacts

The project is not expected to consist of significant sources of stationary noise. The main sources of potential stationary noise impacts from the project would mainly include on-site circulation and parking lot noise, HVAC units and outdoor conversational noise.

The types of on-site noise from the project are typically considered compatible with other adjacent commercial/mixed use and would not typically be categorized as loud, unnecessary, or unusual noise that disturbs the peace or quiet of any neighborhood, or that causes discomfort or annoyance to any person of normal sensitiveness. In particular, social activities and vehicular related noise are generally substantially less during the noise sensitive nighttime hours. Although, mechanical HVAC equipment does have the potential to operate 24-hours a day.

Rooftop mechanical HVAC equipment are expected to be located at the center of each building. The nearest noise sensitive residential receptors are located approximately 750 feet away to the west of the proposed Lot C HVAC units and the noise impacts from the operation of mechanical HVAC equipment is expected to be not significant at this distance. Therefore, a preliminary evaluation of noise impacts at the adjacent commercial uses has been provided.

Parking lot noise would occur from vehicle engine idling and exhaust, doors slamming, tires screeching, people talking, and the occasional horn honking. Parking lot noise is expected to occur on Lot F and Lot G and is conservatively assessed from the first parking space to northern residential properties; approximately 160 feet away.

The proposed site plan shows commercial/retail uses will face Via Piemonte and would be mostly shielded from the line of sight from the adjacent receptor property lines. Therefore, the outdoor conversational noise from the commercial/retail uses would not substantially contribute noise impacts to adjacent properties and was not included as a part of this analysis.

Table 14
Stationary Noise Impact Analysis[1]

Receptor			Stationary Noise Source				Combined Exterior Noise Level (Leq) dBA	
Number[2]	Land Use	Location	Source	Location	Distance[3]	Noise Level (Leq) dBA	Daytime[4]	Nighttime[4]
1	Residential	North of Lot F & Lot G	Parking Lot	Lot F & Lot G	160	34.8	34.8	34.8
2	Residential	West of Lot C	HVAC	Lot C	510	32.2	32.6	32.6
			Parking Lot	Lot F	735	21.9		
City of Ontario Residential Exterior Standard Levels							**65.0**	**50.0**
Noise Level Exceeds Standard (?)							**No**	**No**
3	Commercial	South of Lot C and Lot D	HVAC	Lot A	213	39.6	43.7	43.7
			HVAC	Lot C	243	38.5		
			HVAC	Lot D	243	38.5		
			Parking Lot	Lot F & Lot G	530	24.7		
4	Commercial	East of Lot D	HVAC	Lot D	485	32.7	36.6	36.6
			Parking Lot	Lot G	170	34.3		
5	Commercial	East of Lot A	HVAC	Lot A	213	39.6	42.4	42.4
			HVAC	Lot B	525	39.1		
6	Commercial	South of Lot B	HVAC	Lot A	580	31.1	39.0	39.0
			HVAC	Lot B	250	38.2		
City of Ontario Commercial Exterior Standard Levels							**65.0**	**60.0**
Noise Level Exceeds Standard (?)							**No**	**No**

[1] Stationary noise calculation worksheets are shown in Appendix C.
[2] Refer Exhibit A for Receptor Location.
[3] Distance from the receptor to the nearest noise source.
[4] Daytime: (7:00 A.M. to 10:00 P.M.); Nighttime: (10:00 P.M. to 7:00 A.M.)

As shown in Table 14, operational noise levels generated by the project are not expected to exceed the City's daytime standards and nighttime noise standards at the nearest receptor property line for both commercial and residential uses. Stationary noise calculation worksheets are shown in Appendix C.

6.2 Preliminary Interior Noise Analysis

Traffic noise along the adjacent roadways is expected to be the primary source of ambient noise impacting future residents at the project site. Traffic noise is analyzed to determine the project's noise/land use compatibility setting and to determine future noise levels to habitable exterior and interior areas on the project site. This section of the analysis does not necessarily apply to CEQA, as recent court rulings have indicated that CEQA is primarily concerned with the project's impact of the environment, not the environment's impact on a project.

Future traffic noise along the roadways is obtained from The Ontario Plan Figure S-3a, Future Roadway Noise Contours and represents the noise levels at the project site.

Table 15 shows the estimated future traffic noise levels at the project site and the noise/land use compatibly rating based on the City of Ontario General Plan Table LU-7 standards. The Ontario Plan Noise Level Exposure and Land Use Compatibility Guidelines is provided in Appendix A.

Table 15
Future Traffic Noise Levels[1]

Receptor	Exterior Noise Level (Ldn) (dBA CNEL)	Noise/Land Use Compatibility
Multifamily Residential	65-70	Normally Unacceptable
Retail	65-70	Normally Acceptable

[1] Source: The City of Ontario General Plan Table LU-7

The project may experience noise levels that fall within the normally unacceptable range (65-75 CNEL) for the residential part of the project and clearly acceptable (65-70 CNEL) for the retail part of the project. Hence, upgraded building construction techniques are expected to be required to achieve interior noise level standards for the residential uses.

Based on Section 5, the existing noise levels (CNEL) nearest the project site range from 60.6 CNEL to 62.5 CNEL. It should be noted that the existing noise levels were taken during typical weekday conditions and do not include noise levels during an event at the Toyota Arena event center, which may further increase noise levels (i.e., traffic) in the area. Therefore, in order to be conservative, the higher limit of the future traffic noise levels at the project site (70 dBA CNEL) has been utilized to conduct preliminary interior noise analysis.

A preliminary interior noise analysis has been prepared for the sensitive receptor locations using a typical "windows open" and "windows closed" condition. A "windows open" condition assumes 12 dBA of noise attenuation from the exterior noise level. A "windows closed" condition" assumes 20 dBA of noise attenuation from the exterior noise level.

Table 16 indicates the interior noise levels for the residential uses on the project site.

Table 16
Preliminary Interior Noise Impact Analysis

Receptor Location	Exterior Noise Level at Building Facade (CNEL)	Interior Noise Standard (CNEL)	Required Building Shell Noise Reduction (CNEL)	Interior Noise Level with Standard California Construction Windows (STC ≥ 25)		STC Rating for Windows Facing Subject Roadway
				"Windows Open" [1]	"Windows Closed" [2]	
Multifamily Residential	70	45.0	25	58	50	28

[1] A minimum of 12 dBA noise reduction is assumed with the "windows open" condition.
[2] A minimum of 20 dBA noise reduction is assumed with the "windows closed" condition.

The project is expected to require a "windows closed" condition and upgraded STC rated windows to meet the City/State interior noise standard of 45 dBA. To accommodate a windows closed conditions, all units shall be equipped with adequate fresh air ventilation, per the requirements of the California Uniform Building Code (UBC).

Prior to issuance of building permits, the project proponent should demonstrate to the City building department that the proposed building shell and window assemblies will achieve exterior to interior noise reduction necessary to meet the State of California and City of Ontario requirements.

Furthermore, the project shall comply with California Title 24 insulation building requirements for multi-family dwelling units for common separating assemblies (e.g. floor/ceiling assemblies and demising walls).

6.3 Los Angeles Ontario International Airport (LAONT)

The Los Angeles Ontario International Airport (LAONT) is centrally located in the City of Ontario. The airport is a medium-hub, full-service airport. Traffic at the airport includes general aviation, commercial passenger aviation, and air cargo freight movement. LAONT is a member of the Los Angeles World Airport (LAWA) system. LAWA is currently developing a Master Land Use Plan for LAONT that will provide a framework for the airport's development and use through the year 2030.

The LAONT is located approximately one and a quarter (1.25) miles to the northeast of the project site. A noise/land use compatibility assessment has been performed based on the project's location to the LAONT Airport. The noise contour maps for the LAONT Airport are provided in Exhibit D.

The project is located outside of the 60 dB Ldn noise contour limit; therefore, the exterior noise impact from the airport would be within the allowable limits for residential land uses and the project is considered compatible with the surrounding land use and noise environment. Noise from airport operations is expected to generate a less than significant on the proposed project.

6.4 Recommended Operational Design Features

The following recommended project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design. Design features are not typically considered mitigation under CEQA.

DF-1 Prior to the issuance of building permits, the project shall prepare a final acoustical study that demonstrates building construction will achieve the minimum interior noise standard of 45 dBA CNEL for all residential units located along arterial roadways and/or adjacent to industrial uses, per the California Building Standards Code. The following noise control measures may be required for dwelling units located near adjacent roadways and industrial uses:

- Install sound barriers between residences and noise sources.
- Install double-paned or similar sound rated windows.
- Provide sound insulating exterior walls and roofing systems.

- Locate and/or design attic vents to minimize sound propagation into each home.

- Provide forced-air ventilation systems.

- Place dwellings as far as practical from the noise source

DF-2 The project shall comply with California Title 24 building insulation requirements for exterior walls, roofs and common separating assemblies (e.g. floor/ceiling assemblies and demising walls).

DF-3 For proper acoustical performance, all exterior windows, doors, and sliding glass doors should have a positive seal and leaks/cracks must be kept to a minimum.

DF-4 The final building plans shall ensure that HVAC units are not located within an area of the project site that would contribute to a noise level exceedance at any adjacent property line, per the City of Ontario Municipal Code requirements. To meet the City's noise standards the following measures should be followed:

- All HVAC equipment shall be shielded or enclosed from the line of sight of adjacent residential uses.

7.0 Construction Noise and Vibration Impacts

Temporary construction noise and vibration impacts have been assessed from the project site to the nearest sensitive residential use to the north of Lot F and Lot G. The degree of construction noise will vary depending on the type of construction activity taking place and the location of the activity relative to the surrounding properties.

Chapter 29: Noise, Section 5-29.06 of the City's municipal code states that the following activities shall be exempted from the provisions of the noise code;

- Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the following provisions of § 5-29.09;

    i. No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

    ii. No landowner, construction company owner, contractor, subcontractor, or employer shall permit or allow any person or persons working under their direction and control to operate any tool, equipment or machine in violation of the provisions of this section.

To help further assess potential construction noise level impacts under CEQA, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006) criteria is used as a referenced threshold of significance in this report. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA Leq for an 8-hour period. In compliance with the City's Municipal Code, it is assumed construction would not occur during the noise-sensitive nighttime hours.

7.1 Typical Construction Noise Levels

Table 17 shows typical construction noise levels compiled by the Environmental Protection Agency (EPA) for common type construction equipment. Typical construction noise levels

are used to estimate potential project construction noise levels at the adjacent sensitive receptors.

Table 17
Typical Construction Noise Levels[1]

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86
Impact Equipment	
Pneumatic Wrenches	82 - 87
Jack Hammers, Rock Drills	80 - 99
Pile Drivers (Peak)	95-105
Other	
Vibrators	68 - 82
Saws	71 - 82

[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

7.2 Construction Noise Impact Analysis

This assessment analyzes potential noise impacts during all expected phases of construction, including; demolition, site preparation, grading, building construction, paving, and architectural coating. Construction phasing and equipment usage assumptions are referenced from:

- Toyota Arena Mixed Use Development AQ & GHG Impact Study, by RK Engineering Group, June 2021.

The project's estimated construction noise levels have been calculated using the Federal Highway Administration Roadway Construction Noise Model Version 1.1. Tables 18 show the noise level impacts to the nearest residential property lines to the north at 160 feet. Construction noise calculation worksheets are provided in Appendix D.

Table 18
Project Construction Noise Levels – Residential Uses to the North

Phase	Equipment	Quantity	Equipment Noise Level at 160ft (dBA Leq)	Combined Noise Level (dBA Leq)
Demolition	Concrete/Industrial Saw	1	72.5	76.3
	Excavator	3	66.6	
	Rubber Tired Dozer	2	67.6	
Site Preparation	Rubber Tired Dozers	3	67.6	77.5
	Tractors/Loaders/Backhoes	4	69.9	
Grading	Excavators	2	66.6	78.1
	Graders	1	70.9	
	Rubber Tired Dozers	1	67.6	
	Scrappers	2	69.5	
	Tractors/Loaders/Backhoes	2	69.9	
Building Construction	Cranes	1	62.5	76.2
	Forklifts	3	60.9	
	Generator Sets	1	67.5	
	Tractors/Loaders/Backhoes	3	69.9	
	Welders	1	59.9	
Paving	Cement and Mortar Mixer	2	64.7	71.8
	Pavers	2	64.1	
	Paving Equipment	2	62.9	
Architectural Coating	Air Compressors	1	63.6	63.6
Worst Case Construction Phase Noise Level - Leq (dBA)				78.1
FTA Construction Noise Criteria (Detailed Assessment: 8-Hour Leq)				80.0
Noise level exceeds FTA criteria?				No

As shown in Table 18, project construction noise levels are expected to be below the recommended 8-hour construction noise threshold provided by the FTA for adverse community reaction at the adjacent residential uses.

7.3 Construction Vibration

To determine the vibratory impacts during construction, reference construction equipment vibration levels were utilized and then extrapolated to the façade of the nearest adjacent structures. The nearest sensitive receptors are the commercial/retail structures located adjacent to the project site. All structures surrounding the project site are "new structures". No historical or fragile buildings are known to be located within the vicinity of the site.

The construction of the proposed project is not expected to require the use of substantial vibration inducing equipment or activities, such as pile drivers or blasting. The main sources of vibration impacts during construction of the project would be the operation of equipment such as bulldozer activity during demolition, loading trucks during grading and excavation, and vibratory rollers during paving.

The construction vibration assessment utilizes the referenced vibration levels and methodology set-forth within the Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018.

Table 19 shows the referenced vibration levels.

Table 19
Typical Construction Vibration Levels[1]

Equipment	Peak Particle Velocity (PPV) (inches/second) at 25 feet	Approximate Vibration Level (LV) at 25 feet
Piledriver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Piledriver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, September 2018

Table 20 shows the project's construction-related vibration analysis at the nearest structures to the project construction area. Construction impacts are assessed from the closest area on the project site to the nearest adjacent structure at approximately 50 feet. The worst case vibratory impact from the site is estimated to be 0.098 PPV (in/sec) at the structures to the west. No damage potential is expected.

Table 20
Construction Vibration Impact Analysis

Construction Activity	Distance to Nearest Structure (ft)	Duration	Calculated Vibration Level - PPV (in/sec)	Damage Potential Level	Annoyance Criteria Level
Large Bulldozer	50	Continuous/Frequent	0.042	No Impacts	Distinctly Perceptible
Vibratory Roller	50	Continuous/Frequent	0.035	No Impacts	Barely Perceptible
Loaded Trucks	50	Continuous/Frequent	0.098	Extremely Fragile Buildings, Ruins Ancient Monuments	Distinctly Perceptible
Caisson Drilling	50	Continuous/Frequent	0.042	No Impacts	Distinctly Perceptible

As shown in Table 20, project related construction activity is not expected to cause any potential damage to the nearest structures. The annoyance potential of vibration from construction activities would range from "distinctly perceptible" to "Barely perceptible".

Construction vibration calculation worksheets are shown in Appendix D.

7.4 Recommended Construction Design Features

The following recommended project design features include standard rules and requirements, best practices and recognized design guidelines for reducing noise levels. Design features are assumed to be part of the conditions of the project and integrated into its design. Design features are not typically considered mitigation under CEQA

DF-7 Prepare a construction management plan and obtain a construction work permit from the City of Ontario prior to starting construction. The construction management plan shall ensure all contractors implement construction best management practices to reduce construction noise levels. Best management practices shall include the following:

- All construction equipment shall be equipped with muffles and other suitable noise attenuation devices (e.g., engine shields).
- Grading and construction contractors shall use quieter equipment as opposed to noisier equipment (such as rubber-tired equipment rather than track equipment), to the maximum extent feasible.
- If feasible, electric hook-ups shall be provided to avoid the use of generators. If electric service is determined to be infeasible for the site, only whisper-quiet generators shall be used (i.e., inverter generators capable of providing variable load.
- Use electric air compressors and similar power tools rather than diesel equipment, where feasible.
- Locate staging area, generators and stationary construction equipment as far from the adjacent residential homes as feasible.
- Construction-related equipment, including heavy-duty equipment, motor vehicles, and portable equipment, shall be turned off when not in use for more than 5 minutes.

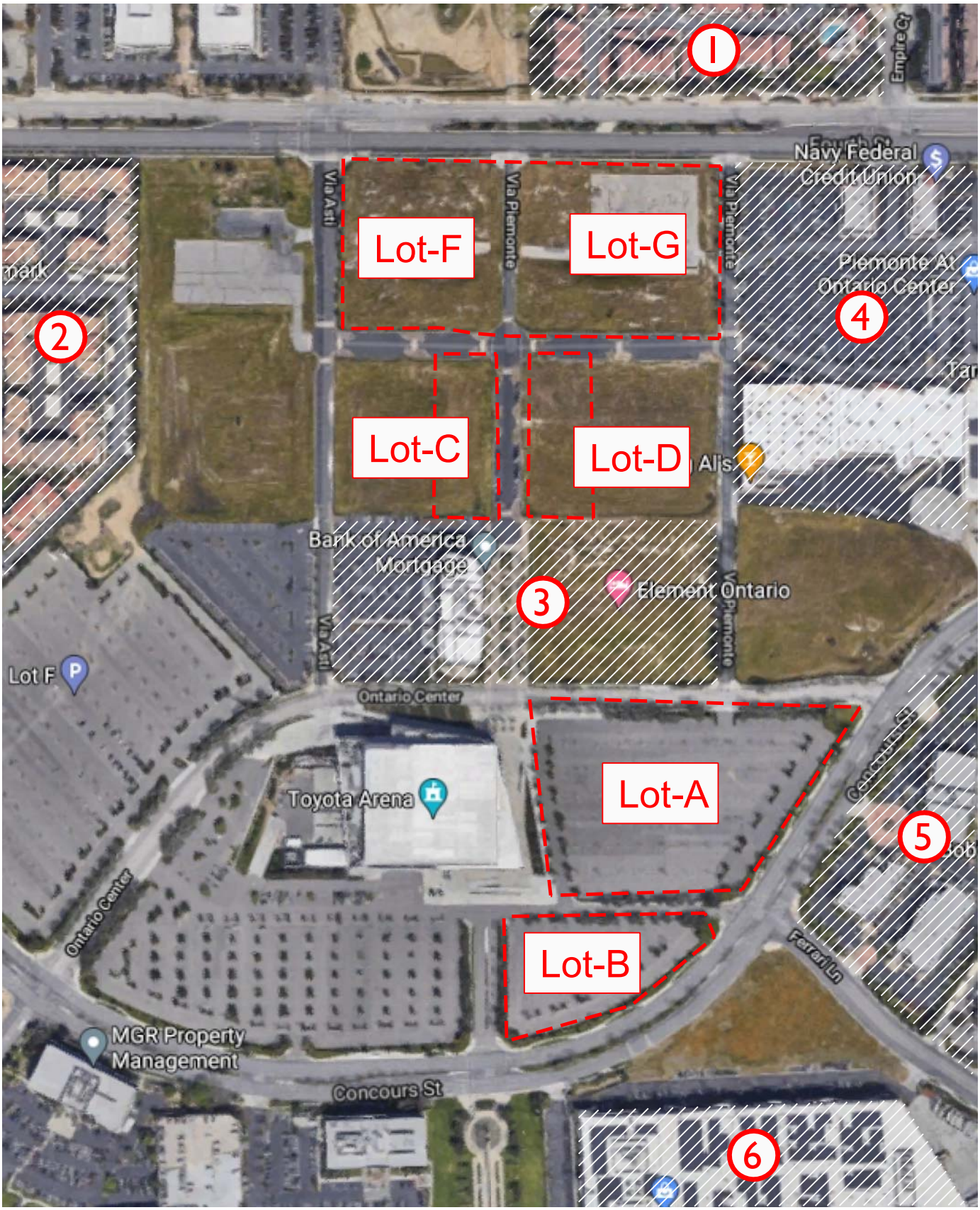
- Provide notifications and signage in readily visible locations along the perimeter of construction sites that indicate the dates and duration of construction activities, as well as provide a telephone number where neighbors can enquire about the construction process and register complaints to a designated construction noise disturbance coordinator.

- Construction activities shall not take place between the hours of 6:00 p.m. and 7:00 a.m. on weekdays and Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

DF-8 No impact pile driving or blasting activities shall be permitted on the project site during construction. If impact pile driving or blasting is required, a follow-up noise and vibration impact assessment shall be conducted prior to start of any activity.

Exhibits

Exhibit A
Location Map



N

Legend:

1 = Receptor Location

Exhibit C

Noise Monitoring Locations

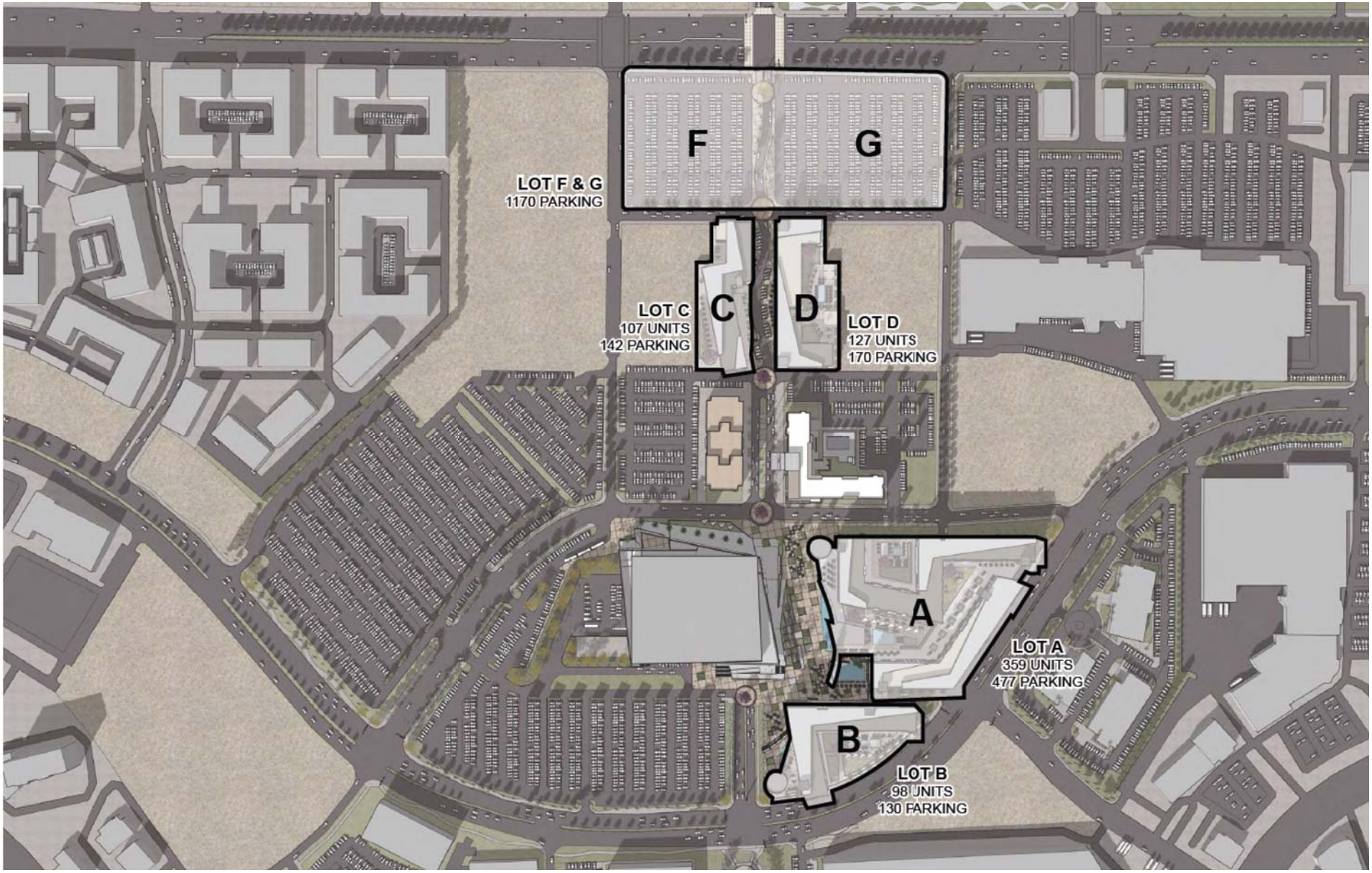


Exhibit C

Noise Monitoring Locations

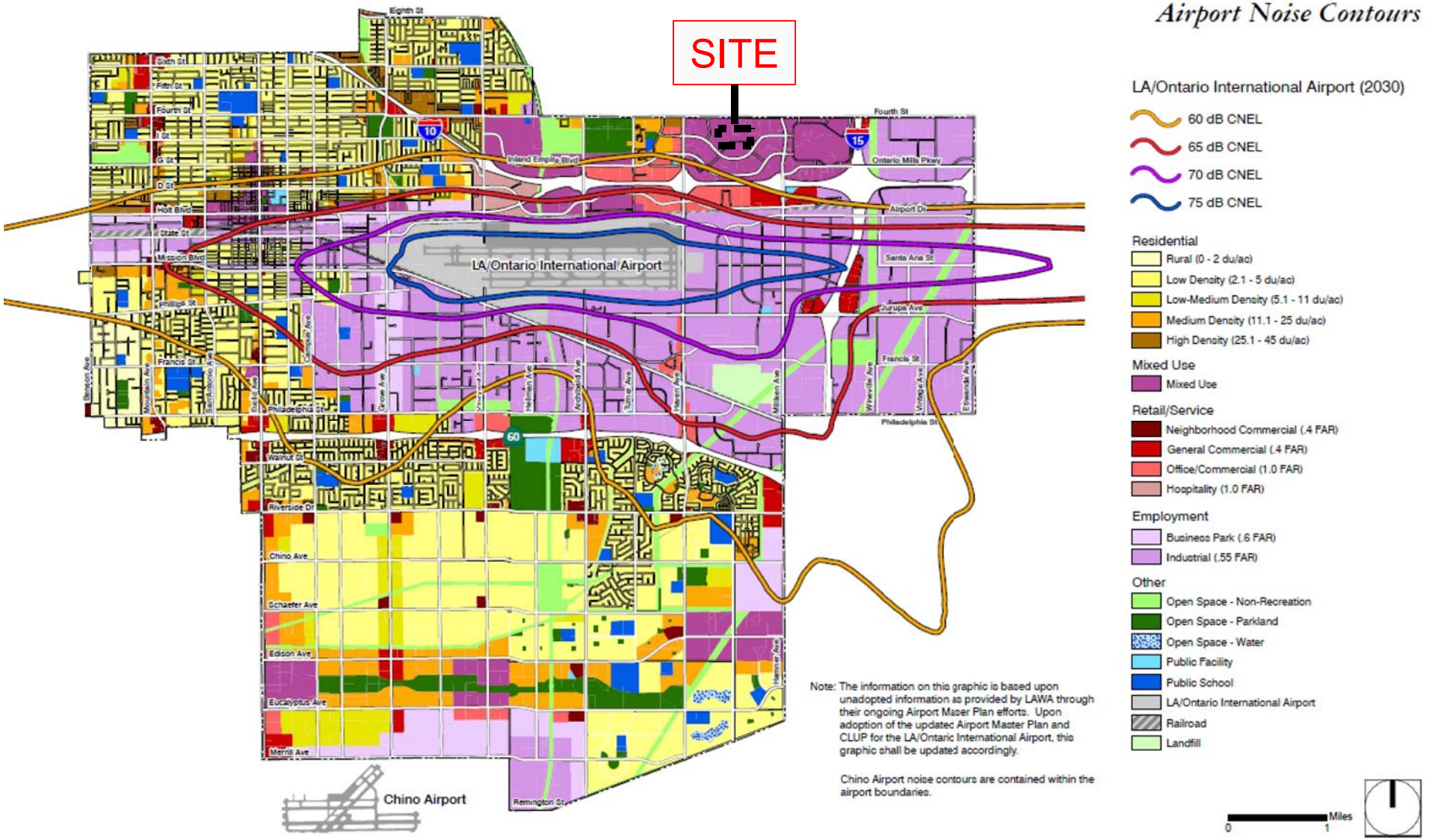
Legend:

LT-1 = Long Term (24-Hr) Noise Monitoring Location

N

Exhibit D

LAONT Airport Noise Contours



Appendices

Appendix A

City of Ontario
Noise Standards

CHAPTER 29: NOISE

5-29.01 Declaration of findings and policy

5-29.02 Definitions

5-29.03 Designated noise zones

5-29.04 Exterior noise standards

5-29.05 Interior noise standards

5-29.06 Exemptions

5-29.07 Loud and disturbing noise

5-29.08 Real property maintenance noise regulations

5-29.09 Construction activity noise regulations

5-29.10 Other public agency exceptions

5-29.11 Schools, day care centers, churches, libraries, museums, health care institutions; Special provisions

5-29.12 Sound amplifying equipment

5-29.13 Amplified sound

5-29.14 Motor vehicles

5-29.15 Noise level measurement

5-29.16 Prima facie violation

5-29.17 Penalty

5-29.18 Enforcement and administration

5-29.19 City Manager waiver

5-29.20 Noise abatement program

Sec. 5-29.01. Declaration of findings and policy.

It is hereby found and declared that:

(a) The making and creation of excessive, unnecessary or unusually loud noises within the limits of the City is a condition that has existed for some time, however, the extent and volume of such noises is increasing;

(b) The making, creation or maintenance of such excessive, unnecessary, unnatural or unusually loud noises that are prolonged, unusual and unnatural in their time, place and use affect and are a detriment to public health, comfort, convenience, safety, welfare and prosperity of the residents of the City; and

(c) The necessity in the public interest for the provisions and prohibitions hereinafter contained and enacted, is declared as a matter of legislative determination and public policy, and it is further declared

that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, comfort, convenience, safety, welfare and prosperity and the peace and quiet of the residents of the City.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.02. Definitions.

As used in this chapter, specific words and phrases are defined as follows:

(a) "Ambient noise level" shall mean the all-encompassing noise level associated with a given environment and is a composite of sounds from all sources, excluding the alleged offensive noise or excessive sound, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

(b) "Applicable (noise) zone" shall mean the noise zone category based on the actual use of the property, provided that the actual use is a legal use in the City.

(c) "A-weighted sound level" shall mean the sound pressure level in decibels (dBAs) as measured with a sound level meter using the A-weighted filter network (scale) at slow response and at a pressure of twenty (20) micropascals. The A-weighted filter de-emphasizes the very low and a very high frequency component of sound in a manner similar to the response of the human ear, and is a numerical method of rating human judgment of loudness.

(d) "Decibel (dBA)" shall mean a unit for measuring the amplitude of a sound, equal to twenty (20) times the logarithm to the base ten (10) of the ratio of pressure of the sound measured to the reference pressure of twenty (20) micropascals.

(e) "Equivalent sound or noise level (Leq)" shall mean the International Electrotechnical Commission (IEC) 60804 Standard for measurement, or the most recent revision thereof, for the sound level corresponding to a steady state noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level or the energy average noise level during the sample period. The measurement period for the purposes of this chapter is fifteen (15) minutes.

(f) "Impulsive noise" shall mean a noise of short duration usually less than one (1) second and of high intensity, with an abrupt onset and rapid decay. Such objectionable noises may also be repetitive.

(g) "Intrusive noise" shall mean that noise that intrudes over and above the ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence and tonal information content, as well as the prevailing ambient noise level.

(h) "Maintenance" shall mean the upkeep, repair or preservation of existing property or structures.

(i) "Noise" shall mean any unwanted sound or sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing or is otherwise annoying.

(j) "Noise level (sound level)" shall mean the weighted sound pressure level obtained by use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum. For purposes of this chapter, all noise levels (sound levels) shall be A-weighted sound pressure level.

(k) "Noise (sound) level meter" shall mean an instrument, including a microphone, an amplifier, an output meter and frequency weighting networks for the measurement and determination of noise and sound levels. For the purposes of this chapter, the sound level meter must meet the International Electrotechnical Commission (IEC) 60651 and 60804 Standards, or the most recent revisions thereof, for Type 1 sound level meters or an instrument and the associated recording and analyzing equipment that will provide equivalent data.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.03. Designated noise zones.

The properties hereinafter described shall be assigned to the following noise zones:

Noise Zone I:	All single-family residential properties;
Noise Zone II:	All multi-family residential properties and mobile home parks;
Noise Zone III:	All commercial property;
Noise Zone IV:	The residential portion of mixed use properties;
Noise Zone V:	All manufacturing or industrial properties and all other uses.

The actual use of the property, and not necessarily its zoning designation, shall be the determining factor in establishing whether a property is in Noise Zone I, II, III, IV or V, provided that the actual use is a legal use within the applicable zone.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.04. Exterior noise standards.

(a) The following exterior noise standards, unless otherwise specifically indicated, shall apply to all properties within a designated noise zone.

Allowable Exterior Noise Level (1)		***Allowed Equivalent Noise Level, Leq. (2)***	
Noise Zone	***Type of Land Use***	***7 a.m. to 10 p.m.***	***10 p.m. to 7 a.m.***
I	Single-Family Residential	65 dBA	45 dBA
II	Multi-Family Residential, Mobile Home Parks	65 dBA	50 dBA
III	Commercial Property	65 dBA	60 dBA
IV	Residential Portion of Mixed Use	70 dBA	70 dBA
V	Manufacturing and Industrial, Other Uses	70 dBA	70 dBA

(1) If the ambient noise level exceeds the resulting standard, the ambient noise level shall be the standard.

(2) Measurements for compliance are made on the affected property pursuant to § 5-29.15.

(b) It is unlawful for any person at any location within the incorporated area of the City to create noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which noise causes the noise level, when measured at any location on any other property, to exceed either of the following:

(1) The noise standard for the applicable zone for any fifteen-minute (15) period; and

(2) A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).

(c) In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.

(d) The Noise Zone IV standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use, if the noise originates from that commercial property or use.

(e) If the measurement location is on a boundary between two (2) different noise zones, the lower noise level standard applicable to the noise zone shall apply.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.05. Interior noise standards.

(a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all properties within a designated noise zone.

Allowable Interior Noise Level (1)		**Allowed Equivalent Noise Level, Leq.** (2)	
Noise Zone	***Type of Land Use***	***7 a.m. to 10 p.m.***	***10 p.m. to 7 a.m.***
I	Single-Family Residential	45 dBA	40 dBA
II	Multi-Family Residential, Mobile Home Parks	45 dBA	40 dBA
IV	Residential Portion of Mixed Use	45 dBA	40 dBA

(1) If the ambient noise level exceeds the resulting standard, the ambient noise level shall be the standard.

(2) Measurements for compliance are made on the affected property pursuant to § 5-29.15.

(b) It is unlawful for any person at any location within the incorporated area of the City to create noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which noise causes the noise level, when measured at any location on any other property, to exceed either of the following:

(1) The noise standard for the applicable zone for any fifteen-minute (15) period;

(2) A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).

(c) In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.

(d) The Noise Zone IV standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use, if the noise originates from that commercial property or use.

(e) If the measurement location is on a boundary between two (2) different noise zones, the lower noise level standard applicable to the noise zone shall apply.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.06. Exemptions.

The following activities shall be exempted from the provisions of this chapter:

(a) Any activity conducted on public property, or on private property with the consent of the owner, by any public entity or its officers, employees, representatives, agents, subcontractors, permittees, licensees or lessees that the public entity has authorized are exempt from the provisions of this chapter. This includes, without limitation, sporting and recreational activities that are sponsored, co-sponsored, permitted or allowed by the City or any school district within the City's jurisdictional boundaries. This also includes, without limitation, occasional outdoor gatherings, public dances, shows or sporting and entertainment events, provided such events are conducted pursuant to an approval, authorization, contract, lease, permit or sublease by the appropriate public entity, specifically the planning commission or City Council;

(b) Occasional outdoor gatherings, public dances, show, sporting and entertainment events, provided said events are conducted pursuant to a permit or license issued by the appropriate jurisdiction relative to the staging of said events;

(c) Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle, work or warning alarm or bell, provided the sounding of any bell or alarm on any building or motor vehicle shall terminate its operation within forty-five (45) minutes in any hour of its being activated;

(d) Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the provisions of § 5-29.09;

(e) Noise sources associated with construction, repair, remodeling, demolition or grading of public rights-of-way or during authorized seismic surveys;

(f) All mechanical devices, apparatus or equipment associated with agriculture operations provided that:

(1) Operations do not take place between 8:00 p.m. and 7:00 a.m.;

(2) Such operations and equipment are utilized for the protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions; or

(3) Such operations and equipment are associated with agricultural pest control through pesticide application, provided the application is made in accordance with permits issued by or regulations enforced by the California Department of Agriculture;

(g) Noise sources associated with the maintenance of real property. Such activities shall instead be subject to the provisions of § 5-29.08;

(h) Any activity to the extent regulation thereof has been preempted by state or federal law;

(i) Any noise sources associated with people and/or music associated with a party at a residential property. Such noise shall be subject to the provisions of OMC § 5-29.07;

(j) Any noise source emanating from an ice cream truck within the City. Such noise shall be subject to the provisions of OMC § 4-18.04;

(k) Any noise sources associated with barking dogs or other intermittent noises made by animals on any properly within the City. Such noise shall be subject to the provisions of OMC Chapter 1, Title 6;

(l) Noise sources related to uses approved by a permit or development agreement adopted prior to the date of adoption of this chapter and that contains acoustic or noise standard conditions of approval. This exemption shall only be applicable during the effective period of the City-approved permit or development agreement.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.07. Loud and disturbing noise.

(a) It is unlawful for any person or property owner within the City to make, cause or allow to be made any loud, excessive, impulsive or intrusive noise, disturbance or commotion that disturbs the peace or quiet of any area or that causes discomfort or annoyance to any reasonable person of normal sensitivities in the area, after a Police or Code Enforcement Officer has first requested that the person or property owner cease and desist from making such noise. The types of loud, disturbing, excessive, impulsive or intrusive noise may include, but shall not be limited to, yelling, shouting, hooting, whistling, singing, playing a musical instrument, or emitting or transmitting any loud music or noise from any mechanical or electrical sound making or sound-amplifying device.

(b) The factors, standards, and conditions that may be considered in determining whether a violation of the provisions of this section has been committed, included, but not limited to, the following:

(1) The level of the noise;

(2) The level and intensity of the background (ambient) noise, if any;

(3) The proximity of the noise to residential or commercial sleeping areas;

(4) The nature and zoning of the area within which the noise emanates;

(5) The density of inhabitation of the area within which the noise emanates;

(6) The time of day and night the noise occurs;

(7) The duration of the noise;

(8) Whether the noise is constant, recurrent or intermittent;

(9) Whether the noise is produced by a commercial or noncommercial activity; and

(10) Whether the use is lawful under the provisions of Title 5 of this Code and whether the noise is one that could reasonably be expected from the activity or allowed use.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.08. Real property maintenance noise regulations.

(a) No person, while engaged in maintenance of real property, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, except between the hours of 8:00 a.m. and 6:00 p.m.

(b) Trimming or pruning that requires the use of chainsaws or mulching machines shall only be allowed between the hours of 8:00 a.m. and 6:00 p.m. on a weekday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday or Sunday.

(c) The use of electrical or gasoline powered blowers, such as commonly used by gardeners or other persons for cleaning lawns, yards, driveways, gutters and other property shall only be allowed between the hours of 8:00 a.m. and 6:00 p.m. on a weekday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday or Sunday.

(d) No landowner, gardener, property maintenance service, contractor, subcontractor or employer shall permit or allow any person or persons working under his or her direction or control to operate any tool, equipment or machine in violation of the provisions of this section.

(e) Exceptions. The provisions of this section shall not apply to the following:

(1) Emergency property maintenance required by the building official;

(2) The maintenance, repair or improvement of any public work or facility by public employees, by any person or persons acting pursuant to a public works contract, or by any person or persons performing such work or pursuant to the direction of, or on behalf of, any public agency; provided, however, this exception shall not apply to the City, or its employees, contractors or agents, unless:

(i) The City Manager or department head determines that the maintenance, repair or improvement is immediately necessary to maintain public service,

(ii) The maintenance, repair or improvement is of a nature that cannot feasibly be conducted during normal business hours, or

(iii) The City Council has approved project specifications, contract provisions, or an environmental document that specifically authorizes maintenance during hours of the day that would otherwise be prohibited pursuant to this section; and

(3) Any maintenance that complies with the noise limits specified in § 5-29.04.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.09. Construction activity noise regulations.

(a) No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

(b) No landowner, construction company owner, contractor, subcontractor, or employer shall permit or allow any person or persons working under their direction and control to operate any tool, equipment or machine in violation of the provisions of this section.

(c) Exceptions.

(1) The provisions of this section shall not apply to emergency construction work performed by a private party when authorized by the City Manager or his or her designee;

(2) The maintenance, repair or improvement of any public work or facility by public employees, by any person or persons acting pursuant to a public works contract, or by any person or persons performing such work or pursuant to the direction of, or on behalf of, any public agency; provided, however, this exception shall not apply to the City, or its employees, contractors or agents, unless:

(i) The City Manager or a department head determines that the maintenance, repair or improvement is immediately necessary to maintain public services,

(ii) The maintenance, repair or improvement is of a nature that cannot feasibly be conducted during normal business hours, or

(iii) The City Council has approved project specifications, contract provisions, or an environmental document that specifically authorizes construction during hours of the day that would otherwise be prohibited pursuant to this section; and

(3) Any construction that complies with the noise limits specified in §§ 5-29.04 or 5-29.05.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.10. Other public agency exceptions.

The provisions of this chapter shall not be construed to prohibit any work at different hours by or under the direction of any other public agency or public or private utility companies in cases of necessity or emergency.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.11. Schools, day care centers, churches, libraries, museums, health care institutions; Special provisions.

It is unlawful for any person to create any noise that causes the outdoor noise level at any school, day care center, hospital or similar health care institution, church, library or museum while the same is in use, to exceed the noise standards specified in § 5-29.04 prescribed for the assigned Noise Zone I.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.12. Sound amplifying equipment.

Loudspeakers, sound amplifiers, public address systems or similar devices used to amplify sounds shall be subject to the provisions of § 5-29.13. Such sound amplifying equipment shall not be construed to include electronic devices, including but not limited to, radios, tape players, tape recorders, compact disc players, MP3 players, electric keyboards, music synthesizers, record players or televisions, which are designed and operated for personal use, or used entirely within a building and are not designed or used to convey the human voice, music or any other sound to an audience outside such building, or which are used in vehicles and heard only by occupants of the vehicle in which installed.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.13. Amplified sound.

(a) The City Council enacts the following legislation for the sole purpose of securing and promoting the public health, comfort, safety and welfare for its citizenry. While recognizing that the use of sound amplifying equipment may be entitled to certain protection by the constitutional rights of freedom of speech and assembly, the City Council finds that in order to protect the public safety and the correlative rights of the citizens of this community to privacy and freedom from public nuisance of loud and unnecessary noise, reasonable regulation of the time, place and manner of the use of amplifying equipment is necessary. In no event shall approval or authorization required herein be withheld by reason of the constitutionally protected content of any material proposed to be broadcast through amplifying equipment.

(b) It is unlawful for any person, other than personnel of law enforcement or governmental agencies, to install, use or operate a loudspeaker or sound amplifying device in a fixed or movable position or mounted upon any vehicle within the City for the purpose of giving instructions, directions, talks, addresses or lectures to any persons or assemblages of persons in or upon any street, alley, sidewalk, park, place or public property without a permit to do so from the Police Chief or his or her designee. Notwithstanding any other provision of this chapter, the provisions of this section shall also apply to the use of sound amplifying equipment upon public or private property when used in connection with outdoor or indoor public or private events, whether or not admission is charged or food or beverages are sold, when such activity is to be attended by more than one hundred (100) persons and the noise emanating from the event will be audible at the property plane, or in the case of a street dance or concert on the nearest residential property. Those activities listed in § 5-29.06(a) are exempt from the requirements of this section.

(c) The Police Chief or his or her designee is authorized to approve and issue permits under this section.

(d) An application for a permit required by this section shall be filed with the Police Chief at least sixteen (16) days and no more than one hundred twenty (120) days prior to the date on which the sound amplifying equipment is intended to be used. Applications for events covered by the First Amendment of the United States Constitution are exempt from the time requirements of this section if it is shown that circumstances require a shorter filing period and the event will not constitute an unsafe condition. The application shall contain the following information:

(1) The name, address and telephone number of both the owner and the user of the sound amplifying equipment;

(2) The license number, if a sound truck is to be used;

(3) A general description of the sound amplifying equipment which is to be used;

(4) Whether sound amplifying equipment will be used for commercial or noncommercial purpose;

(5) The dates and times upon and within which, and the streets or property over or upon which, the equipment is proposed to be operated;

(6) The name or names of one (1) or more persons who will be present during the conduct of any activities for which registration is sought and who will have authority to reduce the volume of any sound amplifying equipment during the course of the activities if required pursuant to this chapter and, otherwise, to insure compliance with the provisions of this chapter;

(7) A statement by the applicant that he or she is willing and able to comply with the provisions of this chapter and the conditions of the permit; and

(8) A sketch of the area or facilities within which the activities are to be conducted, with approximate dimensions and illustration of the location and orientation of all sound-amplifying equipment.

(e) The Police Chief shall deny the permit application or revoke any permit if the chief finds any of the following:

(1) The application contains materially false or intentionally misleading information;

(2) The use of sound amplifying equipment at an event or activity proposed will be located in or upon a premises, building or structure that is hazardous to the health or safety of the employees or patrons of the premises, business, activity, or event, or the general public, under the standards established by the Uniform Building or Fire Codes, or other applicable codes, as set forth in OMC Titles 4 and 8;

(3) The use of sound amplifying equipment at an event or activity proposed in or upon a premises, building or structure that lacks adequate on-site parking for participants attending the proposed event or activity under the applicable standards set forth in OMC Title 9;

(4) The conditions of any motor vehicle movement are such that, in his or her opinion, the use of the equipment would constitute an unreasonable interference with traffic safety;

(5) The conditions of pedestrian movement are such that the use of the equipment would constitute a detriment to traffic safety;

(6) The application submitted by the applicant reveals that the applicant would violate the provisions of this section or any other provision of federal, state and/or local law;

(7) The applicant is unwilling or unable to comply with the provisions of this chapter or any conditions imposed upon any permit issued;

(8) There had already been a permitted event at the intended location, or within a two hundred (200) yard radius of the intended location and the prior permitted event was located on residentially zoned property or on a street, alley, public parking lot or neighborhood park within three (3) months prior to the intended event. Community parks are exempt from this subsection (8); or

(9) The applicant or location has had previous violations within the past calendar year, and in the judgment of the Police Chief, issuance would be contrary to the intent of this section.

(f) In determining whether the use of the equipment would constitute an unreasonable interference with or detriment to traffic safety, the Police Chief shall consider, but shall not necessarily be limited to:

(1) The volumes, patterns and speed of vehicular and pedestrian traffic in the proposed area of use;

(2) The relationship of the proposed use of equipment and potential impacts upon traffic patterns;

(3) Availability of sufficient room for the operation of the equipment without significantly interfering with the traffic patterns;

(4) Proximity to schools, playgrounds and similar facilities where use of such equipment might attract children into traffic patterns; or

(5) Proximity to busy intersections or other potentially hazardous conditions where use of such equipment might constitute a hazard by reason of its tendency to distract drivers of vehicles or pedestrians.

(g) Issuance or denial.

(1) If the application is approved, the Police Chief shall return an approved copy of the application to the applicant and shall issue a permit. The permit shall constitute permission for the use of the sound amplifying equipment as requested.

(2) Any application filed shall be either approved or disapproved within five (5) days of the filing thereof.

(3) If the application is disapproved, the Police Chief shall return a disapproved copy forthwith to the applicant with a written statement on the reason for disapproval.

(i) Any person aggrieved by a decision of the Police Chief or his or her designee may file an appeal to the City Manager. A complete and proper appeal shall be filed with the City Clerk within ten (10) calendar days of the action that is the subject of the appeal. If the applicant fails to file an appeal within the ten (10) day filing period provided herein, denial shall take effect immediately upon expiration of such filing period. All appeals shall be in writing and shall contain the following information: (a) name(s) of the person filing the appeal, (b) a brief statement in ordinary and concise language of the relief sought, and (c) the signatures of all parties named as appellants and their mailing addresses. After receiving the appeal, the City Clerk shall immediately forward the matter to the City Manager for handling.

(ii) The City Manager shall, upon receipt of the appeal, set the matter for hearing before the City Manager or a hearing officer. Any hearing officer shall be a licensed attorney or recognized mediator designated by the City Manager. The hearing shall be set for not more than ten (10) calendar days after the receipt of the appeal unless a longer time is requested or consented to by the appellant. Notice of such hearing shall be given in writing and mailed at least five (5) calendar days prior to the date of the hearing, by U.S. mail, with a proof of service attached, addressed to the address listed on the permit application, or the written appeal if different from the permit application. The notice shall state the grounds of the complaint or reason for the denial and shall state the time and place where such hearing will be held.

(iii) The City Manager or hearing officer shall, within ten (10) calendar days following the conclusion of the hearing, make a written finding and decision, which shall be delivered to the City and the appellant by first class mail. Notwithstanding any provision in this Code, the decision of the City Manager or hearing officer shall be the final administrative decision of the City. Any party dissatisfied with the decision of the City Manager or hearing officer may seek review of such decision under the provisions of Code Civil Procedure, §§ 1094.5 and 1094.8, as amended from time to time.

(h) In addition to any other provisions of this Code, the use of sound-amplifying equipment and sound trucks in the City shall be subject to the following regulations:

(1) The only sounds permitted are music and human speech;

(2) Sound shall not be emitted within one hundred (100) yards of hospitals, churches, schools and City Hall;

(3) The volume of sound shall be controlled so that it will not be audible for a distance in excess of one hundred (100) feet from the sound amplifying equipment or sound truck, and so that the volume is not unreasonably loud, raucous, jarring, disturbing or a nuisance to persons within the range of allowed audibility; or

(4) The sound amplifying equipment or sound truck shall not be used between the hours of 8:00 p.m. and 8:00 a.m.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.14. Motor vehicles.

The use of any motor vehicle in such a condition as to create excessive, impulsive or intrusive noises is prohibited. The discharge into the open air of the exhaust of any internal combustion engine, stationary or mounted on wheels, motorboat or motor vehicle, including motor cycle, whether or not discharged through a muffler or other similar device, which discharge creates excessive, unusual, impulsive or intrusive noise is prohibited. Motor vehicles shall comply with the noise regulations of the California Vehicle Code.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.15. Noise level measurement.

(a) The location selected for measuring exterior noise levels in a residential area shall be at any part of a private yard, patio, deck or balcony normally used for human activity and identified by the owner or, if occupied by someone other than the owner, the occupant of the affected property as suspected of exceeding the noise level standard. This location may be the closest point in the private yard or patio, or on the deck or balcony, to the noise source, but should not be located in nonhuman activity areas such as trash container storage areas, planter beds, above or contacting a property line fence, or other areas not normally used as part of the yard, patio, deck or balcony. The location selected for measuring exterior noise levels in a nonresidential area shall be at the closest point to the noise source. The measurement microphone height shall be five (5) feet above finish elevation or, in the case of a deck or balcony, the measurement microphone height shall be five (5) feet above the finished floor level.

(b) The location selected for measuring interior noise levels shall be made within the affected residential unit. The measurements shall be made at a point at least four (4) feet from the wall, ceiling or floor, or within the frame of a window opening, nearest the noise source. The measurements shall be made with windows in an open position.

(c) Any decibel measurement made pursuant to the provisions of this chapter shall be measured in decibels (dBAs) as measured with a sound level meter using the A-weighted sound pressure level.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.16. Prima facie violation.

Any noise exceeding the noise level standard as specified in §§ 5-29.04 and 5-29.05, shall be deemed to be prima facie evidence of a violation of the provisions of this chapter.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.17. Penalty.

(a) Any person who negligently or knowingly violates any provision of this chapter shall be guilty of an infraction and upon conviction shall be punishable by a fine specified in OMC § 1-2.01. Each day a violation occurs shall constitute a separate offense and shall be punishable as such.

(b) Any person who negligently or knowingly violates any provision of this chapter may also be subject to fine(s) specified in the administrative citation schedule of fines set forth in OMC § 1-5.04. The manner of issuing administrative citations shall comply with all the procedures specified in OMC Chapter 5, Title 1.

(c) As an additional remedy, the operation or maintenance of any device, instrument, vehicle or machinery in violation of any provisions of this chapter, which operation or maintenance causes or creates sound levels exceeding the allowable standards as specified in this chapter, shall be deemed and is declared to be a public nuisance and may be subject to abatement by a restraining order or injunction issued by a court of competent jurisdiction.

(d) Any violation of this chapter is declared to be a public nuisance and may be abated in accordance with law. The expense of enforcing this chapter is declared to be public nuisance and may be by resolution of the City Council declared to be a lien and special assessment against the property on which such nuisance is maintained, and any such charge shall also be a personal obligation of the property owner.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.18. Enforcement and administration.

(a) It shall be the responsibility of Police or Code Enforcement Officers to enforce the provisions of this chapter and to perform all other functions required by this chapter. Such duties shall include, but not be limited to investigating potential violations, issuing warning notices and citations, and providing evidence to the City prosecutor for legal action.

(b) For violations of § 5-29.07, Police or Code Enforcement Officers shall obtain a declaration under penalty of perjury from two (2) declarants living in separate households within a sixty (60) day period stating in detail all of the following:

(1) That the declarant is a resident of a residential neighborhood located within two hundred (200) yards of the noise source; and

(2) Within the past month declarant has heard noise for substantially long periods to the extreme annoyance of the declarant.

(3) Declarations from two (2) declarants are required to prove a violation of § 5-29.07, but are not required to prove that a person has violated any other provision of this chapter.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.19. City Manager waiver.

The City Manager is authorized to grant a temporary waiver to the provisions of this chapter for a period of time necessary to correct the violations of this chapter, if such temporary waiver would be in the public interest and there is no feasible and prudent alternative to the activity, or the method of conducting the activity, for which the temporary waiver is sought. This time period may include a commitment to a program that includes placing necessary orders and entering into necessary contracts within thirty (30) days for repair or installation.

(§ 2, Ord. 2888, eff. March 6, 2008)

Sec. 5-29.20. Noise abatement program.

(a) In circumstances where adopted community-wide noise standards and policies prove impractical in controlling noise generated from a specific source, the City Council may establish a noise abatement program that recognizes the characteristics of the noise source and affected property and that incorporates specialized mitigation measures.

(b) Noise abatement programs shall set forth in detail the approved terms, conditions and requirements for achieving maximum compliance with noise standards and policies. Said terms, conditions and requirements may include, but shall not be limited to, limitations, restrictions, or prohibitions on operating hours, location of operations, and the types of equipment.

(§ 2, Ord. 2888, eff. March 6, 2008)

NOISE LEVEL EXPOSURE AND LAND USE COMPATIBILITY GUIDELINES

Table LU-7

LAND USE CATEGORIES		COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)						
Category	Land Use	55	60	65	70	75	80	
Residential/ Lodging	Single Family / Duplex							
	Multi-Family							
	Mobile Homes							
	Hotel/Motels							
Public/Institutional	Schools/Hospitals							
	Churches/ Libraries							
	Auditoriums/Concert Halls							
Commercial	Offices							
	Retail							
Industrial	Manufacturing							
	Warehousing							
Recreational/ Open Space	Parks/Playgrounds							
	Golf Courses/ Riding Stables							
	Outdoor Spectator Sports							
	Outdoor Music Shells/ Amphitheaters							
	Livestock/Wildlife Preserves							
	Crop Agriculture							

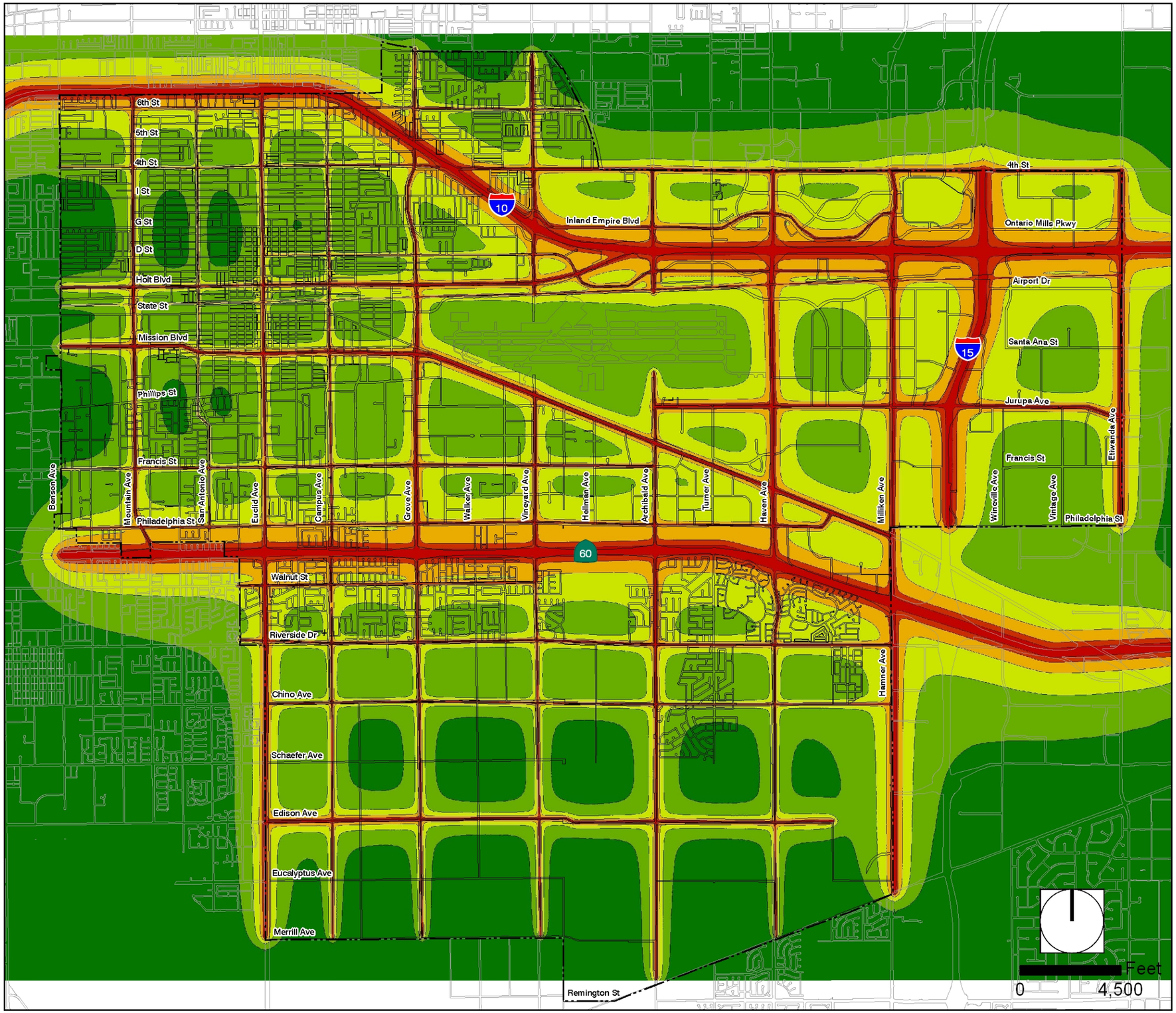
LEGEND

Clearly Acceptable:	No special noise insulation required, assuming buildings of normal conventional construction.
Normally Acceptable:	Acoustical reports will be required for major new residential construction. Conventional construction with closed windows and fresh air supply systems of air conditioning will normally suffice.
Normally Unacceptable:	New construction should be discouraged. Noise/aviation easements required for all new construction. If new construction does proceed, a detailed analysis of noise reduction requirements must be made and necessary noise insulation features included.
Clearly Unacceptable:	No new construction should be permitted.

Note: For noise compatibility criteria and contours for Ontario International Airport refer to the adopted ALUCP for ONT.

Figure S-3a

Future Roadway Noise Contours



Noise Level Ldn in dBA CNEL

	<= 60
60 <	<= 65
65 <	<= 70
70 <	<= 75
75 <	<= 80
80 <	

Source: SoundPlan Noise Model, Braunstein and Berndt, GmbH, Version 6.5. Noise contours do not take into account attenuation provided by building structures or masonry walls or noise from the Los Angeles Ontario International Airport, Chino Airport, or Union Pacific Railroad.

THE ONTARIO PLAN
A FRAMEWORK FOR THE FUTURE

Appendix B

Field Data and Photos

Field Sheet

Project: Toyota Arena Mixed Use Development **Engineer:** M. Torres

Date: 4/7/2021
JN: 2957-2021-02

Measurement Address: Toyota Arena
City: Ontario
Site No.: 1

Sound Level Meter:
Piccolo II
Serial # P0218042101
Serial # P0218092808
Serial # P0221010801
Serial # P0221010802

Calibrator:
CA114 Sound Calibrator
Serial # 500732

Calibration Record:

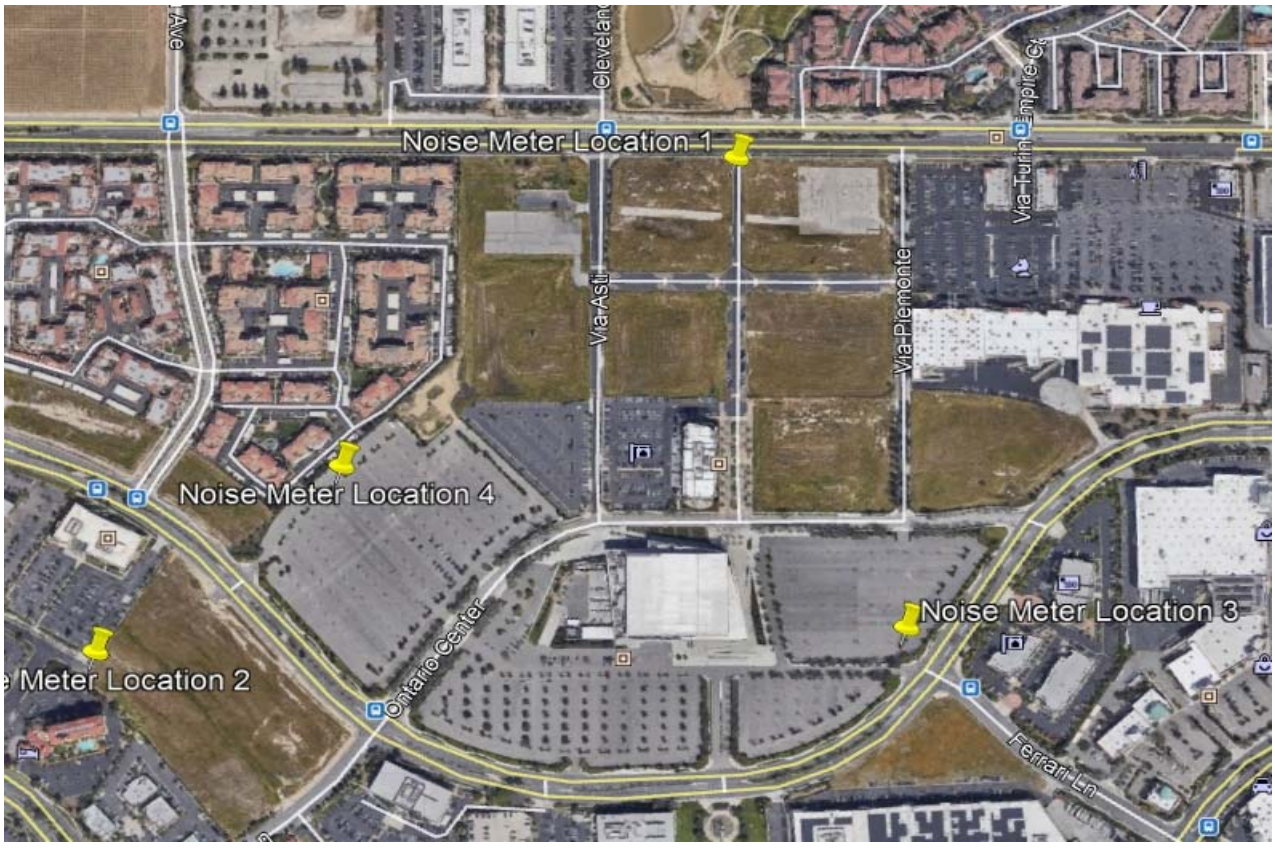
	Input, dB/	Reading, dB/	Offset, dB/	Time
1	94.0			9:47 AM
2	94.0			10:18 AM
3	94.0			10:47 AM
4	94.0			10:54 AM

Notes:
Temp: 55
Windspeed: 8 MPH
Direction: SSW
Skies: and Partly Cloudy
Camera:
Photo Nos.

Meter Settings:
☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS ___60____- MINUTE
☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☒ L_N PERCENTILE VALUES

Notes:

Measurement Type:
Long-term X
Short-term



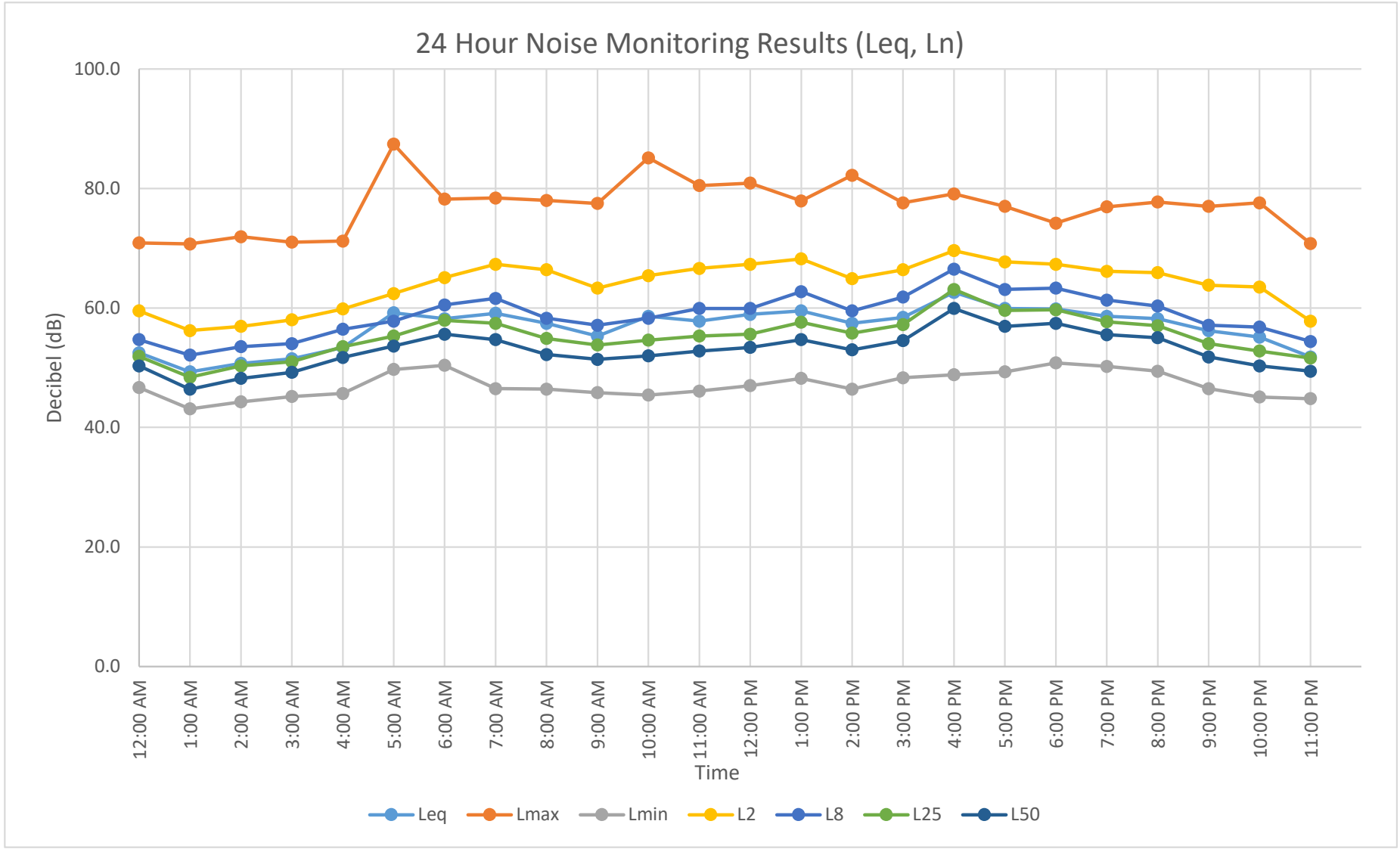
RK engineering group, inc.

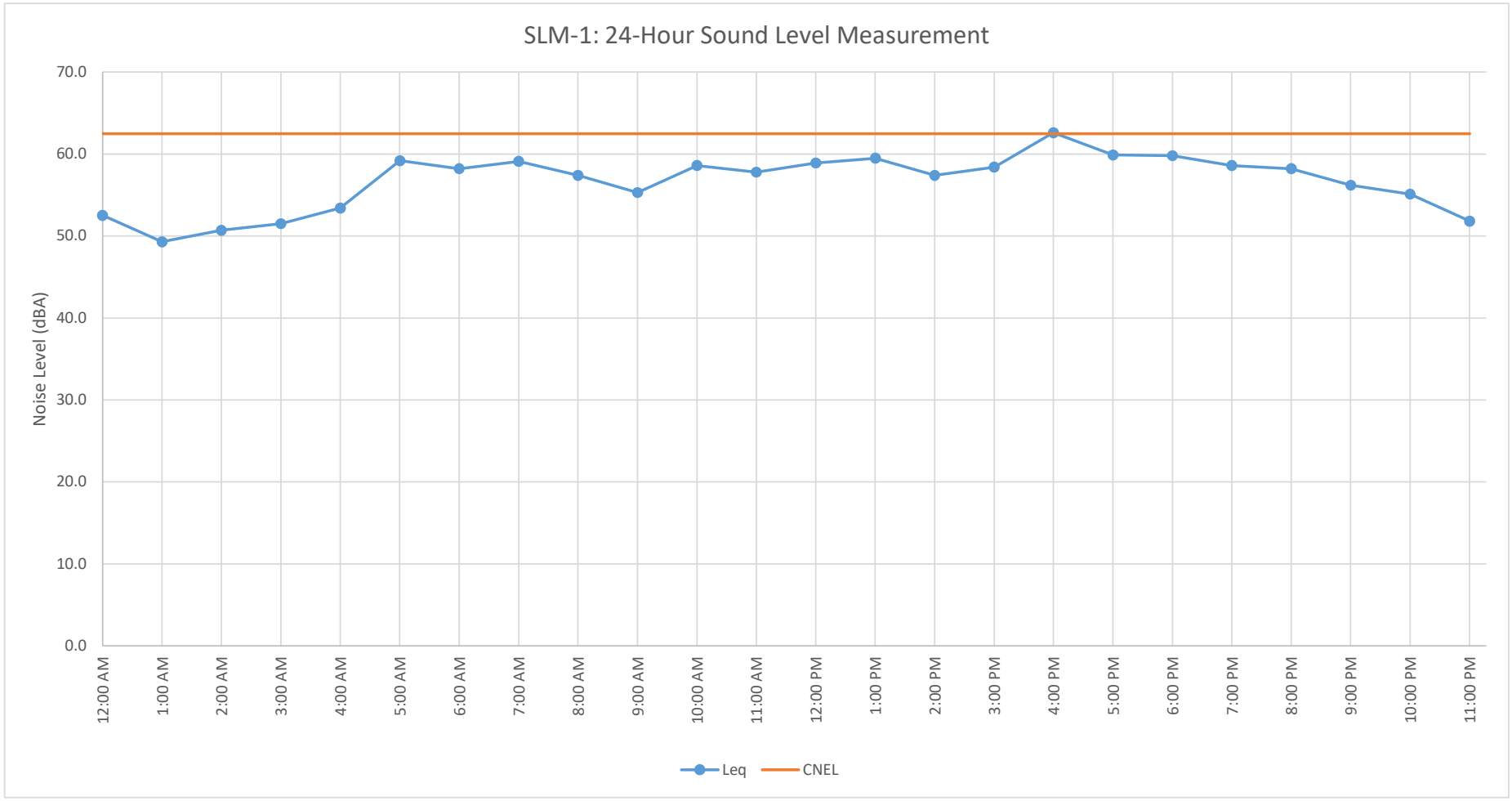
Field Sheet - ST1 Location Photos

Project: Toyota Arena Mixed Use Development	**Engineer:** M. Torres	**Date:**	4/7/2021
		JN:	2957-2021-02
Measurement Address: Southwest Corner of Via Piemonte and Fourth Street.	**City:** Ontario	**Site No.:**	1

RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	Southwest Corner of Resort Way and Haven Avenue					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	52.5	70.9	46.7	59.5	54.7	51.9	50.3
1:00 AM	49.3	70.7	43.1	56.2	52.1	48.4	46.4
2:00 AM	50.7	71.9	44.3	56.9	53.5	50.3	48.2
3:00 AM	51.5	71.0	45.2	58.0	54.0	51.0	49.2
4:00 AM	53.4	71.2	45.7	59.8	56.4	53.5	51.7
5:00 AM	59.2	87.4	49.7	62.4	57.8	55.3	53.6
6:00 AM	58.2	78.2	50.4	65.1	60.5	57.9	55.6
7:00 AM	59.1	78.4	46.5	67.3	61.6	57.4	54.7
8:00 AM	57.4	78.0	46.4	66.4	58.3	54.9	52.2
9:00 AM	55.3	77.5	45.8	63.3	57.1	53.8	51.4
10:00 AM	58.6	85.1	45.4	65.4	58.3	54.6	52.0
11:00 AM	57.8	80.5	46.1	66.6	59.9	55.3	52.8
12:00 PM	58.9	80.9	47.0	67.3	59.9	55.6	53.4
1:00 PM	59.5	77.9	48.2	68.2	62.7	57.6	54.7
2:00 PM	57.4	82.2	46.4	64.9	59.5	55.8	53.0
3:00 PM	58.4	77.6	48.3	66.4	61.8	57.2	54.5
4:00 PM	62.6	79.1	48.8	69.6	66.5	63.1	59.9
5:00 PM	59.9	77.0	49.3	67.7	63.1	59.6	56.9
6:00 PM	59.8	74.2	50.8	67.3	63.3	59.7	57.4
7:00 PM	58.6	76.9	50.2	66.1	61.3	57.7	55.5
8:00 PM	58.2	77.7	49.4	65.9	60.3	57.0	55.0
9:00 PM	56.2	77.0	46.5	63.8	57.1	54.0	51.8
10:00 PM	55.1	77.6	45.1	63.5	56.8	52.8	50.3
11:00 PM	51.8	70.8	44.8	57.8	54.4	51.6	49.4
Daytime	58.7	85.1	45.1	66.6	61.3	57.5	54.9
Nighttime	54.7	87.4	43.1	60.5	56.2	53.5	51.5


24 Hour Noise Monitoring Results (Leq, Ln)
Decibel (dB)
100.0
80.0
60.0
40.0
20.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50

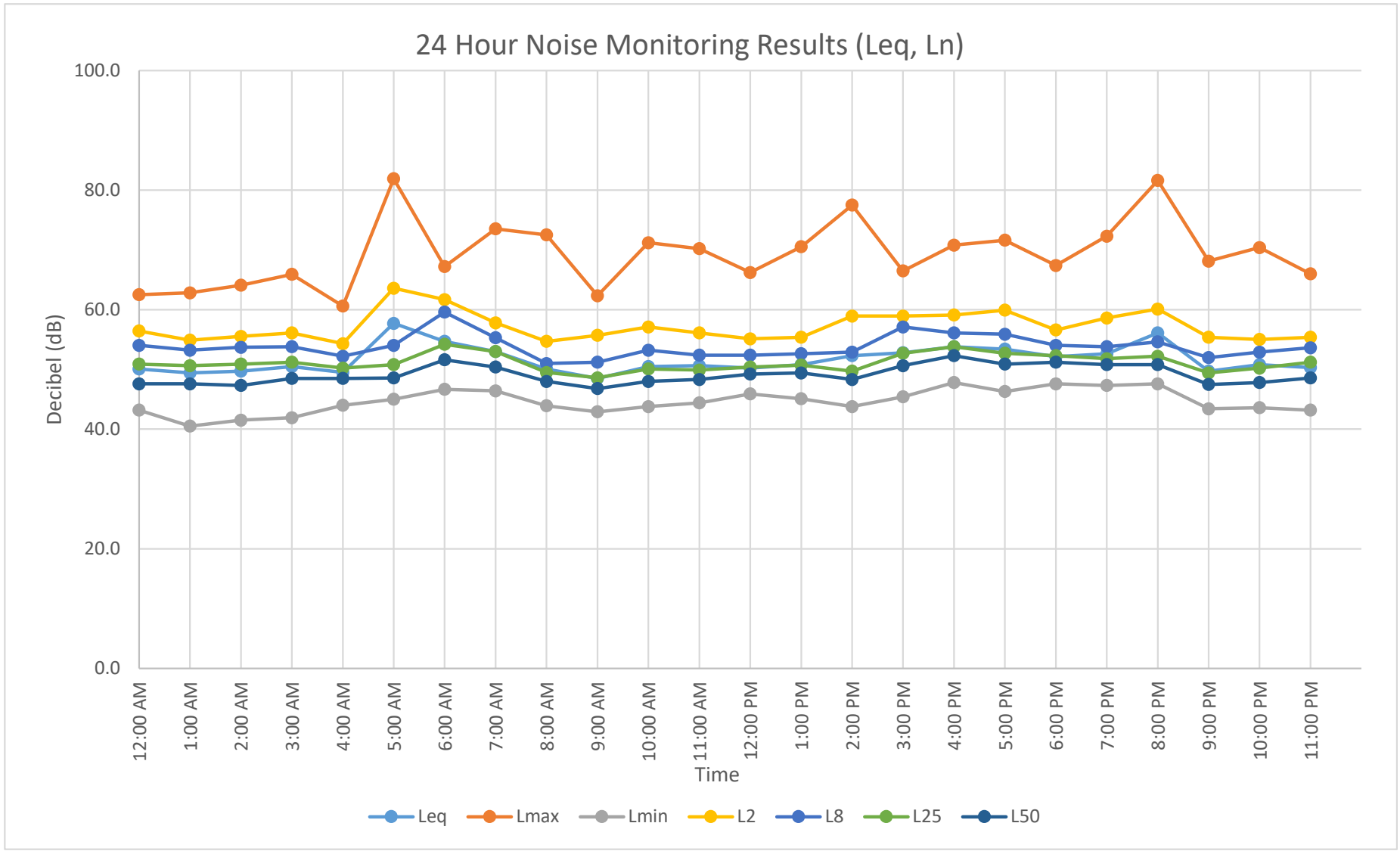

SLM-1: 24-Hour Sound Level Measurement
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

Field Sheet - ST2 Location Photos

Project: Toyota Arena Mixed Use Development	**Engineer:** M. Torres	**Date:**	4/7/2021
		JN:	2957-2021-02
Measurement Address: East of Porsche Way, North of La Quinta Inn Site	**City:** Ontario	**Site No.:**	2

RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	East of Porsche Way, North of La Quinta Inn Site					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	50.1	62.5	43.2	56.4	54.0	50.9	47.6
1:00 AM	49.4	62.8	40.5	54.9	53.2	50.6	47.6
2:00 AM	49.7	64.1	41.5	55.5	53.7	50.9	47.3
3:00 AM	50.5	65.9	41.9	56.1	53.8	51.2	48.5
4:00 AM	49.5	60.6	44.0	54.3	52.2	50.2	48.5
5:00 AM	57.7	81.9	45.0	63.6	54.0	50.8	48.6
6:00 AM	54.7	67.2	46.7	61.7	59.6	54.2	51.6
7:00 AM	53.0	73.5	46.4	57.8	55.3	53.0	50.4
8:00 AM	50.1	72.5	43.9	54.7	51.0	49.5	48.0
9:00 AM	48.5	62.3	42.9	55.7	51.2	48.6	46.8
10:00 AM	50.5	71.2	43.8	57.1	53.2	50.1	48.0
11:00 AM	50.6	70.2	44.4	56.1	52.4	49.9	48.3
12:00 PM	50.2	66.2	45.9	55.1	52.4	50.4	49.2
1:00 PM	50.8	70.5	45.1	55.4	52.6	50.7	49.4
2:00 PM	52.3	77.5	43.8	58.9	52.9	49.7	48.3
3:00 PM	52.8	66.5	45.4	58.9	57.1	52.7	50.6
4:00 PM	53.8	70.8	47.8	59.1	56.1	53.8	52.3
5:00 PM	53.4	71.6	46.3	59.9	55.9	52.7	50.9
6:00 PM	52.1	67.4	47.6	56.6	54.0	52.3	51.2
7:00 PM	52.6	72.3	47.3	58.6	53.8	51.8	50.8
8:00 PM	56.1	81.6	47.6	60.1	54.6	52.2	50.8
9:00 PM	49.7	68.1	43.4	55.4	52.0	49.4	47.5
10:00 PM	50.8	70.4	43.6	55.0	52.9	50.2	47.8
11:00 PM	50.3	66.0	43.2	55.4	53.6	51.2	48.6
Daytime	52.1	81.6	42.9	57.5	53.9	51.3	49.7
Nighttime	52.7	81.9	40.5	58.7	54.9	51.4	48.7


24 Hour Noise Monitoring Results (Leq, Ln)
100.0
80.0
60.0
40.0
20.0
0.0
Decibel (dB)
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
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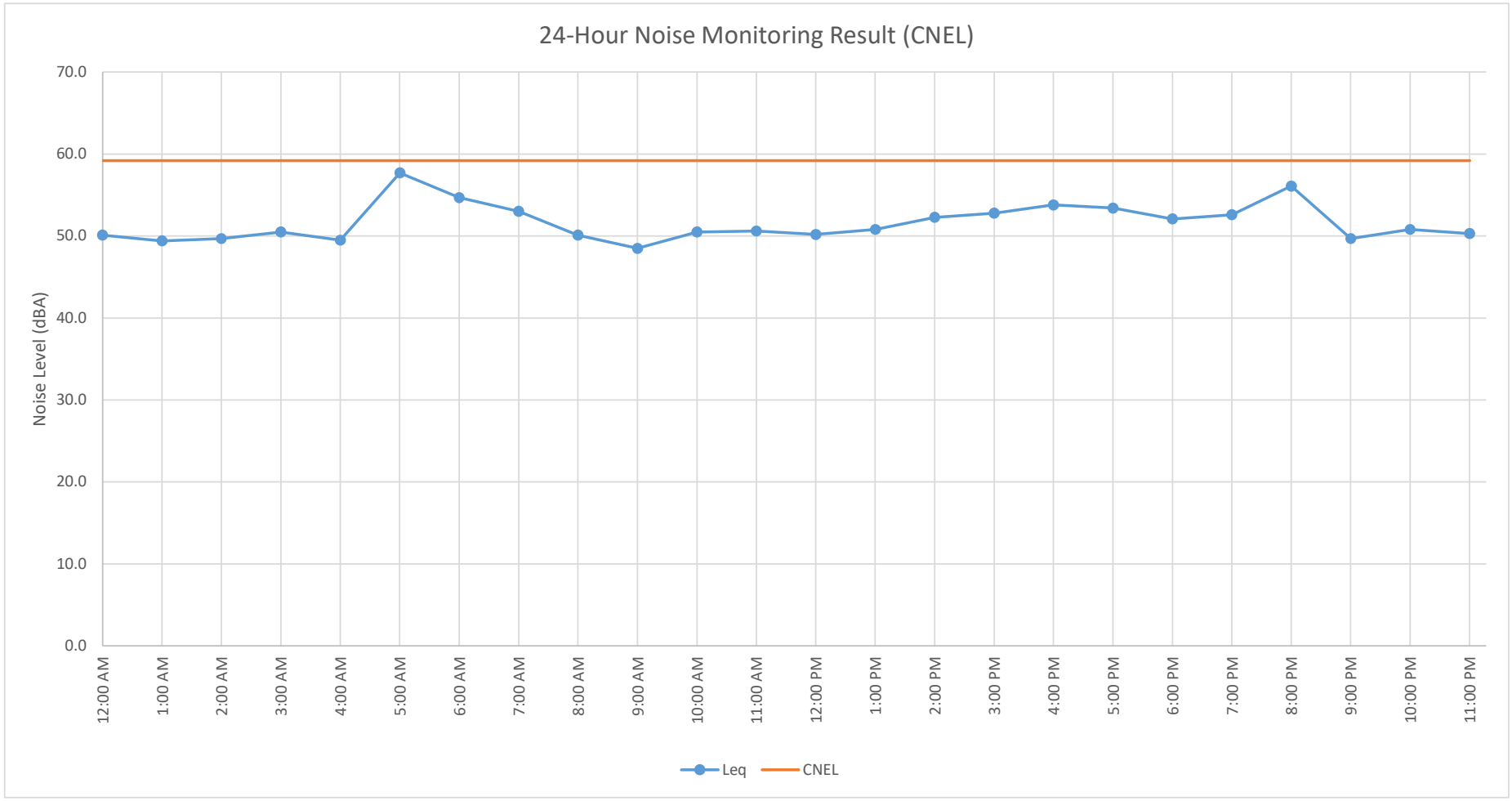
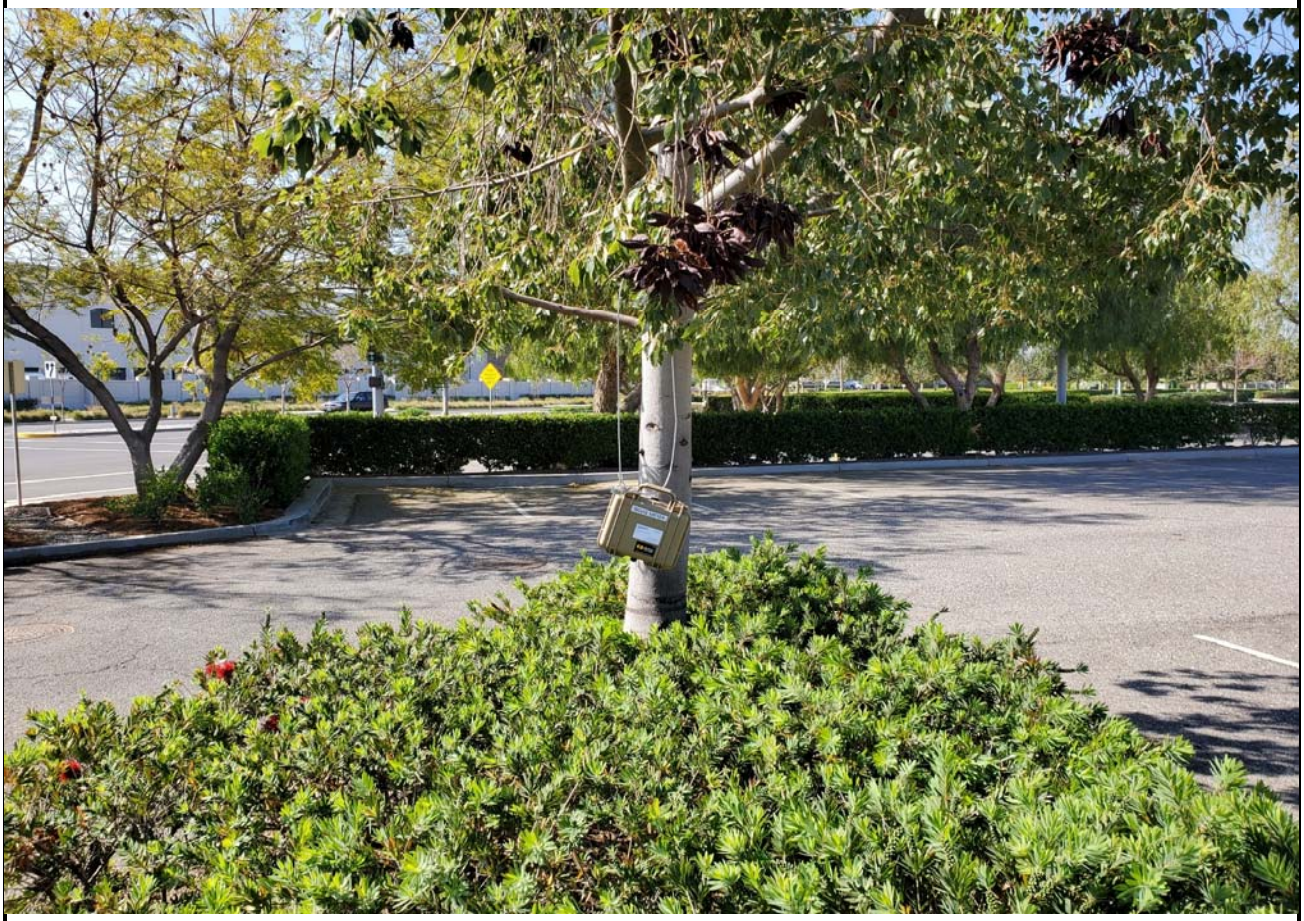
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50


24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

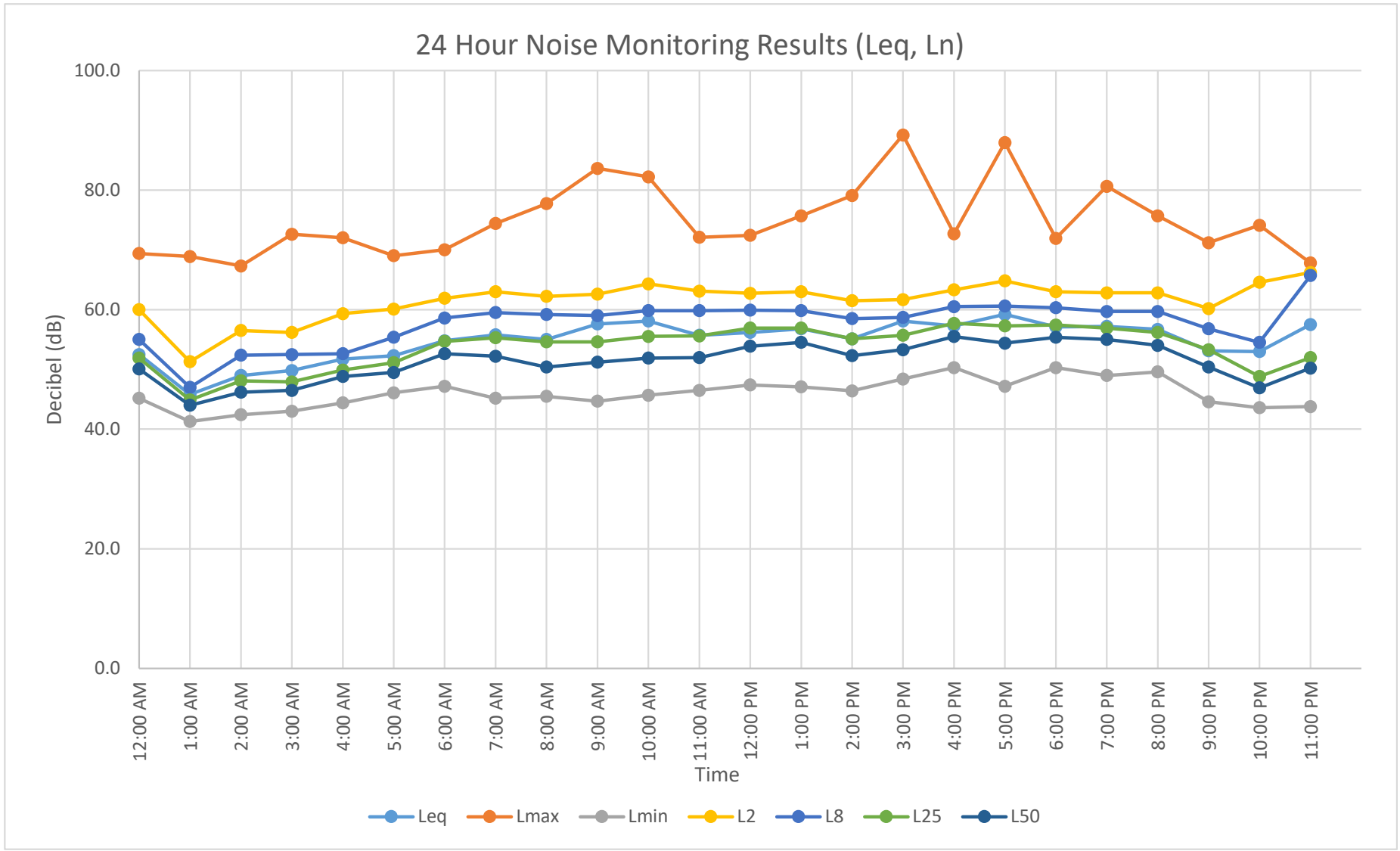
Field Sheet - ST3 Location Photos

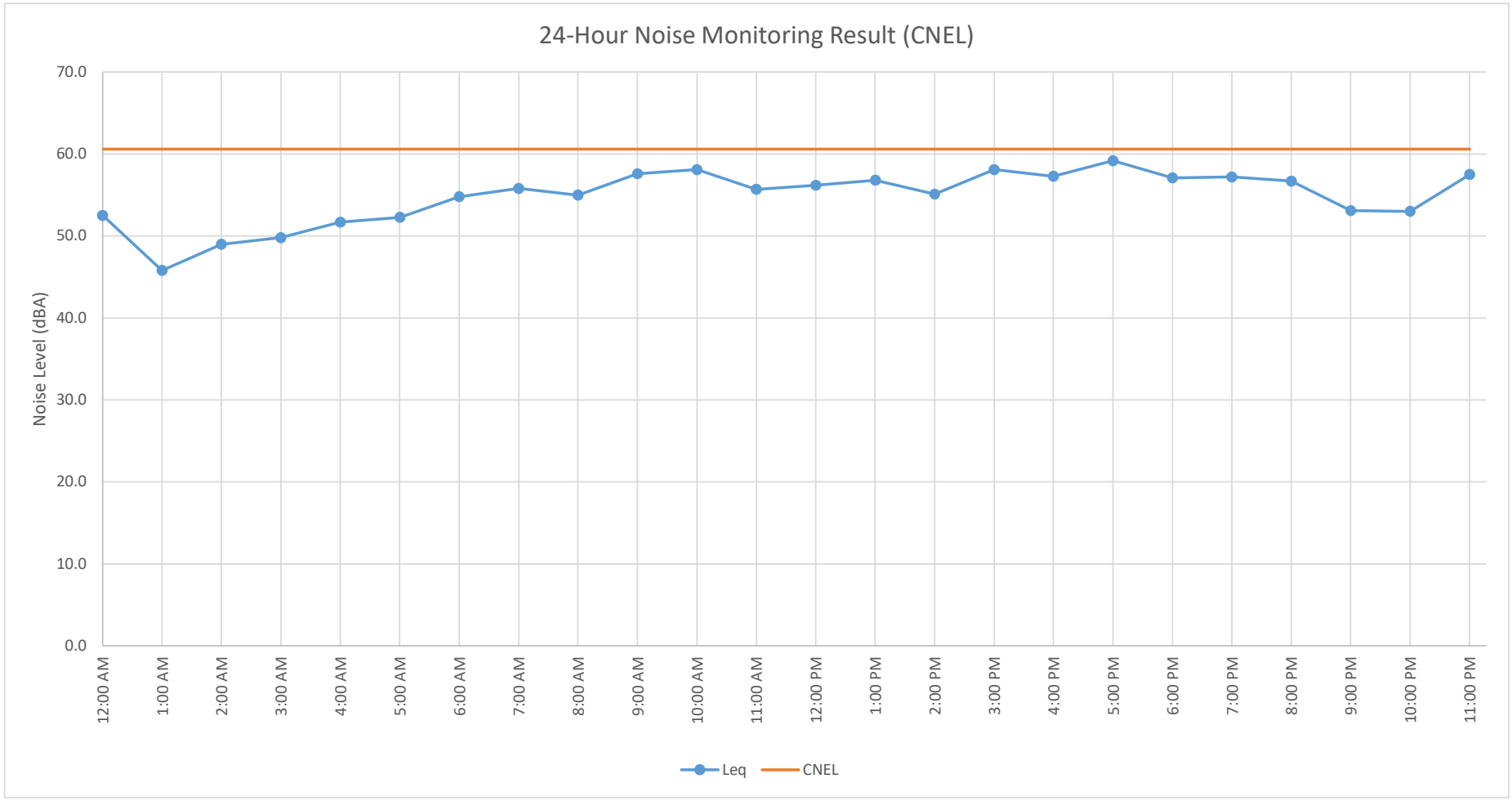
Project: Toyota Arena Mixed Use Development **Engineer:** M. Torres	**Date:**	4/7/2021
	JN:	2957-2021-02
Measurement Address: Northwest Corner of Concours Street and Ferrari Lane **City:** Ontario	**Site No.:**	3



RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	Northwest Corner of Concours Street and Ferrari Lane					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	52.5	69.4	45.2	60.0	55.0	51.9	50.1
1:00 AM	45.8	68.9	41.3	51.3	47.0	44.9	44.0
2:00 AM	49.0	67.3	42.4	56.5	52.4	48.1	46.2
3:00 AM	49.8	72.6	43.0	56.2	52.5	47.9	46.5
4:00 AM	51.7	72.0	44.4	59.3	52.6	49.9	48.8
5:00 AM	52.3	69.0	46.1	60.1	55.4	51.1	49.5
6:00 AM	54.8	70.0	47.2	61.9	58.6	54.7	52.6
7:00 AM	55.8	74.4	45.2	63.0	59.5	55.3	52.2
8:00 AM	55.0	77.7	45.5	62.2	59.2	54.6	50.4
9:00 AM	57.6	83.6	44.7	62.6	59.0	54.6	51.2
10:00 AM	58.1	82.2	45.7	64.3	59.8	55.5	51.9
11:00 AM	55.7	72.1	46.5	63.1	59.8	55.6	52.0
12:00 PM	56.2	72.4	47.4	62.7	59.9	56.9	53.9
1:00 PM	56.8	75.7	47.1	63.0	59.8	56.9	54.5
2:00 PM	55.1	79.1	46.4	61.5	58.5	55.1	52.3
3:00 PM	58.1	89.2	48.4	61.7	58.7	55.7	53.3
4:00 PM	57.3	72.7	50.3	63.3	60.5	57.7	55.5
5:00 PM	59.2	87.9	47.2	64.8	60.6	57.3	54.4
6:00 PM	57.1	71.9	50.3	63.0	60.3	57.4	55.4
7:00 PM	57.2	80.6	49.0	62.8	59.7	56.9	55.0
8:00 PM	56.7	75.7	49.6	62.8	59.7	56.2	54.0
9:00 PM	53.1	71.2	44.6	60.2	56.8	53.3	50.4
10:00 PM	53.0	74.1	43.6	64.6	54.5	48.8	46.9
11:00 PM	57.5	67.8	43.8	66.2	65.7	52.0	50.2
Daytime	56.7	89.2	43.6	63.0	59.4	55.9	53.2
Nighttime	52.9	72.6	41.3	60.8	58.5	50.9	49.2


24 Hour Noise Monitoring Results (Leq, Ln)
100.0
80.0
60.0
40.0
20.0
0.0
Decibel (dB)
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50

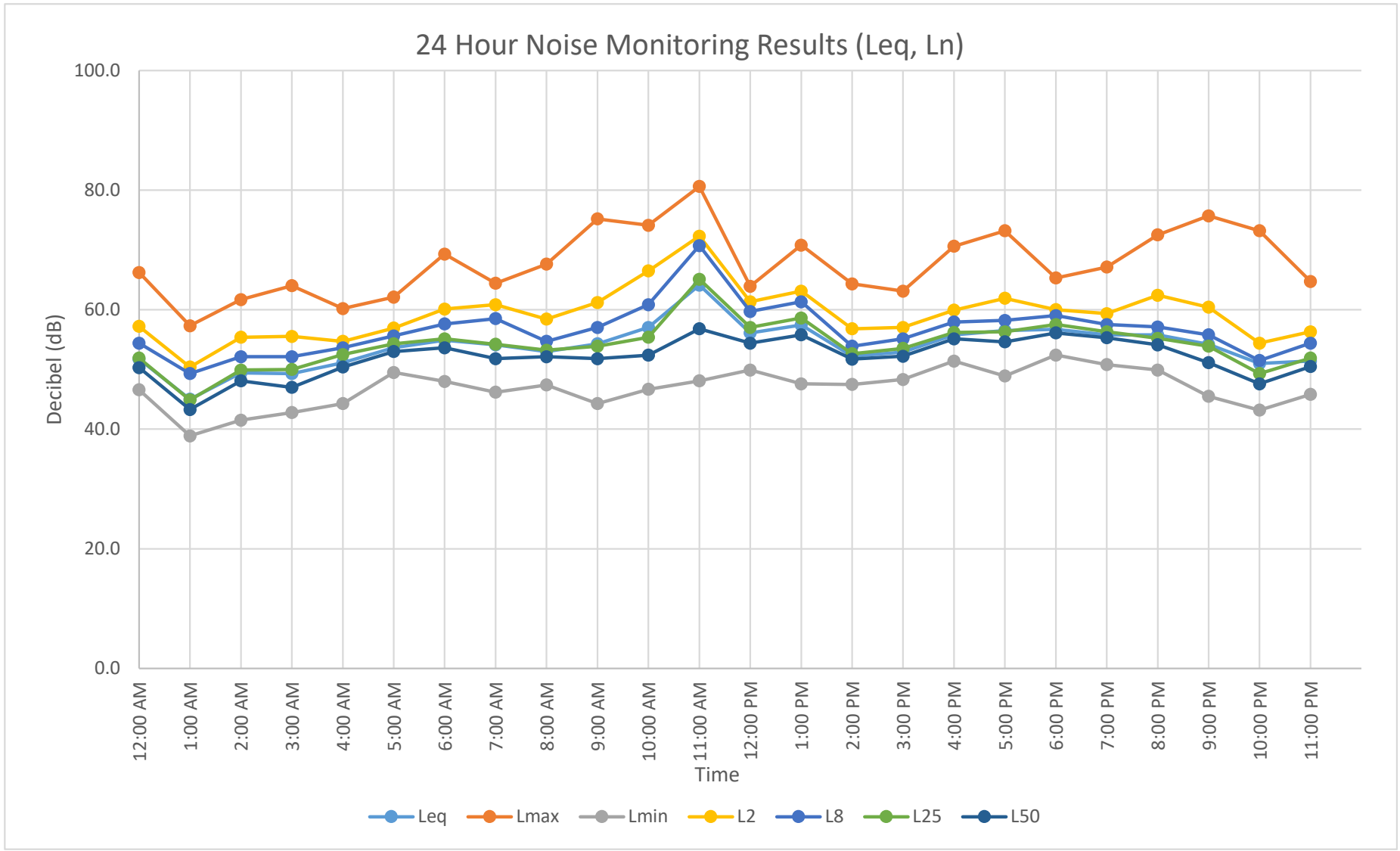

24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

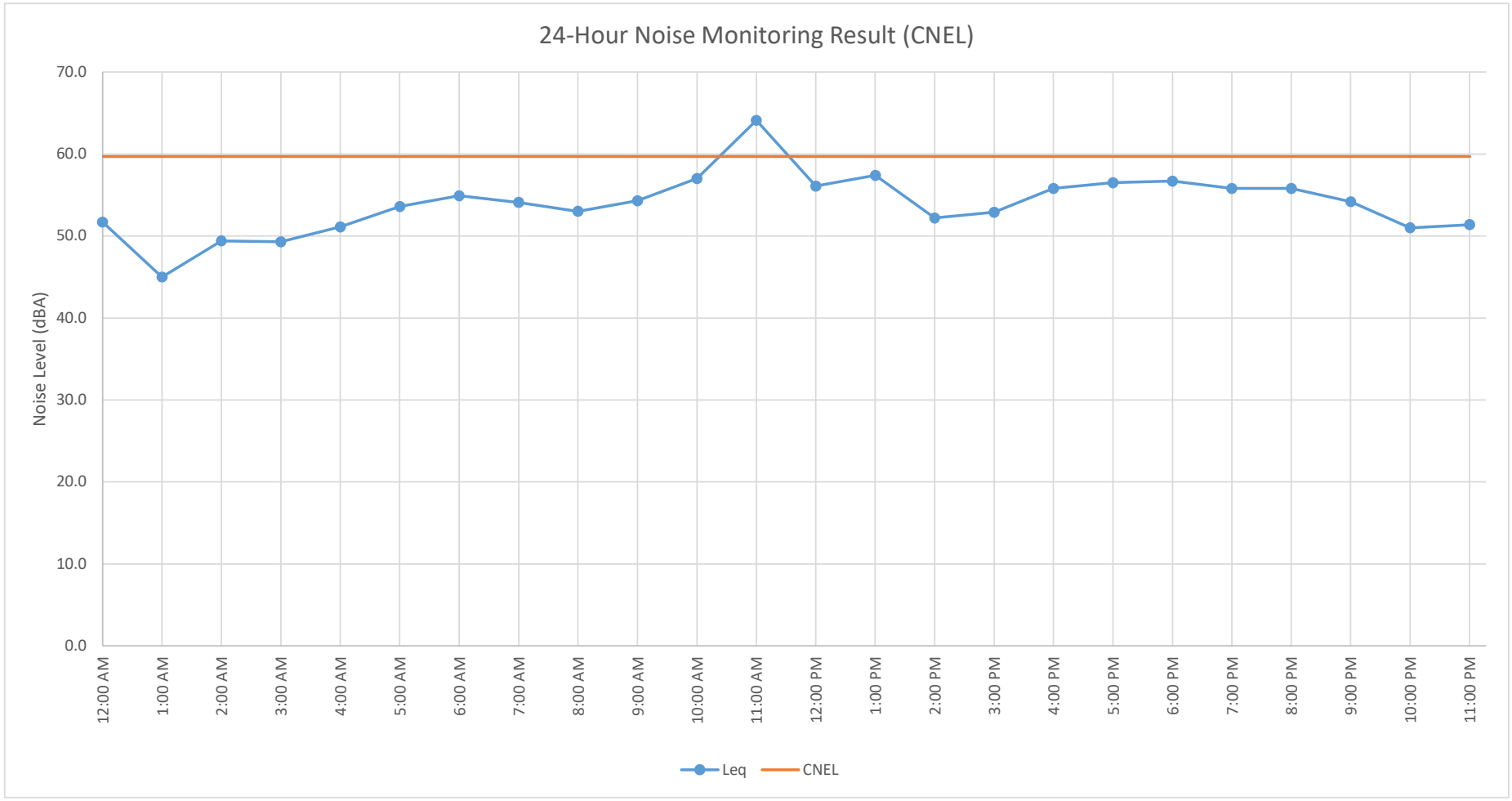
Field Sheet - ST4 Location Photos

Project: Toyota Arena Mixed Use Development **Engineer:** M. Torres	**Date:**	4/7/2021
	JN:	2957-2021-02
Measurement Address: In the parking lot along Western Project Site Boundary **City:** Ontario	**Site No.:**	4

RK engineering group, inc.

PROJECT:	Toyota Arena Mixed Use Development					JOB #:	2957-2021-02
NOISE METER	Piccolo II SLM, 24-Hour Measurement					DATE:	07-Apr-21
LOCATION:	In the parking lot, along Western Project Site Boundary					BY:	M. Torres
Time	Leq	Lmax	Lmin	L2	L8	L25	L50
12:00 AM	51.7	66.2	46.6	57.2	54.4	51.9	50.3
1:00 AM	45.0	57.3	38.9	50.4	49.3	44.9	43.3
2:00 AM	49.4	61.7	41.5	55.4	52.1	49.9	48.1
3:00 AM	49.3	64.0	42.8	55.5	52.1	50.0	47.0
4:00 AM	51.1	60.2	44.3	54.7	53.6	52.5	50.4
5:00 AM	53.6	62.1	49.5	56.9	55.6	54.3	53.0
6:00 AM	54.9	69.3	48.0	60.1	57.6	55.1	53.6
7:00 AM	54.1	64.4	46.2	60.8	58.5	54.2	51.8
8:00 AM	53.0	67.6	47.4	58.4	54.7	53.2	52.1
9:00 AM	54.3	75.2	44.3	61.2	57.0	53.9	51.8
10:00 AM	57.0	74.1	46.7	66.5	60.8	55.4	52.4
11:00 AM	64.1	80.6	48.1	72.3	70.7	65.1	56.8
12:00 PM	56.1	63.9	49.9	61.3	59.7	57.0	54.4
1:00 PM	57.4	70.8	47.6	63.1	61.3	58.6	55.8
2:00 PM	52.2	64.3	47.5	56.8	53.9	52.6	51.7
3:00 PM	52.9	63.1	48.3	57.0	55.1	53.5	52.2
4:00 PM	55.8	70.6	51.4	59.9	57.9	56.2	55.1
5:00 PM	56.5	73.2	48.9	61.9	58.2	56.3	54.6
6:00 PM	56.7	65.3	52.4	60.0	59.0	57.5	56.1
7:00 PM	55.8	67.1	50.8	59.3	57.5	56.3	55.3
8:00 PM	55.8	72.5	49.9	62.4	57.1	55.2	54.1
9:00 PM	54.2	75.7	45.5	60.4	55.8	53.9	51.1
10:00 PM	51.0	73.2	43.2	54.4	51.5	49.3	47.6
11:00 PM	51.4	64.7	45.8	56.3	54.4	51.9	50.5
Daytime	56.7	80.6	43.2	63.6	61.2	57.2	53.9
Nighttime	51.6	69.3	38.9	56.5	54.2	52.1	50.5


24 Hour Noise Monitoring Results (Leq, Ln)
100.0
80.0
60.0
40.0
20.0
0.0
Decibel (dB)
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Time
Leq
Lmax
Lmin
L2
L8
L25
L50


24-Hour Noise Monitoring Result (CNEL)
Noise Level (dBA)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
Leq
CNEL

Appendix C

Stationary Noise Analysis Results

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Parking Lot F and Parking Lot G	DATE:	27-May-21
LOCATION:	Residential Uses to the north of Lot F & G	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	170.0			
DT WALL=	0.0			
DT W/OB=	170.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	0.0		NOISE HTH EL=	3.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	170					34.8	
SHIELDING	170					0.0	
ADJ LEVEL	170	***0.0***	***0.0***	***0.0***	***0.0***	***34.8***	***0.0***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -29.0459534

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot C HVAC	DATE:	27-May-21
LOCATION:	Residential West of Lot C	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	520.0			
DT WALL=	0.0			
DT W/OB=	520.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	520	32.2	32.2	32.2	32.2	32.2	32.2
SHIELDING	520	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	520	***32.2***	***32.2***	***32.2***	***32.2***	***32.2***	***32.2***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -44.7776418

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot F Parking Lot	DATE:	27-May-21
LOCATION:	Residential West of Lot C	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	745.0			
DT WALL=	0.0			
DT W/OB=	745.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	745	-41.9	-41.9	-41.9	-41.9	21.9	-41.9
SHIELDING	745	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	745	***-41.9***	***-41.9***	***-41.9***	***-41.9***	***21.9***	***-41.9***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -41.8801004

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot A HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	223.0			
DT WALL=	0.0			
DT W/OB=	223.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	223	39.6	39.6	39.6	39.6	39.6	39.6
SHIELDING	223	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	223	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -37.4236722

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot C HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	253.0			
DT WALL=	0.0			
DT W/OB=	253.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	253	38.5	38.5	38.5	38.5	38.5	38.5
SHIELDING	253	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	253	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -38.5199853

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot D HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	253.0			
DT WALL=	0.0			
DT W/OB=	253.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	253	38.5	38.5	38.5	38.5	38.5	38.5
SHIELDING	253	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	253	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***	***38.5***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -38.5199853

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot F & G Parking Lot	DATE:	27-May-21
LOCATION:	Commercial South of Lot C and Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	540.0			
DT WALL=	0.0			
DT W/OB=	540.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	540	-39.1	-39.1	-39.1	-39.1	24.7	-39.1
SHIELDING	540	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	540	***-39.1***	***-39.1***	***-39.1***	***-39.1***	***24.7***	***-39.1***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -39.0848502

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot D HVAC	DATE:	27-May-21
LOCATION:	Commercial East of Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	495.0			
DT WALL=	0.0			
DT W/OB=	495.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	495	32.7	32.7	32.7	32.7	32.7	32.7
SHIELDING	495	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	495	***32.7***	***32.7***	***32.7***	***32.7***	***32.7***	***32.7***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -44.3496789

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot G Parking Lot	DATE:	27-May-21
LOCATION:	Commercial East of Lot D	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	180.0			
DT WALL=	0.0			
DT W/OB=	180.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	6					63.8	
PROJ LEVEL	180	-29.5	-29.5	-29.5	-29.5	34.3	-29.5
SHIELDING	180	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	180	***-29.5***	***-29.5***	***-29.5***	***-29.5***	***34.3***	***-29.5***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -29.5424251

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot A HVAC	DATE:	27-May-21
LOCATION:	Commercial East of Lot A	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	223.0			
DT WALL=	0.0			
DT W/OB=	223.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	223	39.6	39.6	39.6	39.6	39.6	39.6
SHIELDING	223	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	223	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***	***39.6***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -37.4236722

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot B HVAC	DATE:	27-May-21
LOCATION:	Commercial East of Lot A	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	235.0			
DT WALL=	0.0			
DT W/OB=	235.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	235	39.1	39.1	39.1	39.1	39.1	39.1
SHIELDING	235	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	235	***39.1***	***39.1***	***39.1***	***39.1***	***39.1***	***39.1***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -37.8789322

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot B HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot B	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	590.0			
DT WALL=	0.0			
DT W/OB=	590.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	590	31.1	31.1	31.1	31.1	31.1	31.1
SHIELDING	590	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	590	***31.1***	***31.1***	***31.1***	***31.1***	***31.1***	***31.1***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -45.8746151

NOISE BARRIER CALCULATIONS - BASED UPON FHWA - RD-77-108

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2964-2021-02
SOURCE:	Lot B HVAC	DATE:	27-May-21
LOCATION:	Commercial South of Lot B	BY:	D. Shivaiah

NOISE INPUT DATA

OBS DIST=	260.0			
DT WALL=	0.0			
DT W/OB=	260.0			
HTH WALL=	0.0	********		
BARRIER =	0.0	(0=WALL,1=BERM)		
OBS HTH=	5.0			
NOISE HTH=	3.0		BARRIER+	
OBS EL =	0.0		TOPO SHIELDING =	0.00
NOISE EL =	55.0		NOISE HTH EL=	58.0
DROP-OFF=	20.0	(20 = 6 dBA PER DOUBLING OF DISTANCE)		
COFF				

NOISE OUTPUT DATA (dBA)

	DIST (FT)	Leq	Lmax	L2	L8	L25	L50
REF LEVEL	3	77.0	77.0	77.0	77.0	77.0	77.0
PROJ LEVEL	260	38.2	38.2	38.2	38.2	38.2	38.2
SHIELDING	260	0.0	0.0	0.0	0.0	0.0	0.0
ADJ LEVEL	260	***38.2***	***38.2***	***38.2***	***38.2***	***38.2***	***38.2***

NOISE LEVEL REDUCTION DUE TO DISTANCE = -38.7570419

NOISE INTERVAL AVERAGER (2.0)

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-2
LOCATION:	Receptor 2	DATE:	27-May-21
SOURCE:	Combined Noise Levels	BY:	D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot C					32.2	
2	Lot F					21.9	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	32.6	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-2
LOCATION:	Receptor 3	DATE:	27-May-21
SOURCE:	Combined Noise Levels	BY:	D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot A					39.6	
2	Lot C					38.5	
3	Lot D					38.5	
4	Lot F & Lot G					24.7	
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	43.7	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT: Toyota Arena Mixed Use Development
LOCATION: Receptor 4
SOURCE: Combined Noise Levels

JOB #: 2957-2021-2
DATE: 27-May-21
BY: D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot D					32.7	
2	Lot G					34.3	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	36.6	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT: Toyota Arena Mixed Use Development
LOCATION: Receptor 5
SOURCE: Combined Noise Levels

JOB #: 2957-2021-2
DATE: 27-May-21
BY: D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot A					39.6	
2	Lot B					39.1	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	42.4	#NUM!

NOISE INTERVAL AVERAGER (2.0)

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-2
LOCATION:	Receptor 6	DATE:	27-May-21
SOURCE:	Combined Noise Levels	BY:	D.Shivaiah

NOISE LEVEL MEASUREMENTS (dBA)

	NOISE SOURCE	LEQ	L(MAX)	L(2)	L(8)	L(25)	L(50)
1	Lot A					31.1	
2	Lot B					38.2	
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
	TOTAL	#NUM!	#NUM!	#NUM!	#NUM!	39.0	#NUM!

Appendix D

Construction Noise and Vibration
Analysis Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Demolition	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	160	0
Excavator	No	40		80.7	160	0
Dozer	No	40		81.7	160	0
Excavator	No	40		80.7	160	0
Excavator	No	40		80.7	160	0
Dozer	No	40		81.7	160	0

Results

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Saw	79.5	72.5
Excavator	70.6	66.6
Dozer	71.6	67.6
Excavator	70.6	66.6
Excavator	70.6	66.6
Dozer	71.6	67.6
Total	79.5	76.3

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Site Preparation	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	160	0
Tractor	No	40	84		160	0
Dozer	No	40		81.7	160	0
Tractor	No	40	84		160	0
Tractor	No	40	84		160	0
Dozer	No	40		81.7	160	0
Tractor	No	40	84		160	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Dozer		71.6	67.6
Tractor		73.9	69.9
Dozer		71.6	67.6
Tractor		73.9	69.9
Tractor		73.9	69.9
Dozer		71.6	67.6
Tractor		73.9	69.9
	Total	73.9	77.5

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Grading	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	160	0
Grader	No	40	85		160	0
Dozer	No	40		81.7	160	0
Scraper	No	40		83.6	160	0
Tractor	No	40	84		160	0
Excavator	No	40		80.7	160	0
Scraper	No	40		83.6	160	0
Tractor	No	40	84		160	0

	Results			
	Calculated (dBA)		Noise Limits (dBA)	
Equipment	*Lmax	Leq		
Excavator	70.6	66.6		
Grader	74.9	70.9		
Dozer	71.6	67.6		
Scraper	73.5	69.5		
Tractor	73.9	69.9		
Excavator	70.6	66.6		
Scraper	73.5	69.5		
Tractor	73.9	69.9		
Total	74.9	78.1		

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Building Construction	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	160	0
Pickup Truck	No	40		75	160	0
Generator	No	50		80.6	160	0
Tractor	No	40	84		160	0
Welder / Torch	No	40		74	160	0
Pickup Truck	No	40		75	160	0
Pickup Truck	No	40		75	160	0
Tractor	No	40	84		160	0
Tractor	No	40	84		160	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Crane		70.4	62.5
Pickup Truck		64.9	60.9
Generator		70.5	67.5
Tractor		73.9	69.9
Welder / Torch		63.9	59.9
Pickup Truck		64.9	60.9
Pickup Truck		64.9	60.9
Tractor		73.9	69.9
Tractor		73.9	69.9
	Total	73.9	76.2

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Paving	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	160	0
Paver	No	50		77.2	160	0
Roller	No	20		80	160	0
Concrete Mixer Truck	No	40		78.8	160	0
Paver	No	50		77.2	160	0
Roller	No	20		80	160	0

Results

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Mixer Truck	68.7	64.7
Paver	67.1	64.1
Roller	69.9	62.9
Concrete Mixer Truck	68.7	64.7
Paver	67.1	64.1
Roller	69.9	62.9
Total	69.9	71.8

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 5/27/2021
Case Description: Toyota Arena Mixed Use Development

		Baselines (dBA)		---- Receptor #1 ----
Description	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	80	60	45

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	160	0

Results

		Calculated (dBA)	
Equipment		*Lmax	Leq
Compressor (air)		67.6	63.6
	Total	67.6	63.6

*Calculated Lmax is the Loudest value.

VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Caisson Drilling	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.042 in/sec**

Equipment Type =	3	Caisson Drilling
PPV_{ref} =	0.089	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Large Bulldozer	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.042 in/sec**

Equipment Type =	2	Large Bulldozer
PPV_{ref} =	0.089	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Loaded Truck	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.035 in/sec**

Equipment Type =	4	Loaded Trucks
PPV_{ref} =	0.076	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

VIBRATION IMPACTS FROM CONSTRUCTION AND OPERATIONS

PROJECT:	Toyota Arena Mixed Use Development	JOB #:	2957-2021-02
ACTIVITY:	Vibratory Roller	DATE:	27-May-21
LOCATION:	Nearest Structure at 50 Feet	ENGINEER:	D. Shivaiah

VIBRATION INPUT/OUTPUT DATA

OTHER CONSTRUCTION EQUIPMENT

$$PPV = PPV_{ref}(25/D)^{n} \text{ (in/sec)}$$

PPV =	**0.098 in/sec**

Equipment Type =	1	Vibratory Roller
PPV_{ref} =	0.210	Reference PPV at 25 ft.
D =	50.00	Distance from Equipment to receiver in ft.
n =	1.10	Vibration attenuation rate through the ground

EQUIPMENT PPV REFERENCE LEVELS

Type	Equipment	Reference PPV at 25 ft. (in/sec)
1	Vibratory Roller	0.210
2	Large Bulldozer	0.089
3	Caisson Drilling	0.089
4	Loaded Trucks	0.076
5	Jackhammer	0.035
6	Small Bulldozer	0.003
7	Crack and Seat	2.400

City of Ontario
Planning Department
303 East B Street
Ontario, California 91764
Phone: 909.395.2036
Fax: 909.395.2420

California Environmental Quality Act

Mitigation Monitoring and Reporting Program

Project Title: Piemonte Overlay for Ontario Center Specific Plan **/ File No.:** PSPA16-003

Project Sponsors: Lewis Piemonte Land, LLC, c/o David Robbins, Lewis Management Corp., 1156 N Mountain Avenue, Upland, California 91785, Phone: 909.949.6781, Email: david.robbins@lewismc.com; and Pendulum Property Partners, c/o Kevin Hayes, 5 Park Plaza, Suite 370, Irvine, California 92614, Phone: 949.449.1381, Email: khayes@pendulumpp.com

Lead Agency: City of Ontario Planning Department, 303 East B Street, Ontario, California 91764, (909) 395-2036

Contact Person: Charles Mercier, Senior Planner; Phone: 909.395.2425, Email: cmercier@ontarioca.com

Mitigation Measures/Implementing Action	*Responsible for Monitoring*	*Monitoring Frequency*	*Timing of Verification*	*Method of Verification*	*Verified (Initial/Date)*	*Sanctions for Noncompliance*
1) AIR QUALITY						
a) Use of dust control during clearing, grading and construction. Fugitive dust generated during cleaning, grading, earth moving or excavation shall be controlled by regular watering, paving of construction roads, or other dust-preventative measures. If freshwater resources are too precious to waste on dust control, availability of brackish or reclaimed water sources shall be investigated. Soil disturbance shall be terminated when high winds (25 mph or greater) make dust control extremely difficult.	Building Dept & Planning Dept	Throughout construction	As necessary	On-site inspection		Stop work order; or withhold grading permit; or withhold building permit
b) Minimization of construction interference with regional non-project traffic movement. Impacts shall be reduced to below a level of significance by the following mitigation measures: **i)** Scheduling receipt of construction materials to non-peak travel periods. **ii)** Routing construction traffic through areas of least impact sensitivity. **iii)** Limiting lane closures and detours to off-peak travel periods. **iv)** Providing rideshare incentives for contractor and subcontractor personnel.	Building Dept & Planning Dept	Throughout construction	As necessary	On-site inspection		Stop work order; or withhold grading permit; or withhold building permit
c) After clearing, grading or earth moving: **i)** Seed and water until plant cover is established.	Building Dept & Planning Dept	Throughout construction	As necessary	On-site inspection		Stop work order; or withhold grading permit; or withhold

Mitigation Measures/Implementing Action	*Responsible for Monitoring*	*Monitoring Frequency*	*Timing of Verification*	*Method of Verification*	*Verified (Initial/Date)*	*Sanctions for Noncompliance*
ii) Spread soil binders. **iii)** Form and maintain a crust on the surface through repeated soaking that will prevent dust pickup by wind. **iv)** Reduce "spill-over" effects by washing vehicles entering public roadways from dirt off road project areas, and washing/sweeping project access to public roadways on an adequate schedule.						building permit
d) Emissions control from on-site equipment through a routine, mandatory program of low-emission tune-ups.	Building Dept & Planning Dept	Throughout construction	As necessary	On-site inspection		Stop work order; or withhold grading permit; or withhold building permit
2) BIOLOGICAL RESOURCES						
a) Thirty to ninety days prior to ground disturbing construction-related activities, a focused survey for the burrowing owl shall be conducted by a qualified biologist. Should any burrowing owls be located on the project site, the below-listed mitigation measures shall be completed: **i)** Occupied burrows should not be disturbed during nesting season (February 1 through August 31) unless a qualified biologist verifies through non-invasive methods, that: (1) Birds have not begun egg-laying and incubation; or (2) Juveniles from the occupied burrows are foraging independently and are capable of independent survival. **ii)** If owls must be moved away from the disturbance area, relocation techniques shall be used as established in the California Department of Fish and Game, Natural Resources Agency, "Staff Report on Burrowing Owls," dated March 7, 2012.	Planning Dept.	Grading Plan issuance	Prior to issuance of grading permits	Plan check		Withhold grading permit
3) GEOLOGY & SOILS						
a) The applicant shall submit an erosion control plan to reduce wind erosion impacts.	Building Dept, Planning Dept & Engineering Dept	Grading Plan issuance		Plan check		Withhold grading permit
b) Fugitive dust generated during cleaning, grading, earth moving or excavation shall be controlled by regular watering, paving of construction roads, or other dust-preventative measures.	Building Dept	Throughout construction	As necessary	On-site inspection		Stop work order; or withhold grading permit; or withhold building permit
c) After clearing, grading, or earth moving: **i)** Seed and water until plant cover is established.	Building Dept & Planning Dept	Throughout construction	As necessary	On-site inspection		Stop work order; or withhold grading permit; or withhold

Mitigation Measures/Implementing Action	*Responsible for Monitoring*	*Monitoring Frequency*	*Timing of Verification*	*Method of Verification*	*Verified (Initial/Date)*	*Sanctions for Noncompliance*
ii) Spread soil binders. **iii)** Form and maintain a crust on the surface through repeated soaking that will prevent dust pickup by wind. **iv)** Sweep streets if silt is carried to adjacent public thoroughfares						building permit
d) Obtain authorization to discharge storm water under an NPDES construction storm water permit and pay appropriate fees.	Engineering Dept	Grading Plan issuance	Prior to issuance of grading permits	Plan check		Withhold grading permit
4) GREENHOUSE GAS EMISSIONS						
a) The City has reviewed the emission reduction measures and concepts in The Ontario Plan EIR MM 6-2 and 6-3, and has determined that the following actions apply and shall be undertaken by the applicant in connection with the project: **i)** Evaluate existing landscaping and options to convert reflective and impervious surfaces to landscaping, and install or replace vegetation with drought-tolerant, low-maintenance native species or edible landscaping that can also provide shade and reduce heat-island effects. **ii)** Require all new landscaping irrigation systems installed to be automated, high-efficient irrigation systems to reduce water use and require use of bubbler irrigation; low-angle, low-flow spray heads; or moisture sensors. **iii)** Reduce heat gain from pavement and other similar hardscaping. **iv)** All new development shall comply with the requirements of the City of Ontario Community Climate Action Plan.	Building Dept & Planning Dept	Throughout construction	As necessary	Plan check/On-site inspection		Stop work order; or withhold building permit
5) MANDATORY FINDINGS OF SIGNIFICANCE						
a) Thirty to ninety days prior to ground disturbing construction-related activities, a focused survey for the burrowing owl shall be conducted by a qualified biologist. Should any burrowing owls be located on the project site, the below-listed mitigation measures shall be completed:	Planning Dept.	Grading Plan issuance	Prior to issuance of grading permits	Plan check		Withhold grading permit
i) Occupied burrows should not be disturbed during nesting season (February 1 through August 31) unless a qualified biologist verifies through non-invasive methods, that:						
(1) Birds have not begun egg-laying and incubation; or						
(2) Juveniles from the occupied burrows are foraging independently and are capable of independent survival.						

Mitigation Measures/Implementing Action	*Responsible for Monitoring*	*Monitoring Frequency*	*Timing of Verification*	*Method of Verification*	*Verified (Initial/Date)*	*Sanctions for Noncompliance*
ii) If owls must be moved away from the disturbance area, relocation techniques shall be used as established in the California Department of Fish and Game, Natural Resources Agency, "Staff Report on Burrowing Owls," dated March 7, 2012.						

RESOLUTION NO.

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF ONTARIO, CALIFORNIA, APPROVING FILE NO. PSPA21-001, AN AMENDMENT TO THE PIEMONTE OVERLAY AT THE ONTARIO CENTER SPECIFIC PLAN, [1] REVISING THE OVERLAY BOUNDARY TO ADD APPROXIMATELY 24.9 ACRES, COMPRISING OF THE PROPERTY LOCATED AT 4000 ONTARIO CENTER PARKWAY, TO THE OVERLAY AREA, [2] CHANGING THE LAND USE DESIGNATION ON APPROXIMATELY 4.9 ACRES OF LAND FROM OFFICE AND ENTERTAINMENT/RETAIL TO MIXED USE, IN AN AREA BOUNDED BY FOURTH STREET TO THE NORTH, CONCOURS STREET AND ONTARIO CENTER PARKWAY TO THE SOUTH, VIA ALBA TO THE EAST, AND THE CAMDEN LANDMARK APARTMENTS AND VACANT LAND TO THE WEST, [3] ESTABLISH DEVELOPMENT STANDARDS AND DESIGN GUIDELINES FOR THE MIXED USE LAND USE AREA WITHIN THE PIEMONTE OVERLAY AT ONTARIO CENTER SPECIFIC PLAN, AND MAKING FINDINGS IN SUPPORT THEREOF—APN: 0210-204-12, 0210-204-13, 0210-204-14, 0210-204-15, 0210-204-17, 0210-204-18, 0210-204-20, 0210-204-21, 0210-204-22, 0210-204-23, 0210-204-23, 0210-204-24, 0210-204-25, 0210-204-26, 0210-204-28, 0210-204-36, 0210-204-37, 0210-204-37, 0210-204-38, 0210-204-39, 0210-204-40, 0210-204-41, 0210-531-06, 0210-531-07, 0210-531-08, 0210-531-09, 0210-531-10, 0210-231-11, 0210-231-12, 0210-231-13, 0210-231-14, 0210-231-15, 0210-231-16, 0210-205-01.

WHEREAS, the City of Ontario (hereinafter referred to as "City") has initiated a Specific Plan Amendment, File No. PSPA21-001, which consists of an Amendment to the Piemonte Overlay of the Ontario Center Specific Plan, in the City of Ontario, California (hereinafter referred to as "Application" or "Project"); and

WHEREAS, the Application applies to 119.8 acres of land generally located at the northerly boundary of the City of Ontario, south of Fourth Street, east of Haven Avenue, west of Milliken Avenue, and north of Concours Street, within the Piemonte Overlay at the Ontario Center Specific Plan zoning district, and is presently improved with commercial, office, hotel, Arena, and vacant land; and

WHEREAS, Fourth Street forms the project site’s north boundary and is the corporate boundary dividing the cities of Ontario and Rancho Cucamonga. The properties to the north of the Project site are developed with industrial, residential, and commercial uses. The properties to the east are within the Ontario Center Specific Plan zoning district and is developed with commercial uses. The properties to the south are within the Ontario Center Specific Plan zoning district, and are developed with office, commercial, open space, and vacant land uses. The properties to the west are within the Ontario Center

Specific Plan zoning district, and are developed with residential and commercial uses; and

WHEREAS, on March 23, 2006, City Council adopted Resolution No. 2006-11, approving the creation of the Piemonte Overlay at the Ontario Center Specific Plan within the Urban Commercial land use district of the Ontario Center Specific Plan (File No. PSPA05-003), establishing a master plan for the development of 84 acres of land, which was the former 800-acre Ontario Motor Speedway. The racing facility was completed in 1970 and closed approximately 10 years later. The facility was razed in 1981 and remained vacant until 2006, following the approval of the Piemonte at the Ontario Center Project, which established the Piemonte Overlay, allowing for the development of approximately 1.3 million square feet of retail, office, hotel, and entertainment uses, and more than 800 multiple-family dwelling units on the project site; and

WHEREAS, on May 16, 2017, City Council adopted Resolution No. 2017-041, approving an Amendment to the Piemonte Overlay of the Ontario Center Specific Plan (File No. PSPA16-003) to reduce the development intensity of the project area, designate plaza areas, and expand the design concept to include more contemporary architectural design concepts; and

WHEREAS, on June 2, 2020, City Council adopted Resolution No. 2020-065, approving and Amendment to the Piemonte Overlay at the Ontario Center Specific Plan within the Urban Commercial land use district of the Ontario Center Specific Plan (File No. PSPA19-009) to allow required residential parking to be provided as tandem parking spaces; and

WHEREAS, the Ontario Center Specific Plan Environmental Impact Report (State Clearinghouse No. 89041009) was certified on March 19, 1991 (hereinafter referred to as “Certified EIR”), in which development and use of the Project site was discussed; and

WHEREAS, a Mitigated Negative Declaration was adopted on May 16, 2017, (hereinafter referred to as “MND”), in association with an Amendment to the Ontario Center Specific Plan (File No. PSPA16-003); and

WHEREAS, the Planning Director of the City of Ontario prepared and approved for attachment to the certified EIR and adopted MND, an Addendum to the Certified EIR and MND (hereinafter collectively referred to as “EIR Addendum”) in accordance with the requirements of the California Environmental Quality Act of 1970, together with State and local guidelines implementing said Act, all as amended to date (collectively referred to as “CEQA”); and

WHEREAS, the environmental impacts of this project were thoroughly analyzed in the EIR Addendum, which concluded that implementation of the Project could result in a

number of significant effects on the environment that were previously analyzed in the Certified EIR, and that the Certified EIR identified mitigation measures that would reduce each of those significant effects to a less-than-significant level; and

WHEREAS, the City's "Local Guidelines for the Implementation of the California Environmental Quality Act (CEQA)" provide for the use of a single environmental assessment in situations where the impacts of subsequent projects are adequately analyzed; and

WHEREAS, the Application is a project pursuant to the California Environmental Quality Act — Public Resources Code Section 21000 et seq. — (hereinafter referred to as "CEQA") and an EIR Addendum has been prepared to determine possible environmental impacts; and

WHEREAS, Ontario Development Code Table 2.02-1 (Review Matrix) grants the Planning Commission the responsibility and authority to review and make recommendation to the City Council on the subject Application; and

WHEREAS, the Project has been reviewed for consistency with the Housing Element of the Policy Plan component of The Ontario Plan, as State Housing Element law (as prescribed in Government Code Sections 65580 through 65589.8) requires that development projects must be consistent with the Housing Element, if upon consideration of all its aspects, it is found to further the purposes, principals, goals, and policies of the Housing Element; and

WHEREAS, the Project is located within the Airport Influence Area of Ontario International Airport, which encompasses lands within parts of San Bernardino, Riverside, and Los Angeles Counties, and is subject to, and must be consistent with, the policies and criteria set forth in the Ontario International Airport Land Use Compatibility Plan (hereinafter referred to as “ALUCP”), which applies only to jurisdictions within San Bernardino County, and addresses the noise, safety, airspace protection, and overflight impacts of current and future airport activity; and

WHEREAS, City of Ontario Development Code Division 2.03 (Public Hearings) prescribes the manner in which public notification shall be provided and hearing procedures to be followed, and all such notifications and procedures have been completed; and

WHEREAS, as the first action on the Project, on March 22, 2022, the Planning Commission issued a Resolution recommending the City Council approve the EIR Addendum, finding that the proposed Project introduces no new significant environmental impacts and applying all previously adopted mitigation measures to the Project, which were incorporated by reference; and

WHEREAS, on March 22, 2022, the Planning Commission of the City of Ontario conducted a hearing to consider the Project, and concluded said hearing on that date; and

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

NOW, THEREFORE, IT IS HEREBY FOUND, DETERMINED, AND RESOLVED by the Planning Commission of the City of Ontario, as follows:

SECTION 1: ***Environmental Determination and Findings.*** As the recommending body for the Project, the Planning Commission has reviewed and considered the information contained in the Addendum, the initial study, and the administrative record for the Project, including all written and oral evidence provided during the comment period. Based upon the facts and information contained in the Addendum, the initial study, and the administrative record, including all written and oral evidence presented to the Planning Commission, the Planning Commission finds as follows:

(1) The environmental impacts of the Project were reviewed in conjunction with an Addendum to the Ontario Center Specific Plan Environmental Impact Report (State Clearinghouse No. 89041009), certified by the Ontario City Council on March 19, 1991 in conjunction with File No. 4059-SPA, in combination with an Addendum to the Mitigated Negative Declaration, adopted by the Ontario City Council on May 17, 2017 in conjunction with File No. PSPA16-003; and

(2) The EIR Addendum and administrative record have been completed in compliance with CEQA, the State CEQA Guidelines, and the City of Ontario Local CEQA Guidelines; and

(3) The City's "Guidelines for the Implementation of the California Environmental Quality Act (CEQA)" provide for the use of a single environmental assessment in situations where the impacts of subsequent projects are adequately analyzed. This Application introduces no new significant environmental impacts; and

(4) All previously adopted mitigation measures shall be a condition of project approval, as they are applicable to the Project, and are incorporated herein by this reference; and

(5) The EIR Addendum contains a complete and accurate reporting of the environmental impacts associated with the Project, and reflects the independent judgment of the Planning Commission; and

(6) There is no substantial evidence in the administrative record supporting a fair argument that the project may result in significant environmental impacts.

SECTION 2: ***Subsequent or Supplemental Environmental Review Not Required.*** Based on the EIR Addendum, all related information presented to the Planning Commission, and the specific findings set forth in Section 1, above, the Planning Commission finds that the preparation of a subsequent or supplemental Certified EIR is not required for the Project, as the Project:

(1) Does not constitute substantial changes to the Certified EIR that will require major revisions to the Certified EIR or MND due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; and

(2) Does not constitute substantial changes with respect to the circumstances under which the Certified EIR or MND were prepared, that will require major revisions to the Certified EIR or MND due to the involvement of new significant environmental effects or a substantial increase in the severity of the previously identified significant effects; and.

(3) Does not contain new information of substantial importance that was not known and could not have been known with the exercise of reasonable diligence at the time the Certified EIR or MND were certified/adopted, that shows any of the following:

(a) The Project will have one or more significant effects not discussed in the Certified EIR or MND; or

(b) Significant effects previously examined will be substantially more severe than shown in the Certified EIR or MND; or

(c) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the Project, but the City declined to adopt such measures; or

Mitigation measures or alternatives considerably different from those analyzed in the Certified EIR or MND would substantially reduce one or more significant effects on the environment, but which the City declined to adopt.

SECTION 3: ***Housing Element Compliance.*** Pursuant to the requirements of California Government Code Chapter 3, Article 10.6, commencing with Section 65580, as the recommending body for the Project, the Planning Commission finds that based upon the facts and information contained in the Application and supporting documentation, at the time of Project implementation, the project is consistent with the Housing Element of the Policy Plan (General Plan) component of The Ontario Plan. The project site contains

four properties listed in the Available Land Inventory contained in Table A-3 (Available Land by Planning Area) of the Housing Element Technical Report Appendix. The proposed changes affect two of the four properties listed in the Available Land Inventory (Subareas 8 and 11; Map ID No. 124 and 125). The residential capacity proposed in this Project is consistent with the number of dwelling units (198) and density (48 DU/AC) specified in the Available Land Inventory.

SECTION 4: ***Ontario International Airport Land Use Compatibility Plan ("ALUCP") Compliance.*** The California State Aeronautics Act (Public Utilities Code Section 21670 et seq.) requires that an Airport Land Use Compatibility Plan be prepared for all public use airports in the State; and requires that local land use plans and individual development proposals must be consistent with the policies set forth in the adopted Airport Land Use Compatibility Plan. On April 19, 2011, the City Council of the City of Ontario approved and adopted the ALUCP, establishing the Airport Influence Area for Ontario International Airport (hereinafter referred to as "ONT"), which encompasses lands within parts of San Bernardino, Riverside, and Los Angeles Counties, and limits future land uses and development within the Airport Influence Area, as they relate to noise, safety, airspace protection, and overflight impacts of current and future airport activity. As the recommending authority for the Project, the Planning Commission has reviewed and considered the facts and information contained in the Application and supporting documentation against the ALUCP compatibility factors, including [1] Safety Criteria (ALUCP Table 2-2) and Safety Zones (ALUCP Map 2-2), [2] Noise Criteria (ALUCP Table 2-3) and Noise Impact Zones (ALUCP Map 2-3), [3] Airspace protection Zones (ALUCP Map 2-4), and [4] Overflight Notification Zones (ALUCP Map 2-5). As a result, the PLANNING COMMISSION, therefore, finds and determines that the Project, when implemented in conjunction with the conditions of approval, will be consistent with the policies and criteria set forth within the ALUCP.

SECTION 5: ***Concluding Facts and Reasons.*** Based upon the substantial evidence presented to the Planning Commission during the above-referenced hearing, and upon the specific findings set forth in Sections 1 thru 4, above, the Planning Commission hereby concludes as follows:

(1) ***The proposed Specific Plan, or amendment thereto, is consistent with the goals, policies, plans and exhibits of the Vision, Policy Plan (General Plan), and City Council Priorities components of The Ontario Plan.*** The proposed Specific Plan Amendment is consistent with the Vision, Policy Plan (General Plan), and City Council Priorities components of The Ontario Plan, in that the Specific Plan Amendment contributes toward the legislative framework for the implementation of The Ontario Plan components, guiding growth and development within the project area to achieve optimum results from the City's physical, economic, environmental, and human resources.

(2) ***The proposed Specific Plan, or amendment thereto, would not be detrimental to the public interest, health, safety, convenience, or general welfare of the City.*** The development standards and guidelines established by the proposed Specific Plan Amendment have been created with the intent to safeguard and further the public interest, health, safety, convenience, and/or general welfare, and to ensure that the purposes of The Ontario Plan and the proposed Specific Plan Amendment, are maintained.

(3) ***The proposed Specific Plan Amendment will not adversely affect the harmonious relationship with adjacent properties and land uses.*** The location of the proposed Specific Plan Amendment, and the proposed conditions under which future developments will be constructed and maintained, is consistent with the Policy Plan component of The Ontario Plan and the City's Development Plan, and, therefore, will not adversely affect the harmonious relationship with adjacent properties and land uses.

(4) ***In the case of an application affecting specific properties, the subject site is physically suitable, including, but not limited to, parcel size, shape, access, and availability of utilities, for the request and anticipated development.*** The proposed Specific Plan Amendment has been reviewed by all City departments, which have established that the project site is physically suitable for the anticipated development in terms of parcel size, shape, and availability of utilities.

SECTION 6: ***Planning Commission Action.*** Based upon the findings and conclusions set forth in Sections 1 through 5, above, the Planning Commission hereby RECOMMENDS THE CITY COUNCIL APPROVE the herein described Application.

SECTION 7: ***Indemnification.*** The Applicant shall agree to defend, indemnify and hold harmless, the City of Ontario or its agents, officers, and employees from any claim, action or proceeding against the City of Ontario or its agents, officers or employees to attack, set aside, void, or annul this approval. The City of Ontario shall promptly notify the applicant of any such claim, action, or proceeding, and the City of Ontario shall cooperate fully in the defense.

SECTION 8: ***Custodian of Records.*** The documents and materials that constitute the record of proceedings on which these findings have been based are located at the City of Ontario City Hall, 303 East "B" Street, Ontario, California 91764. The custodian for these records is the City Clerk of the City of Ontario.

SECTION 9: ***Certification to Adoption.*** The Secretary shall certify to the adoption of the Resolution.

- - - - - - - - - - - - - -

The Secretary Pro Tempore for the Planning Commission of the City of Ontario shall certify as to the adoption of this Resolution.

I hereby certify that the foregoing Resolution was duly and regularly introduced, passed and adopted by the Planning Commission of the City of Ontario at a regular meeting thereof held on the 22nd day of March 2022, and the foregoing is a full, true and correct copy of said Resolution, and has not been amended or repealed.

Rick Gage
Planning Commission Chairman

ATTEST:

Rudy Zeledon
Planning Director and
Secretary to the Planning Commission

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO)
CITY OF ONTARIO)

I, Gwen Berendsen, Secretary Pro Tempore of the Planning Commission of the City of Ontario, DO HEREBY CERTIFY that foregoing Resolution No. ____ was duly passed and adopted by the Planning Commission of the City of Ontario at their regular meeting held on March 22, 2022, by the following roll call vote, to wit:

AYES:

NOES:

ABSENT:

ABSTAIN:

Gwen Berendsen
Secretary Pro Tempore

ATTACHMENT A:

File No. PSPA21-001
Track-Changes version of Amendment to the Piemonte Overlay of the Ontario Center Specific Plan

(Document to follow this page)

Piemonte Overlay at Ontario Center Specific Plan

Adopted February 2006

Revised June 6, 2017

Revised March, 2022

Ontario, California

~~2016121~~

Piemonte Overlay at Ontario Center Specific Plan

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Table F.1: Proposed Mixed-use Land Uses (SA 8, 11, 16, & 17 .....F-1

APPENDIX ~~F~~G - OCSP PLANTING MATRIX.....~~F-1~~ G-1

Table ~~F~~G.1: Applicable OCSP Planting Matrix..... ~~F-1~~ G-1

1.0 INTRODUCTION

1.1 OVERVIEW

The Piemonte Overlay at Ontario Center (or "Piemonte Overlay" or "Overlay") will stimulate an urban character mixed-use development on an approximately ~~92.4~~119.8-acre site, located within the Ontario Center Specific Plan (OCSP). Within the OCSP, the Piemonte Overlay is located south of Fourth Street, between Haven Avenue and Milliken Avenue. The regional location of the Piemonte Overlay is illustrated in Figure 1.1: Regional Location. Figure 1.2: Overlay Vicinity presents the Piemonte Overlay in its local context.

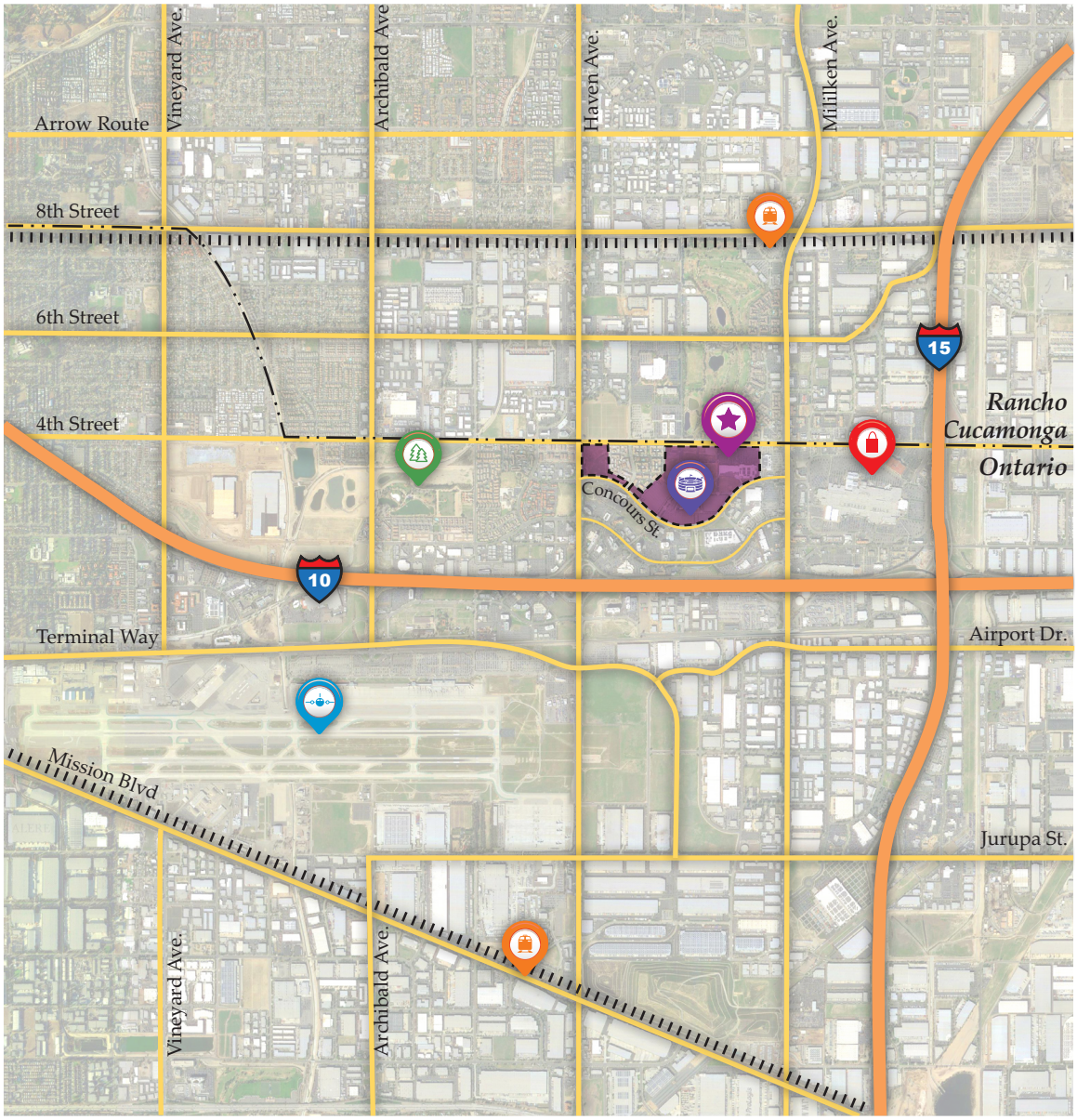
NTS

Figure 1.1: Regional Location

1.2 PURPOSE AND OBJECTIVES

The purpose of the Piemonte Overlay is to define the range of permitted uses, development regulations, requirements, and design guidelines for development within the Overlay area described below, to accomplish the following objectives:

- Provide design and development standards responding to, and reflecting, the urban characteristic elements of the Piemonte at Ontario Center;
- Implement a mix of related and mutually-supporting land uses at development intensities no greater than those identified for the OCSP;
- Provide for the orderly and master planned development of land uses within the OCSP, ensuring development of economically viable development proposals;
- Ensure development of the Piemonte Overlay area is consistent with the Ontario Plan (TOP) policies, objectives, and implementation programs;
- Provide the City of Ontario with standards for evaluation of individual development proposals within the Piemonte Overlay.



Legend

Piemonte Overlay area	Cucamonga-Guasti Regional Park
Site	Arena
Ontario Mills Mall	Interstate 10 Freeway
Metrolink Station	Interstate 15 Freeway
Ontario International Airport	

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Figure 1.2: Overlay Vicinity

1.3 BACKGROUND

The City of Ontario approved the OCSP in August 1981. The OCSP, as originally approved, allowed for up to 1,530 residential units, close to seven (7) million square feet of commercial development, and nearly two (2) million square feet of industrial uses on approximately 600 acres. Several amendments to the OCSP, along with appropriate environmental review, have been approved by the City since its initial approval. Refer to Figure 1.3: OCSP Land Use Plan for the adopted land uses.

The Piemonte at Ontario Center Overlay was adopted in February of 2006 to allow a mix of urban commercial, retail, residential, and entertainment land uses on a portion of the OCSP, with a maximum of 1,292,068 square feet and 806 residential units on that portion. In June 2017, the Piemonte at Ontario Center Overlay was amended to modify ~~This Specific Plan amendment (SPA) amends and replaces the 2006 Overlay and modifies~~ the location of the residential and non-residential development. ~~This~~ The 2017 Specific Plan Amendment (SPA) expands the architectural and landscape themes ~~in the applicable planning areas~~ to allow more options to ensure compatibility with existing development, to promote urban development and allow for landscape options that reduce the use of potable water and match the urban vernacular. ~~For clarification, Subareas (SAs) have been established for this Overlay. Refer to Figure 1.4: Piemonte Overlay Subareas. Refer to Appendix B for a correlation between OCSP parcel numbers and Subarea numbers. Four SAs are not a part of this amendment, since they are already developed or had no desire to change the requirements for their SA; therefore no changes are made to the requirements of those parcels.~~

This 2022 Specific Plan Amendment incorporates land use and development standards focused on allowing mixed use developments in the Arena area that create a vibrant urban lifestyle.

All modifications to the OCSP have been incorporated into the body of the text,

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	Boundary
	Piemonte Overlay area
	Urban Commercial (UC)
	Garden Commercial (GC)
	Urban Residential (UR)
	Open Space (OS)

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Figure 1.3: OCSP Land Use Plan

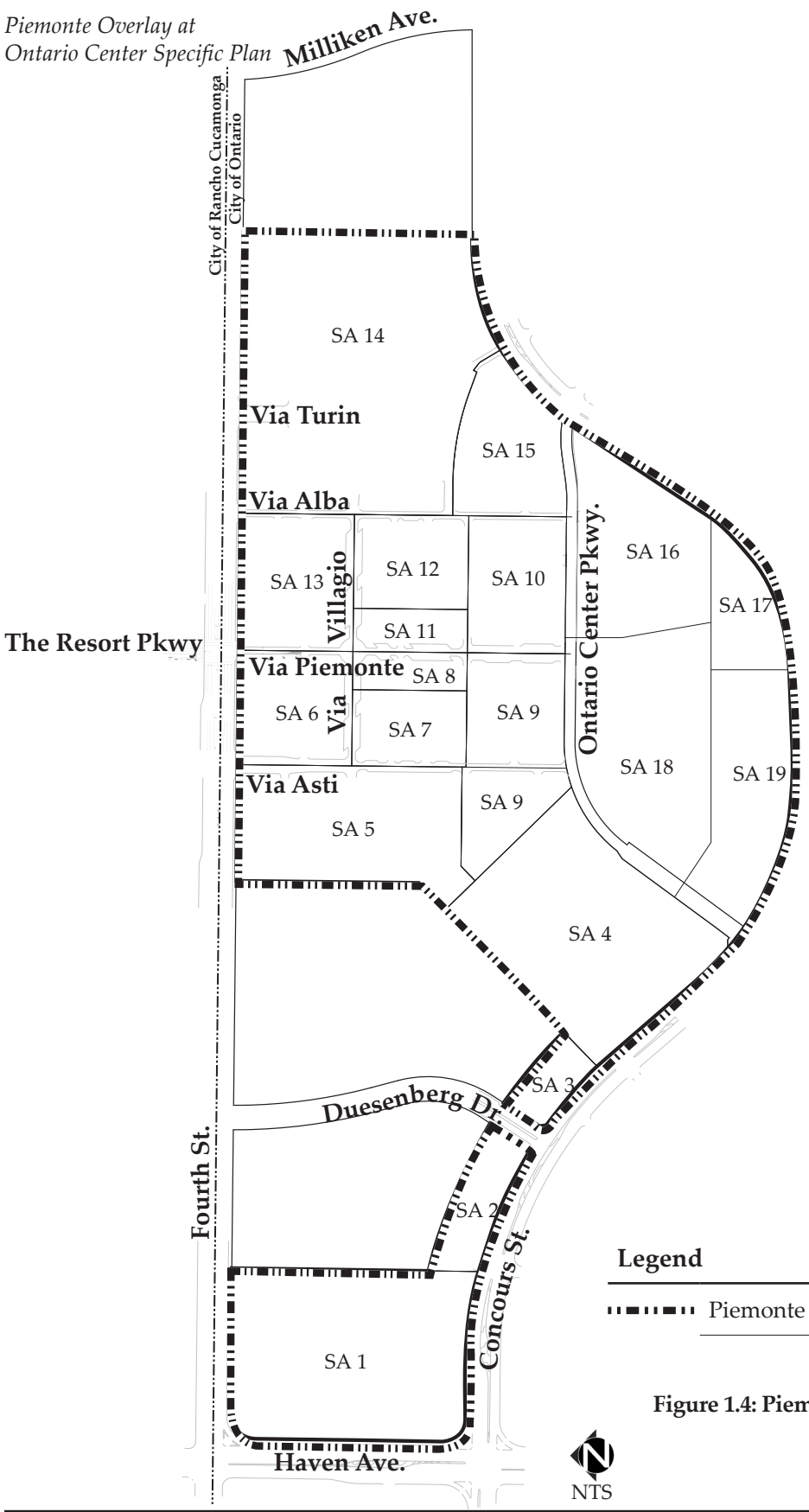


Figure 1.4: Piemonte Overlay Subareas

standards, and exhibits of this document. Revisions to the Design Guidelines and minor text revisions have also been completed. The prior amendments to the OCSP and the ~~2006~~ 2017 Overlay shall not be referenced for the remainder of this document.

1.4 GOVERNING DOCUMENTS

Development of the ~~undeveloped~~ Subareas of this Overlay is regulated by the following documents:

- The Ontario Plan (TOP) Policy Plan (General Plan) which establishes policies governing land use, circulation, housing, conservation and open space, noise, safety, and public facilities within the Specific Plan area;
- The City of Ontario Development Code, as applicable to development, where this Overlay is silent on development standards and regulations; and the subdivision of land within this Overlay area;
- The Airport Land Use Compatibility Plan of Ontario International Airport; and
- The certified Addendum to the Ontario Plan (General Plan) Environmental Impact Report.

1.5 AUTHORITY

This Overlay was prepared in accordance with California Government Code Section (Government Code) 65453 and applicable ordinances, policies, and resolutions of the City of Ontario. The City of Ontario adopts specific plans by ordinance, thereby establishing the zoning regulations for development of this Overlay.

Consistent with general requirements for Specific Plans as outlined under Government Code Article 8, this Overlay presents, or incorporates by reference, applicable regulations, conditions, and programs, which identify the following:

- The distribution, location, and extent of the uses of land, including open space, within the area covered by this Overlay;
- The proposed distribution, location, extent, and intensity of major components

of public and private transportation, sewage, water, drainage, solid waste disposal, energy, and other essential facilities proposed to be located within the area covered by the plan and needed to support the land uses;

- Standards and criteria by which development will proceed, and standards for the conservation, development, and utilization of natural resources, where applicable;
- A program of implementation measures including regulations, programs, public works projects, and financing measures necessary to carry out the development and,
- A statement of the relationship to the General Plan.

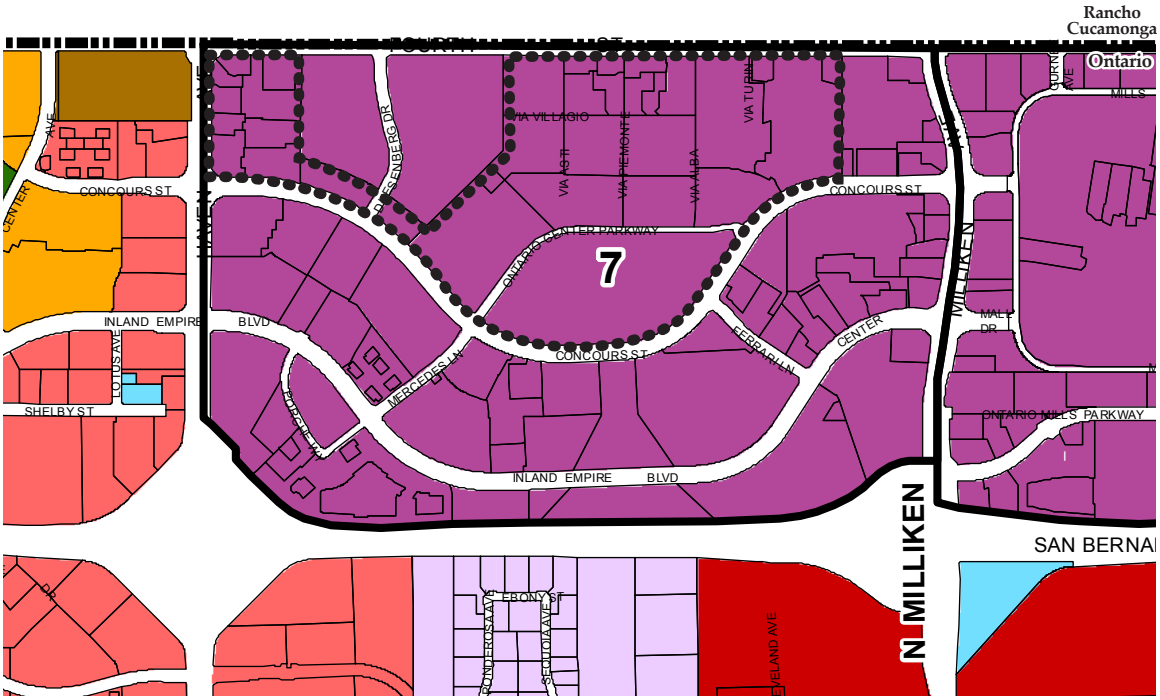
1.6. RELATIONSHIP TO THE GENERAL PLAN (POLICY PLAN) AND ZONING

The Ontario Plan (TOP) establishes the direction and vision for the City of Ontario, providing a single guidance system that will shape the Ontario community for the future. TOP provides for policies to accommodate change over a 30-year period commencing in 2010, the beginning of the planning period. TOP consists of a six part Component Framework: 1) Vision, 2) Governance Manual, 3) Policy Plan, 4) City Council Priorities, 5) Implementation, and 6) Tracking and Feedback.

This Overlay has been prepared in conformance with the goals and policies of TOP. The land use plan of ~~the~~ TOP has identified the entire OCSP area as Mixed Use, refer to Figure 1.5: The Ontario Plan Land Use.

This Overlay implements relevant OCSP goals, principles, and standards. More specifically, the Piemonte Overlay provides for a cohesive and inter-related mix of residential and commercial/retail land uses such as is envisioned under the OCSP and ~~the~~ TOP.

The OCSP further defines the Piemonte Overlay underlying land use and zoning



Legend

Piemonte Overlay area	High Density (25.1-45 du/ac)
7 Mixed Use: Ontario Center	Medium Density (11.1-25 du/ac)
General Commercial	Business Park
Office Commercial	Public Facility

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Figure 1.5: The Ontario Plan Land Use

as "Urban Commercial," as shown on Figure 1.3: OCSP Land Use Plan. These land use designations allow for and encourage a mix of commercial, entertainment/ retail, office, hotel, restaurant, and residential land uses as reflected on Figure 1.6: Piemonte Overlay Land Use Plan.

The Piemonte Overlay satisfies the following OCSP Objectives (from Section 3.1.1 of the OCSP):

- A balance of employment, shopping, and housing opportunities, reducing the need for long commutes. This Overlay provides for integrated development that includes high-density housing, commercial retail/ entertainment, restaurant uses, hotels, and office space. The mix of uses and their collocation within this Overlay provides for multiple employment, entertainment, housing, and shopping opportunities, available to residents of the Piemonte Overlay, and the greater Ontario area and surrounding region. Proximate collocation of this Overlay's mixed uses also promotes, and makes feasible, pedestrian access throughout the area, acting to reduce reliance on private automobiles. This is consistent with the intent of the OCSP to reduce dependence on private automobiles, with correlating reductions in commute distances.
- A higher density housing orientation, recognizing trends toward smaller household size. Up to ~~806~~ 1,485 residential units can be constructed within the Piemonte Overlay. Those areas of the Overlay planned solely for residential development shall target a density of at least 25 units per acre, depending on the final site plan/unit configurations.
- A mixture of entertainment, retail and dining opportunities for OCSP users. The Piemonte Overlay provides a variety of restaurant, shopping, and entertainment opportunities. Further, integral to the Piemonte Overlay concept, is provision of a range of open space opportunities, to include enhanced and articulated streetscapes adjacent to ground-level commercial/ retail and restaurant uses. ~~Additional recreational and entertainment opportunities are available to the Overlay residents and visitors at the Citizens Business Bank Arena, located immediately to the south.~~

- A looped circulation network encouraging public transit opportunities, as well as pedestrian walkways and bicycle routes. This Overlay is defined by major roadways on all sides, with connecting roadways providing access to internal parcels. Transit opportunities will be provided at key locations, consistent with transit concepts articulated within the OCSP.
- A comprehensive urban design treatment, integrating the Arena into an urban form that is both visually pleasing as well as functional. Application of Development Standards and Design Guidelines will ensure development within this Overlay as a visually interesting and attractive component of the OCSP. Further, the Piemonte architectural and site planning concepts continue to define this Overlay area as an inter-related core destination within the City, providing residential, entertainment, business, and shopping opportunities.

The Urban Commercial land use designation provides for development of a mix of tourist-related commercial uses, high and medium-rise office buildings, entertainment/recreation clusters, and high-density residential uses in close proximity. This Overlay also establishes applicable design guidelines and development regulations for these uses.

1.7 FORMAT AND CONTENT OF THE PIEMONTE OVERLAY

Figure 1.6: Piemonte Overlay Land Use Plan designates the Land Use areas as Commercial, ~~Entertainment/Retail~~Mixed-use, Office, Special Use, and Residential. Design Guidelines and Development Regulations applicable to the entire Piemonte Overlay, and specific standards that apply within each of the Land Use areas, are presented in Section 3.0. It is noted here that the predominance of facilities proposed by this Overlay will be implemented consistent with existing standards of the OCSP.

Building designs, architectural renderings, and other representations presented within this Overlay reflect the overall character, development intensity, and composition of development. These graphic portrayals and related descriptions are conceptual in nature, and may be modified as the development is further refined. Within the limits of the maximum of development intensity allowed under the OCSP, subsequent development proposals within this Overlay will be subject to design and conformance review by and through the City of Ontario.

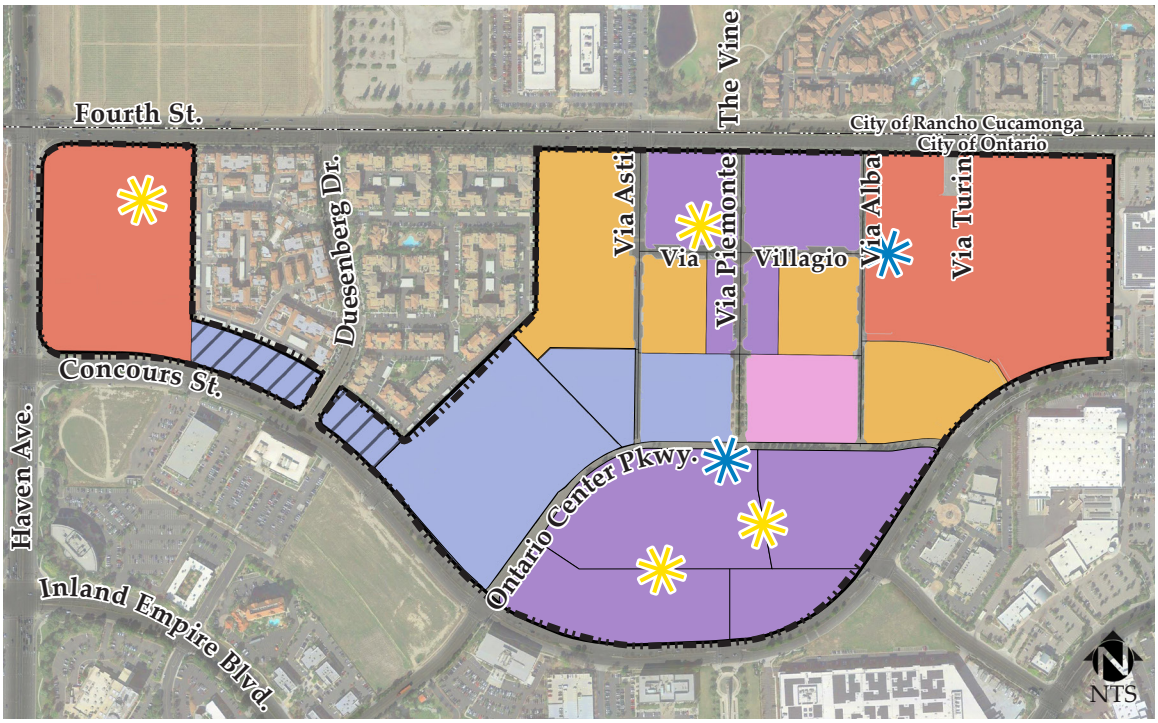
1.7.1 Piemonte Overlay Content

Section 1.0 presents an overview of the Piemonte Overlay designation.

Section 2.0 provides a description of the Overlay, including proposed land uses, facilities, and an overview of major infrastructure systems serving the area.

Section 3.0 presents design guidelines and development regulations applicable within the Piemonte Overlay. Design guidelines and development regulations applicable to the entire Overlay Area are identified, as are the guidelines and development regulations applicable to each Land Use within the Overlay.

Section 4.0 outlines administration of the Piemonte Overlay, including review processes for individual projects prior to any physical development. Means and procedures for interpretation and application of the Piemonte Overlay, associated land uses, and design guidelines, and development regulations are also presented.



Legend

- Piemonte Overlay area
- Commercial
- ~~Entertainment/Retail~~ Mixed Use
- Office
- Special Use
- Residential
- Residential Development Allowed
- Constructed Plaza
- Proposed Plaza

Figure 1.6: Piemonte Overlay Land Use Plan

Section 5.0 describes how the Piemonte Overlay is consistent with the goals and policies of The Ontario Plan (TOP) Policy Plan (General Plan).

Appendix A of this document presents the legal description of properties subject to provisions of the Piemonte Overlay.

Appendix B is a correlation between OCSP parcel numbers and the Piemonte Overlay Subarea parcel numbers.

Appendix C includes the tabulation of existing development and remaining development allocation within the Piemonte Overlay.

Appendix D includes the tabulation of the development analyzed in the 2006 traffic study.

Appendix E includes a memorandum of the Piemonte trip generation comparison and the Piemonte/Empire Lakes 4th Street access configuration dated June 8, 2016.

Appendix F includes a summary of the Toyota Arena Mixed-use Development Traffice Impact Analysis dated September 17, 2021.

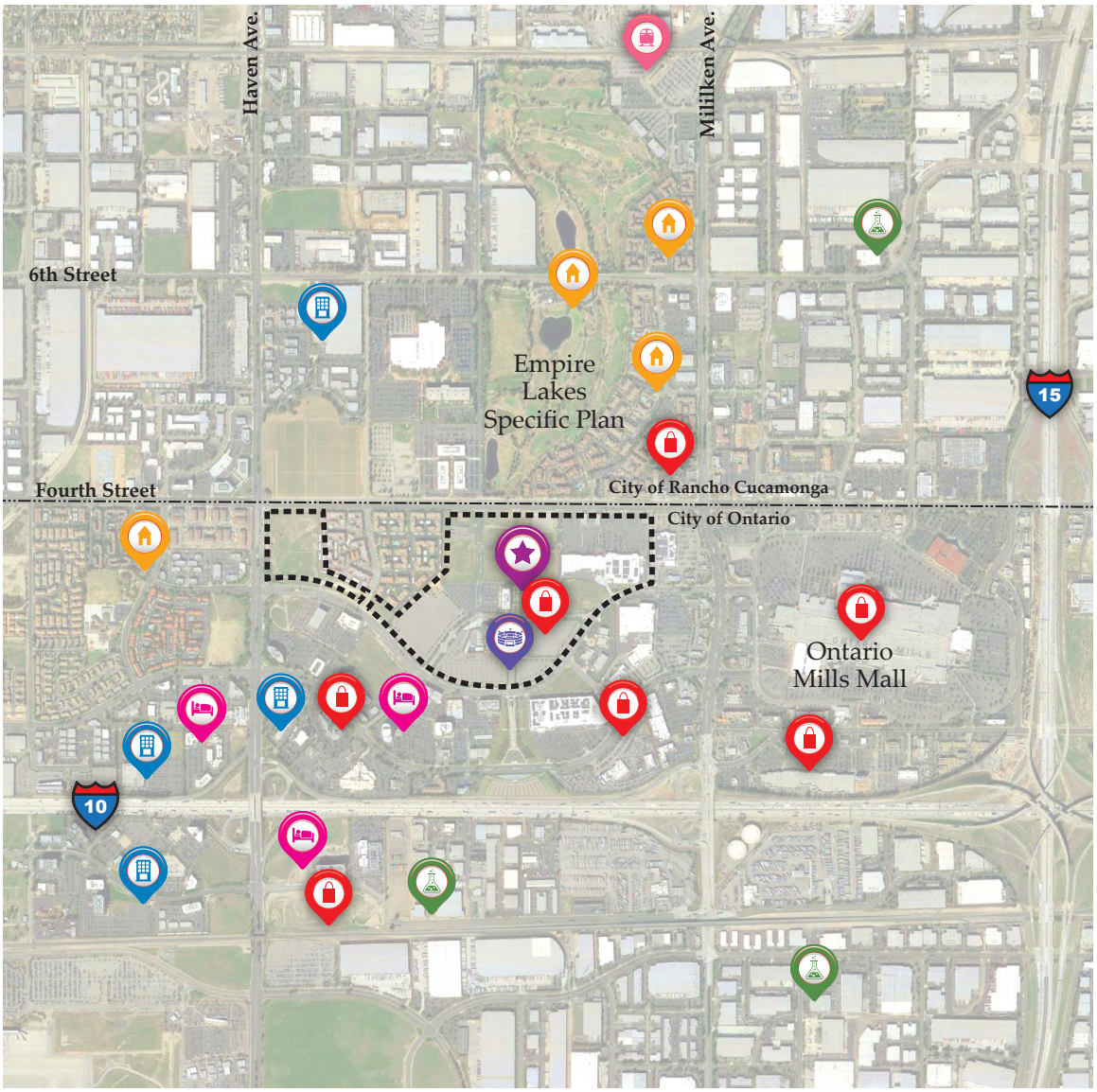
Appendix ~~F~~ G includes the street tree planting matrix of the OCSP.

2.0 OVERLAY DESCRIPTION

2.1 SETTING

The Piemonte Overlay consists of approximately ~~92.4~~ 119.8 acres of land located at the northerly boundary of the City of Ontario, south of Fourth Street, ~~between~~ east of Haven Avenue and west of Milliken Avenue, less than one-quarter mile north of Interstate 10 (I-10). The Piemonte Overlay is located within a rapidly developing portion of the City, and is one of the few remaining available parcels of substantial size within the OCSP.

Regional access to the Piemonte Overlay is provided by I-10 and Interstate 15 (I-15) freeways, which converge approximately one mile to the east. Local access to I-10 is provided at Milliken and Haven Avenues, and access to I-15 is available from Fourth Street. Supplementing freeway and surface street access, a Metrolink transit station is located approximately 1.5 miles northerly of the Piemonte Overlay, west of Milliken Avenue at Eighth Street.



Legend

- Piemonte Overlay area
- Site
- Commercial
- Office
- Special Use
- Residential
- Industrial
- Metrolink Station
- Arena
- Interstate 10 Freeway
- Interstate 15 Freeway

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Figure 2.1: Piemonte Overlay Context

2.1.1 Surrounding Land Uses

Figure 2.1: Piemonte Overlay Context provides an aerial view of the Overlay and surrounding land uses. Local context of the Overlay is described below.

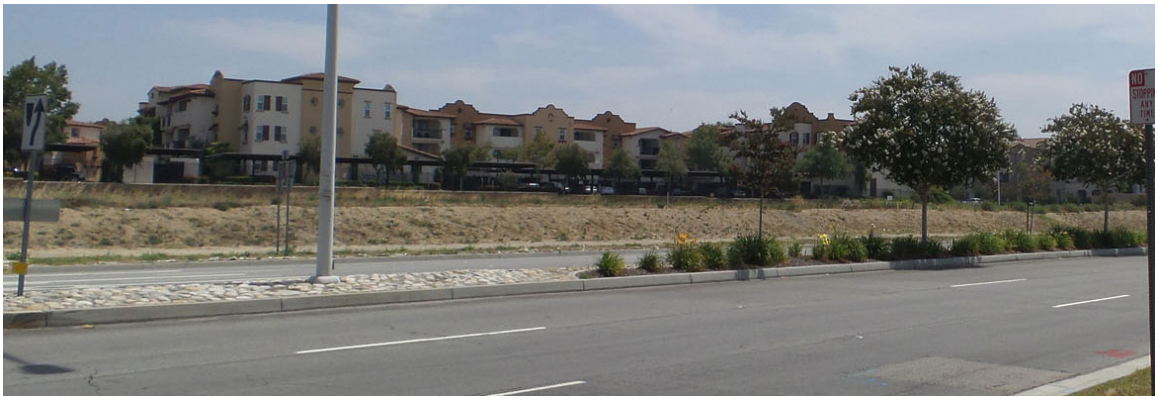
Fourth Street, which forms the site's northerly boundary, is also the ~~corporate~~ jurisdictional boundary dividing the ~~cities~~ Cities of Ontario and Rancho Cucamonga. Apartments, a small retail/restaurant development and a planned residential/mixed use development are located to the north across Fourth Street, in Rancho Cucamonga.

To the east is a commercial center, anchored by a Kohl's department store, located at the southwest corner of Milliken Avenue and Fourth Street. Further to the east, across Milliken Avenue, is the Ontario Mills Shopping Center, comprised of a central mall surrounded by free-standing commercial, entertainment, and restaurant uses.

To the southeast, across Concours Street, additional existing retail uses are located adjacent to Milliken Avenue. ~~Directly~~ To the south ~~across Ontario Center Parkway, is the Citizens Business Bank Arena. To the southwest~~ and southwest across Concours Street are office buildings.

To the west, across Haven Avenue is multi-family housing and a low-rise office/ retail complex.

In the middle of the Piemonte Overlay, and not a part of it, on both sides of Duesenberg Drive between Fourth Street and Concours Street, are the Vintage and Camden Landmark apartments.



Looking north to the Office land use from Concours Street

Looking north along Via Asti

Figure 2.2: Site Photos

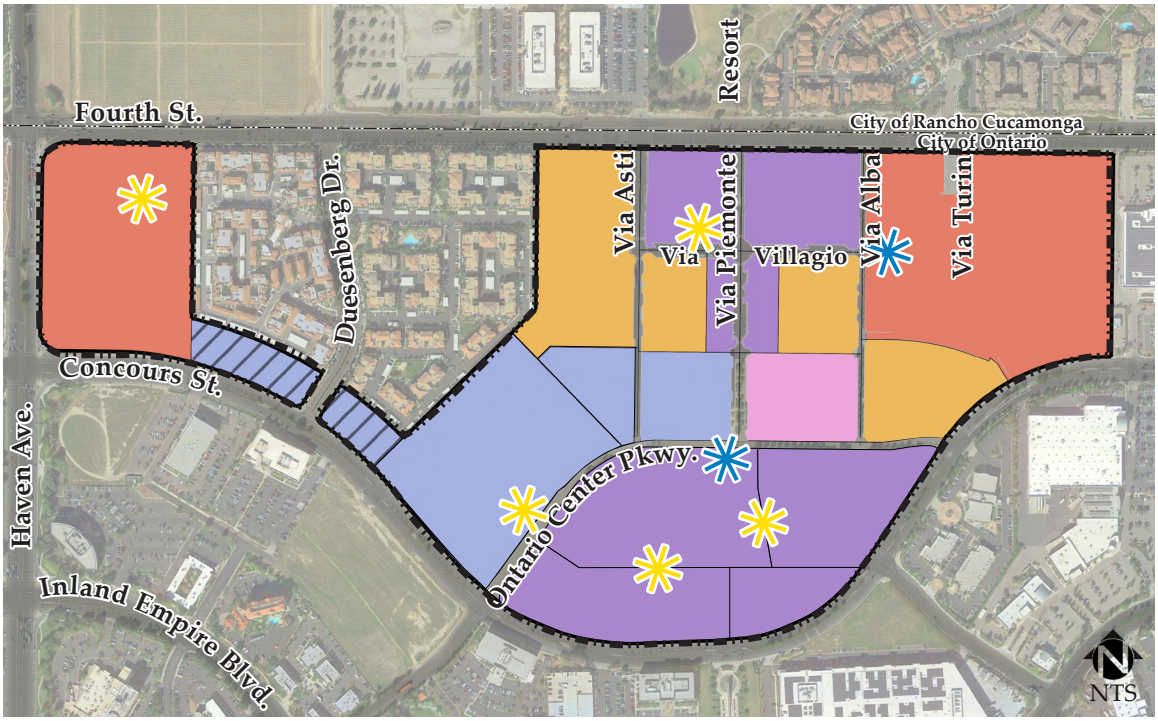
2.1.2 Ontario International Airport (ONT) Influence Area

The Airport Land Use Compatibility Plan (ALUCP) for ONT was adopted in April of 2011. The Piemonte Overlay is located within the ONT Airport Influence Area. Although the Overlay is located outside the noise and safety impact zones, the northern portion of the project site is located within the High Terrain Zone where building heights are limited to no more than 70 feet in height. Refer to ONT ALUCP for more information regarding height criteria and policies.

2.2 LAND USE AND DEVELOPMENT

2.2.1 Piemonte Land Uses and Development Components

The Piemonte Overlay Land Use designations shown on Table 2.1: OCSP Statistical Areas D & E Maximum Development allow for and encourage a mix of commercial, entertainment/retail, office, hotel, restaurant, entertainment, and residential land uses.



Legend

- Piemonte Overlay area
- Commercial
- ~~Entertainment/Retail~~ Mixed-use
- Office
- Special Use
- Residential
- Residential Development Allowed
- Constructed Plaza
- Proposed Plaza

Figure 2.3: Piemonte Overlay Land Use Plan

2.2.2 Development Intensity

The Piemonte Overlay is located within Statistical Areas "D" and "E" of the OCSP that allows for up to 2,840,000 square feet of development intensity, including 1,606 residential units as shown in Table 2.1: OCSP Statistical Areas D & E Maximum Development. An estimated 1,457,512 square feet and 800 residential units currently exist within the Statistical Areas. See Appendix C for a list of the existing development within the OCSP Statistical Areas "D" and "E." The 2006 Overlay permitted 1,292,068 square feet of development intensity, 90,420 square feet and 15 residential units less ~~that~~ than what is permitted under the OCSP; refer toTable 2.2: Piemonte Overlay Development Intensity Allocation by Subarea.

The 2022 Overlay Amendment proposes new development up to 879,990 SF, which is an additional 789,570 square feet (879,990 SF - 90,420 SF) added to the development intensity within Statistical Area "E", as planned under the 2016 Piemonte Overlay amendment. The total will consist of 808,790 square feet, comprising of 691 residential units and ancillary spaces, and 71,200 square feet of commercial space. Refer to Tables 2.1: OCSP Statistical Areas D & E Maximum Development, and 2.2: Piemonte Overlay Development Intensity Allocation by Subarea.

Table 2.1: OCSP Statistical Areas D & E Maximum Development

	Maximum GFA (in SF)	Maximum No. of DUs
Approved OCSP Development	2,840,000	1,606
Previously developed*	1,457,512	800**
~~Approved~~ 2016 Overlay Amendment	1,292,068	806
Office/Retail	1,001,668	
Hotel 1 (236 rooms)	180,000	
Hotel 2 (100 rooms)	110,400	
Residential Units		791***
Remaining OCSP Allocation	90,420	15
2022 Overlay Amendment	879,990	691
Residential	808,790	691
Retail	71,200	

* See Appendix C for list of developed properties

** Residential units replace office/retail gross floor area (GFA) at the rate of one dwelling unit for each 600 SF of office/retail GFA (based on equivalent traffic generation, water demand, and wastewater generation rates).

*** Only 791 residential units were studied in the traffic report prepared for the 2006 Overlay

~~In short, 1,292,068 square feet of commercial, entertainment/retail, office or hotel uses, and up to 806 residential units, could be developed under the 2016 Overlay. However the traffic study conducted in 2006 for the Piemonte Overlay Amendment used a lower unit count of 791 during its study.~~

In 2016, ~~It is~~ it was anticipated that 571 dwelling units ~~will~~ would be constructed in Subareas 5, 7, 12 and 15. In 2022, it is anticipated that construction for 691 more dwelling units will begin in Subareas 8, 11, 16 and 17. Table 2.2: Piemonte Overlay Development Intensity Allocation by Subarea demonstrates the remaining allocation by Subarea.

Table 2.2: Piemonte Overlay Development Intensity Allocation by Subarea

Sub-areas	Net Acres	Land Use					Maximum Floor Area	Maximum Dwelling Units
		Commercial	~~Entertain-ment/Retail~~ Mixed-use	Special Use (Hotel)	Offices	Residential		
1	13.02	•	•				241,429	
2*	2.28				•	•		220
3*	1.36				•	•		
4	12.35		•		•		251,370	
5	8.29					•		278
6	3.20		•				92,584	
7	2.68					•		61
8	0.76		•				~~25,300~~ 11,047	107
9**	5.16				•		125,685	
10**	3.24			236 Rooms			180,000	
11	0.91		•				~~32,300~~ 14,095	127
12	2.49					•		94
13	4.07		•		•		115,000	
14**	20.35	•			•		228,400	
15	4.27					•		138
16	7.46		•				25,256	359
17	2.68		•				20,802	98
18**	7.91		•				200,020	
19	6.88		•				0***	
Totals ~~109.36 84.43~~							~~1,292,068~~ 1,505,688	~~791~~ 1,482

*Subarea allows for residential development if it is determined by the City Council that commercial development within the subarea is not feasible, thereby allowing additional residential development at the rate of one DU for each 600 SF of available floor area.
** Built-out Subarea
*** Subarea currently improved with a parking lot. Future development plans subject to additional design and environmental review.

An approximation of comparative development intensity can be discerned by contrasting key characteristics of land uses, such as traffic generation, water demand, and wastewater generation rates. These factors are particularly appropriate since the upper limit of development intensity defined for the OCSP was founded largely on estimated roadway and water/sewer carrying capacities. Traffic generation rates and water/sewer demands of the Piemonte Overlay, as compared to traffic generation and water/sewer demands resulting from correlating maximum build-out of urban

commercial uses per the adopted OCSP are summarized below and shown in Appendix D 2006 Overlay Land Use Allocation & Maximum Development Intensity Analyzed for Traffic Generation. Please refer also to a detailed comparative analyses presented within the *Piemonte Trip Generation Comparison and the Piemonte/Empire Lakes 4th Street Access Configuration* (Fehr & Peers, June 2016) found in Appendix E.

The traffic generated by the Piemonte Overlay is significantly less than would result under build-out of the Overlay area per the maximum development intensities allowed under the OCSP, and is less than that identified in the *Piemonte at Ontario Center Project Addendum to the Ontario Center EIR* (Applied Planning, February 2006).

The development concept for the undeveloped portion of the Piemonte Overlay shown on Figure 2.4: Piemonte Overlay Development Concept is projected to generate approximately 13,905 daily trips, 957 AM peak hour trips, and 1,357 PM peak hour trips. Specifically, as demonstrated on Table 3 of the Memorandum in Appendix E, the proposed development is expected to result in 6,616 fewer daily trips, 724 fewer AM peak hour trips, and 554 fewer PM peak hour trips.

While relative traffic generation rates would be substantially reduced because of the residential component, residential uses tend to substantially increase water demands and wastewater generation rates when compared to commercial intensities on the same acreage. When considered in the context of the total Piemonte Overlay, however, the calculated incremental increases in water and sewer demands resulting from the residential land uses are offset by relatively lower development intensities realized throughout the remaining OCSP area.

Based on the preceding discussions, development intensities under the Piemonte Overlay would be less than those anticipated under the adopted OCSP. Further, related environmental effects of any Overlay development would be no greater than, and would likely be reduced, when compared to anticipated environmental effects that would result under the non-residential development of the site envisioned under the adopted OCSP.

2.2.2.1 Development Equivalency Program

In an effort to maintain flexibility to respond to changing community needs and market conditions over the build-out of Piemonte, Chapter 4 Administration provides a land use conversion process that allows additional residential units to be developed over and above the ~~220~~ units of remaining capacity shown on the bottom of Table 2.2: Piemonte Overlay Development Intensity Allocation by Subarea by connecting 600 square feet of non-used commercial development intensity for each residential unit to be added.

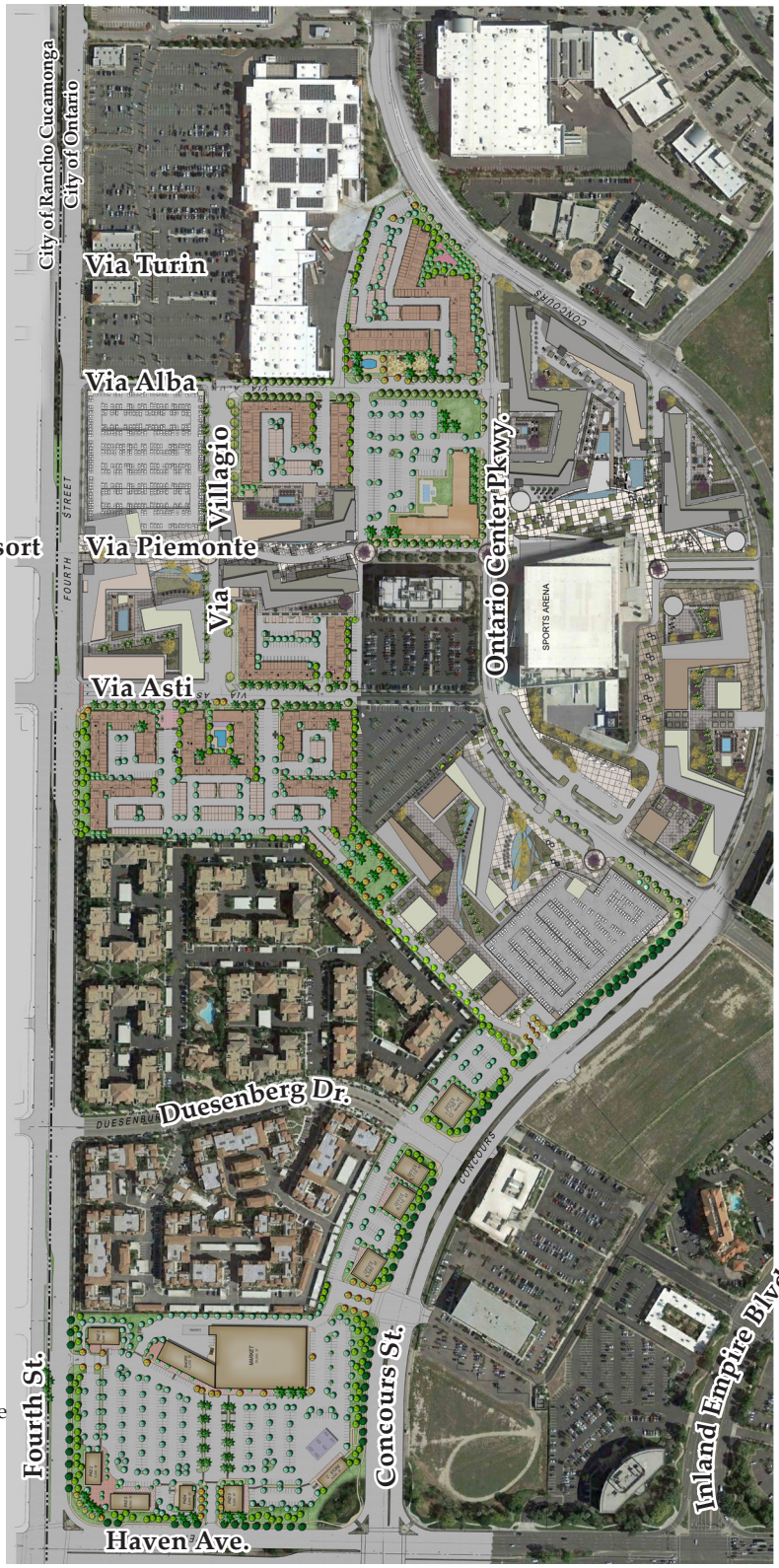
For example, assume that 479 units could be built in Subareas 2 and 3 but there is only a 220-unit remaining capacity. Therefore, 259 units (479 units - 220 units = 259 units) would have to be converted from the non-residential square footage. If the 259 units are added to residential capacity total, 155,400 square feet (259 units x 600 square feet) of the remaining development must be converted to residential using the 600-square-foot conversion factor reducing the amount of non-residential development by that same square feet. This conversion is based on equivalent traffic generation, water demand, and wastewater generation rates. This 600-square-foot conversion factor does not require individual residential units to be 600 square feet or less.

2.3 DEVELOPMENT CHARACTERISTICS

The Piemonte Overlay concept promotes interaction between residential, commercial entertainment/retail, office, and specialty land uses. To these ends, the design and composition of development will provide its residents the opportunity to live, work, shop, and take advantage of various entertainment venues without the need to drive a car. Similarly, employees and visiting patrons are provided retail, dining, and entertainment opportunities without the need for multiple trips.

2.3.1 Development Concept

The Piemonte Overlay Development Concept is illustrated in Figure 2.4: Piemonte Overlay Development Concept. The overall design concept depicts



Note: The site design represented is conceptual in nature, and exemplifies one possible design scenario that has been developed in accordance with the design criteria of the Piemonte Overlay and may not represent ultimate building layout.

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Figure 2.4: Piemonte Overlay Development Concept

a complementary, pedestrian-oriented urban development, with an emphasis on wide, landscaped sidewalks, outdoor seating and dining areas, and contemporary design elements to be employed throughout the Overlay.

~~The central corridor or spine is established by the east/west~~ north/south ~~Via Villagio (a private drive) that is parallel to, and south of, Fourth Street. Via Villagio is anchored by residential uses to the west and residential and major retail uses to the east, and will incorporate varied landscape/hardscape features and pedestrian-oriented activity areas. Building mass and placement along Via Villagio will be used to create interesting spaces, and may include courtyards and outdoor seating and dining areas.~~ The central corridor or spine is established by the north/south Via Piemonte (a private drive) that is perpendicular to Fourth Street, leading to a major open space adjacent to the Arena. Via Piemonte is anchored by a series of retail on the ground floor and residential uses above with a variety of landscape and hardscape features with a focus on pedestrian oriented activity areas. The building mass and placement along Via Piemonte will be used to create interesting spaces, and may include courtyard spaces, open plazas, outdoor seating and dining areas. The building massing will further emphasize the connection between Fourth Street and the entertainment center surrounding the Arena. In so doing, the Via Villagio development concept will provide a visually and spatially varied streetscape.

~~The central portion of Via Villagio is designed to emphasize dining and entertainment opportunities, and will be delineated by decorative pavement and other defining landscape/hardscape treatments. This central core area is also designed to encourage visitors to move in a north/south direction along Via Piemonte (a private drive), fostering interaction with the office use and proposed hotel located to the south. These hotel and office uses are complemented by a central formal pedestrian esplanade.~~

The south side of Via Villagio is designed to emphasize dining and entertainment opportunities, and will be delineated by decorative pavement and other defining landscape/hardscape treatments. This area is also

designated to encourage visitors to move in a north/south direction along Via Piemonte, fostering interaction among the entertainment, dining, retail, office, hotel and Arena uses.

Via Piemonte is designed as a continuous pedestrian parkway to the Arena, providing venus for entertainment, dining, retail and public gathering along the way.

A central core area is designed to foster interaction with office and hotel uses to the south and connected by a formal pedestrian esplanade between Concours Street and Fourth Street.

The various land uses will be connected by a series of defined pedestrian walkways. Pedestrian links in the form of landscaped sidewalks have also been designed to allow workers, residents, and visitors to move through the Piemonte Overlay, and to the ~~Citizens Business Bank~~ Arena.

The OCSP requires three Plazas to be located within the Ontario Center area. Two Plazas have been constructed as shown on Figure 2.3: Piemonte Overlay Land Use Plan. An additional Plaza(s) will be constructed in SA1. These Plaza areas include the following elements, unless alternative designs are approved by the Planning Director:

- Minimum of 0.5 acre (could be in two separate areas).
- 50-foot minimum dimension, not including building or parking setbacks from streets, or roof overhangs, excepting entry canopies.
- Landscaping: ~~55~~ Minimum 10 percent. The planting areas included in the landscape requirement calculations must have minimum 5 feet dimension.
- Hardscape: ~~35~~ Maximum 80 percent.
- Other amenities, such as water features or installations that complement the plaza design: ~~10~~ Minimum 5 percent.

Generally, Plazas are intended to provide an urban environment augmented by extensive use of shade trees and structures, such as benches, fountains, pergolas, arbors, etc.

2.4 CIRCULATION PLAN CONCEPT

A private circulation system and design standards for vehicular and pedestrian movement are established under the Piemonte Overlay. Following, are summary descriptions of both the vehicular and pedestrian circulation systems. The street sections and plans shown in this section are conceptual designs and minor modifications may be implemented in Development Plans as circulation designs are further refined.

2.4.1 Vehicular Circulation

The Vehicular Circulation Plan Concept is presented on Figure 2.5: Piemonte Overlay Circulation Plan. Primary access is provided by public roadways that border the Overlay, including Haven Avenue to the west, Concours Street ~~and Ontario Center Parkway~~ to the south, and Fourth Street to the north. Within the Overlay, access to individual uses will be provided by Ontario Center Parkway and privately owned and maintained drives. Private drives also provide for necessary access/public utilities easements. Along the perimeter, public streets will accommodate public utilities improvements.

Figure 2.5: Piemonte Overlay Circulation Plan also identifies representative street cross-sections locations within, and adjacent to, the Overlay, and the cross-sections are presented in subsequent Figures. Consistent with City requirements, private drives identified within these Figures will be clearly identified on development plans, construction drawings, and property descriptions. To the satisfaction of the City Engineering Department, public access and utilities easements will be provided within private drives.

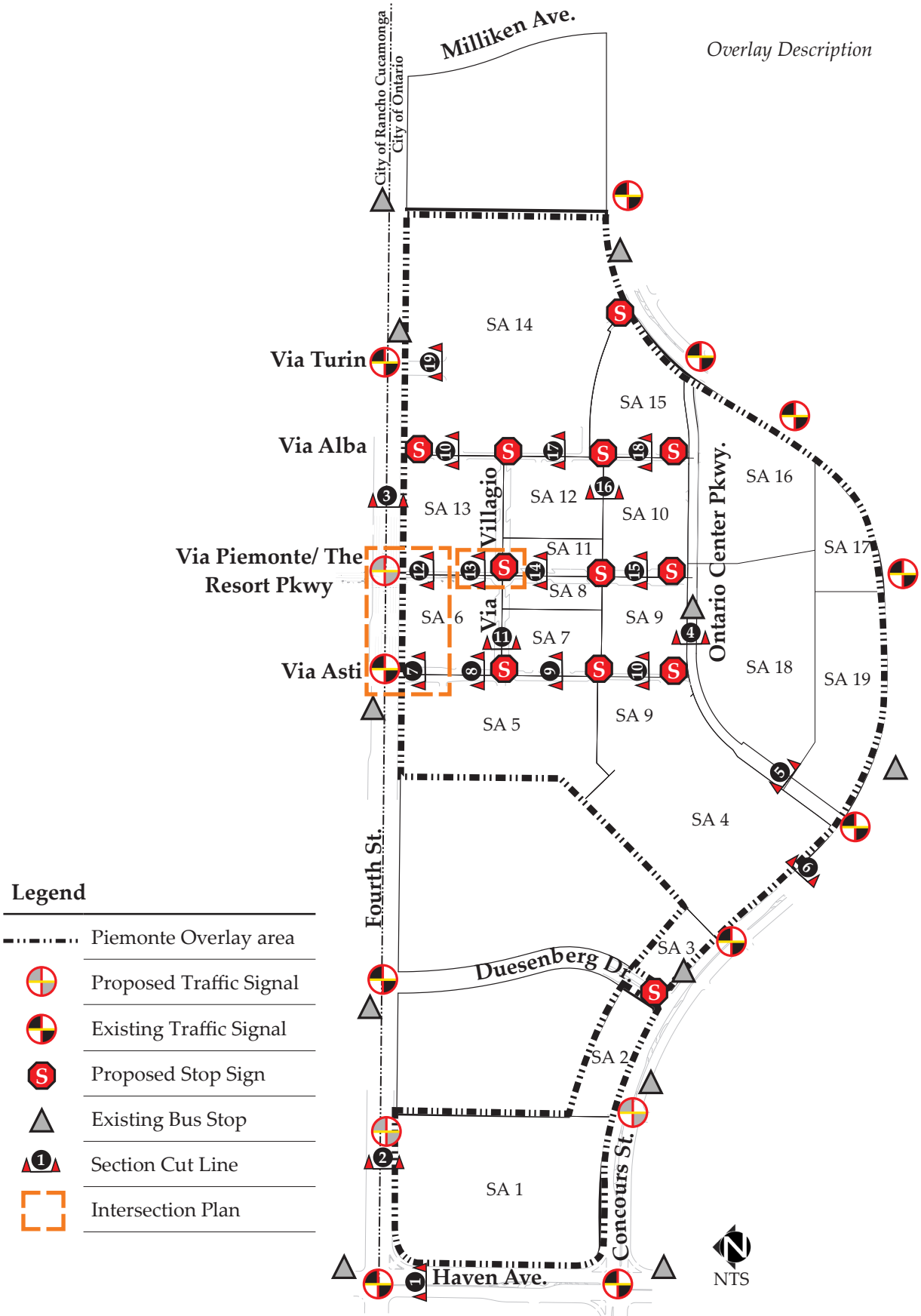
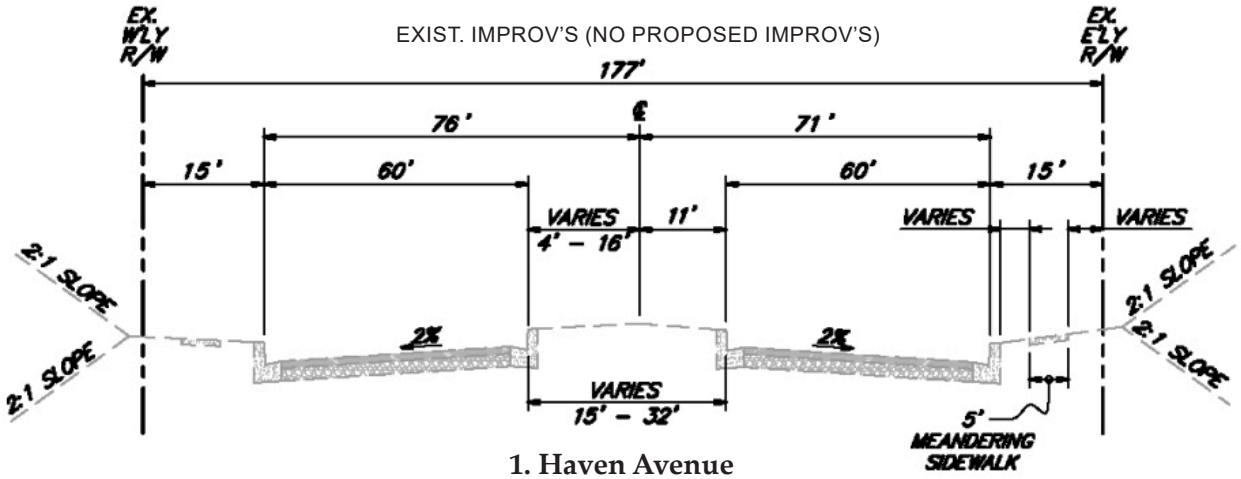
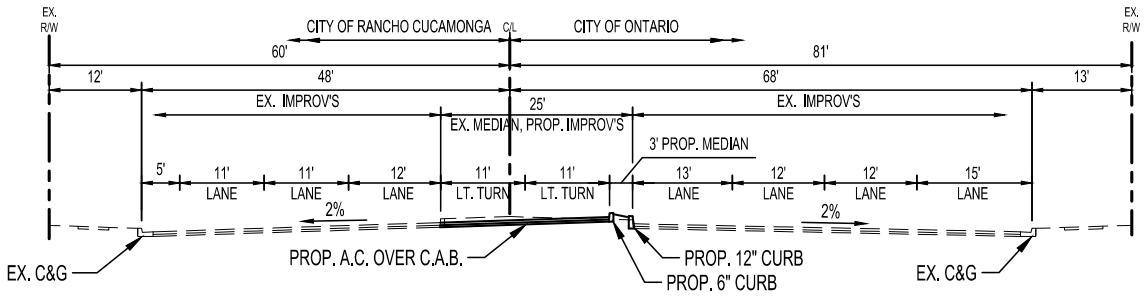


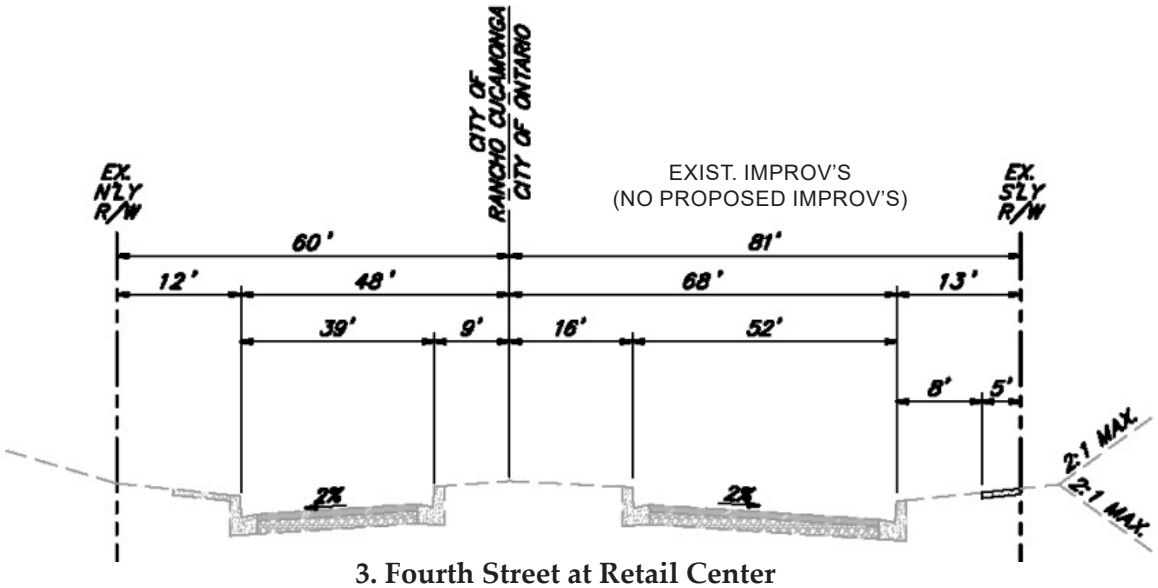
Figure 2.5: Piemonte Overlay Circulation Plan



1. Haven Avenue

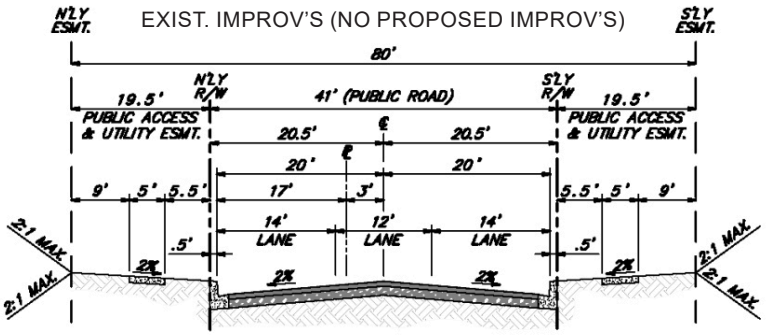


2. Fourth Street (East of Piemonte)

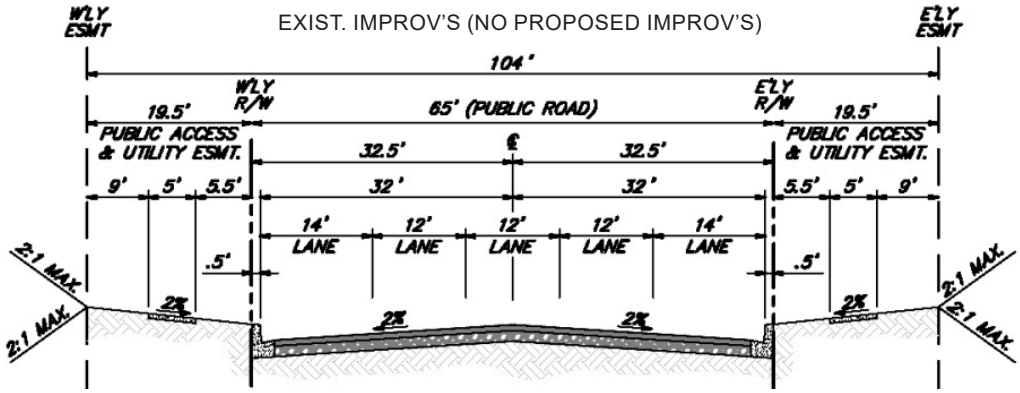


3. Fourth Street at Retail Center

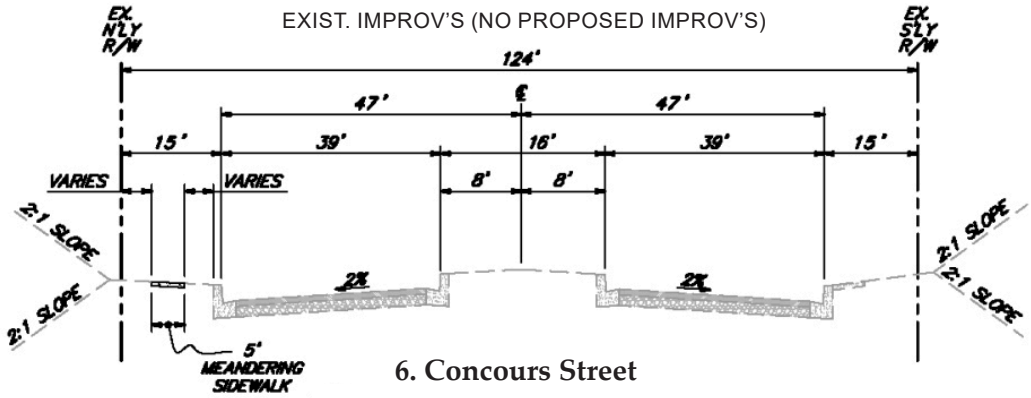
Figure 2.6a: Public Street Cross Sections



4. Ontario Center Parkway
(East of Via Asti)

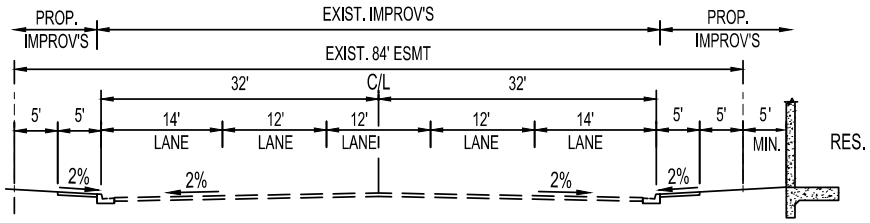


5. Ontario Center Parkway
(West of Via Asti)

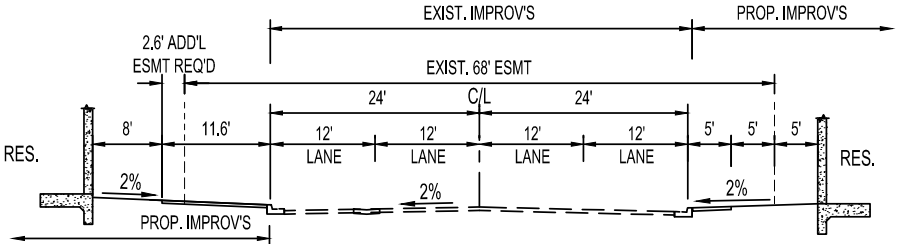


6. Concours Street

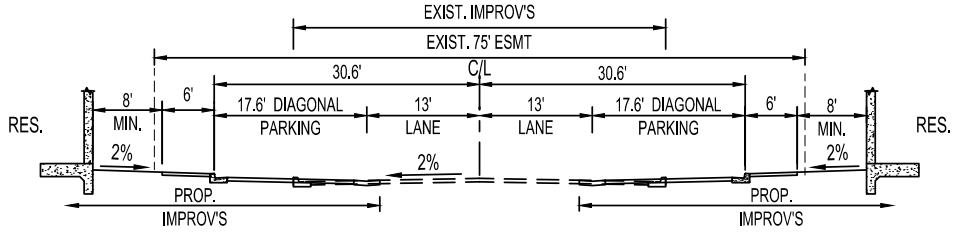
Figure 2.6b: Public Street Cross Sections



7. Via Asti - North Section (North Entrance)

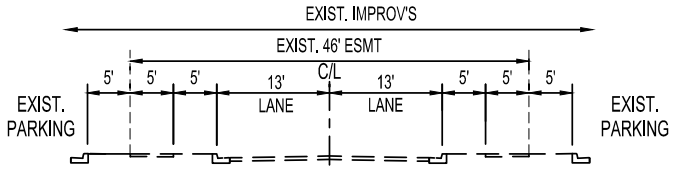


8. Via Asti - Middle Section (North of Via Villagio)

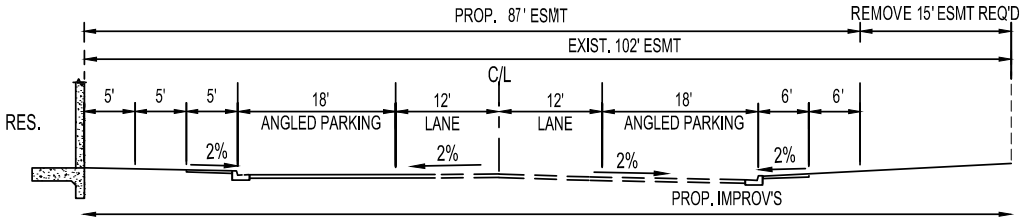


9. Via Asti - Middle Section (South of Via Villagio)

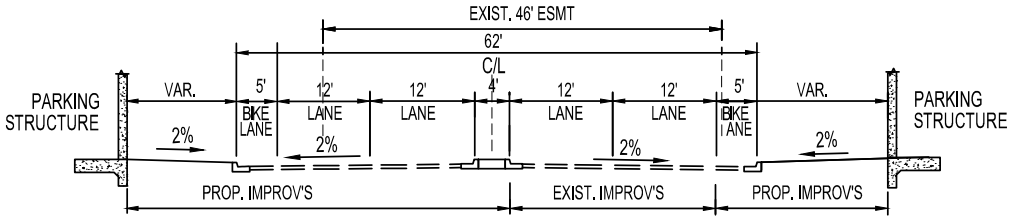
Figure 2.7a: Private Drive Cross Sections



10. Via Asti - South Section (North of Ontario Center Parkway)
Via Alba - North Section (North of Via Villagio)

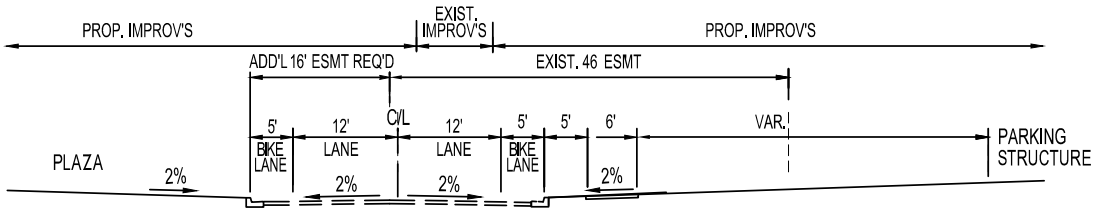


11. Via Villagio

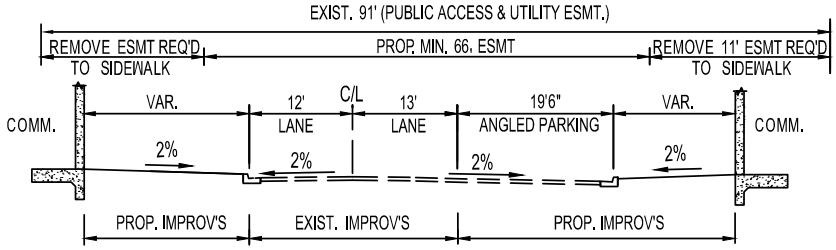


12. Via Piemonte - North Section (North Entrance)

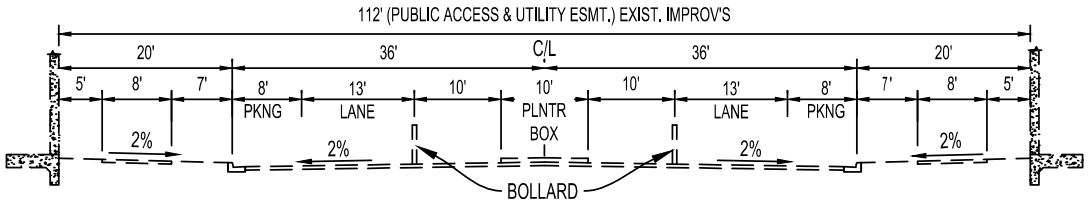
Figure 2.7b: Private Drive Cross Sections



13. Via Piemonte - North Section (North of Via Villagio)

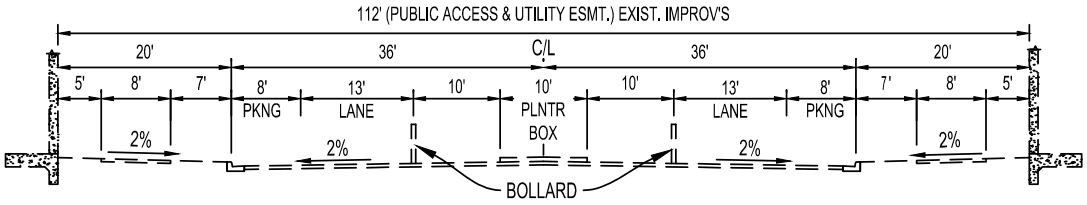


14. Via Piemonte - Middle Section (~~South of Via Villago~~ North Entrance)

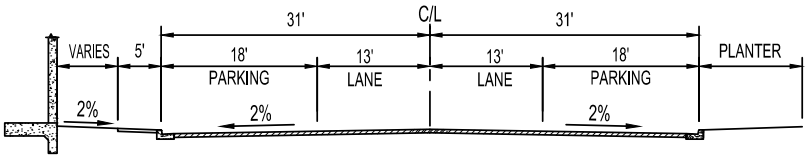


15. Via Piemonte - Middle Section (South Entrance)

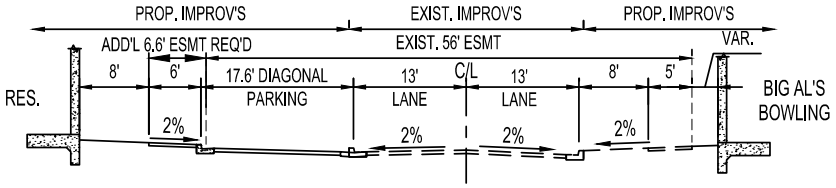
Figure 2.7c: Private Drive Cross Sections



~~15~~ 16. Via Piemonte - South Section - (South of Via Villago)

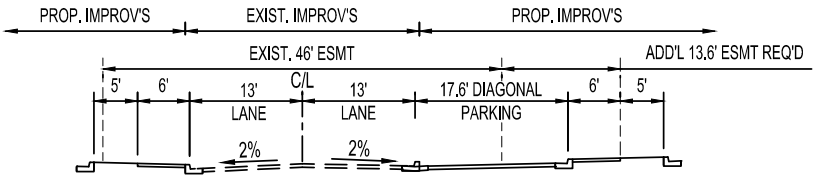


~~16~~ 17. Shared Drive between SA 10, 11, & 12 (South of Via Villagio)

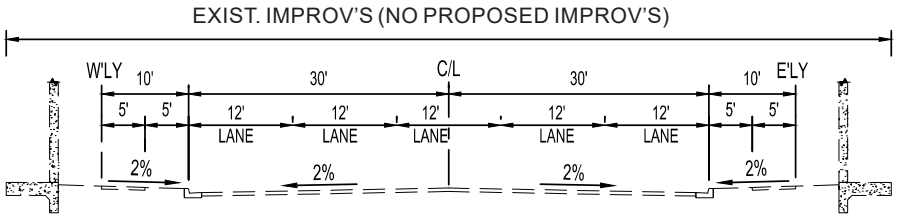


~~17~~ 18. Via Alba - Middle Section (South of Via Villagio)

Figure 2.7d: Private Drive Cross Sections



~~18~~ 19. Via Alba - South Section (North of Ontario Center Parkway)



~~19~~ 20. Via Turin

Figure 2.7e: Private Drive Cross Sections

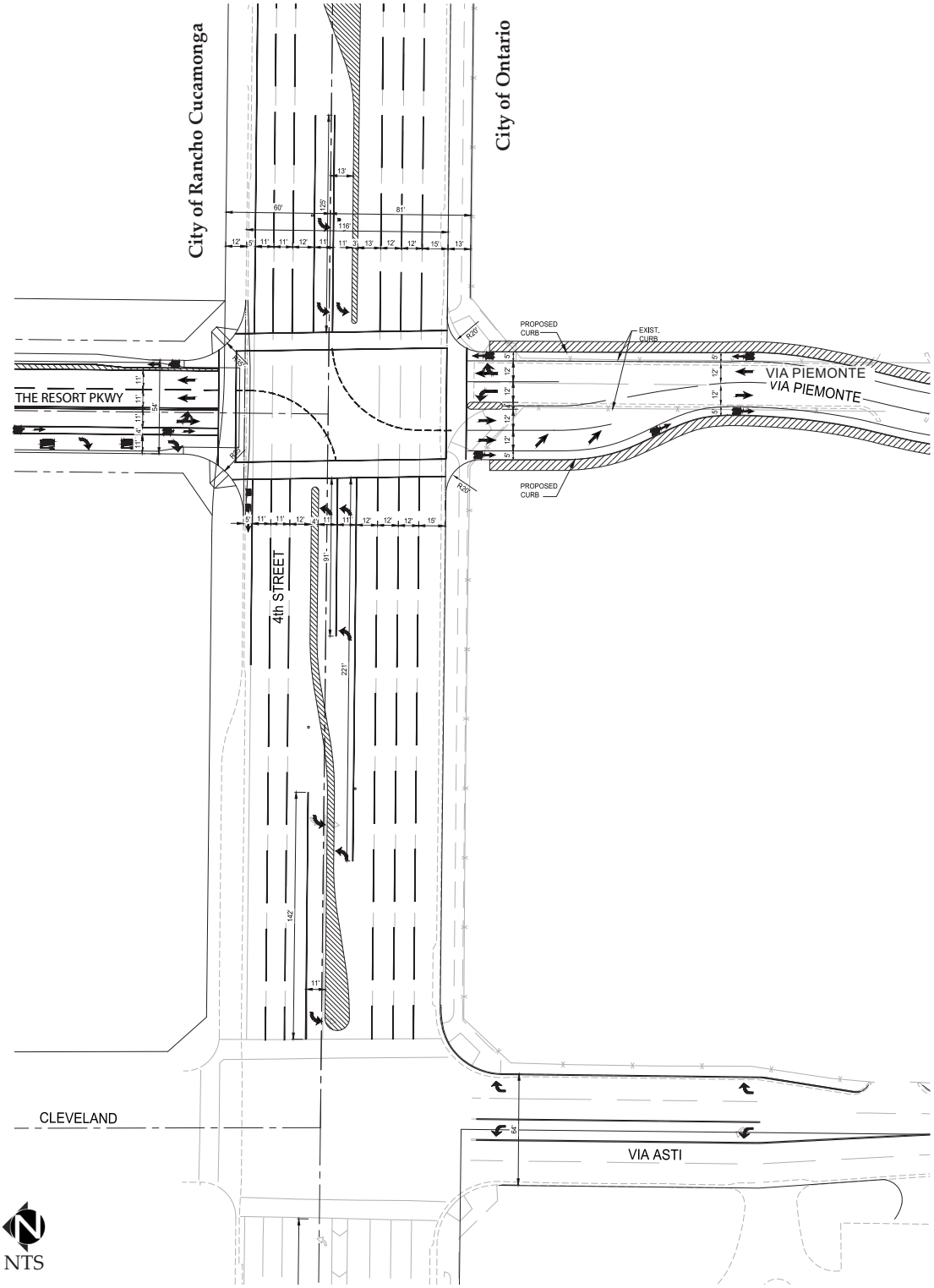


Figure 2.8a: 4th Street Intersection Plan

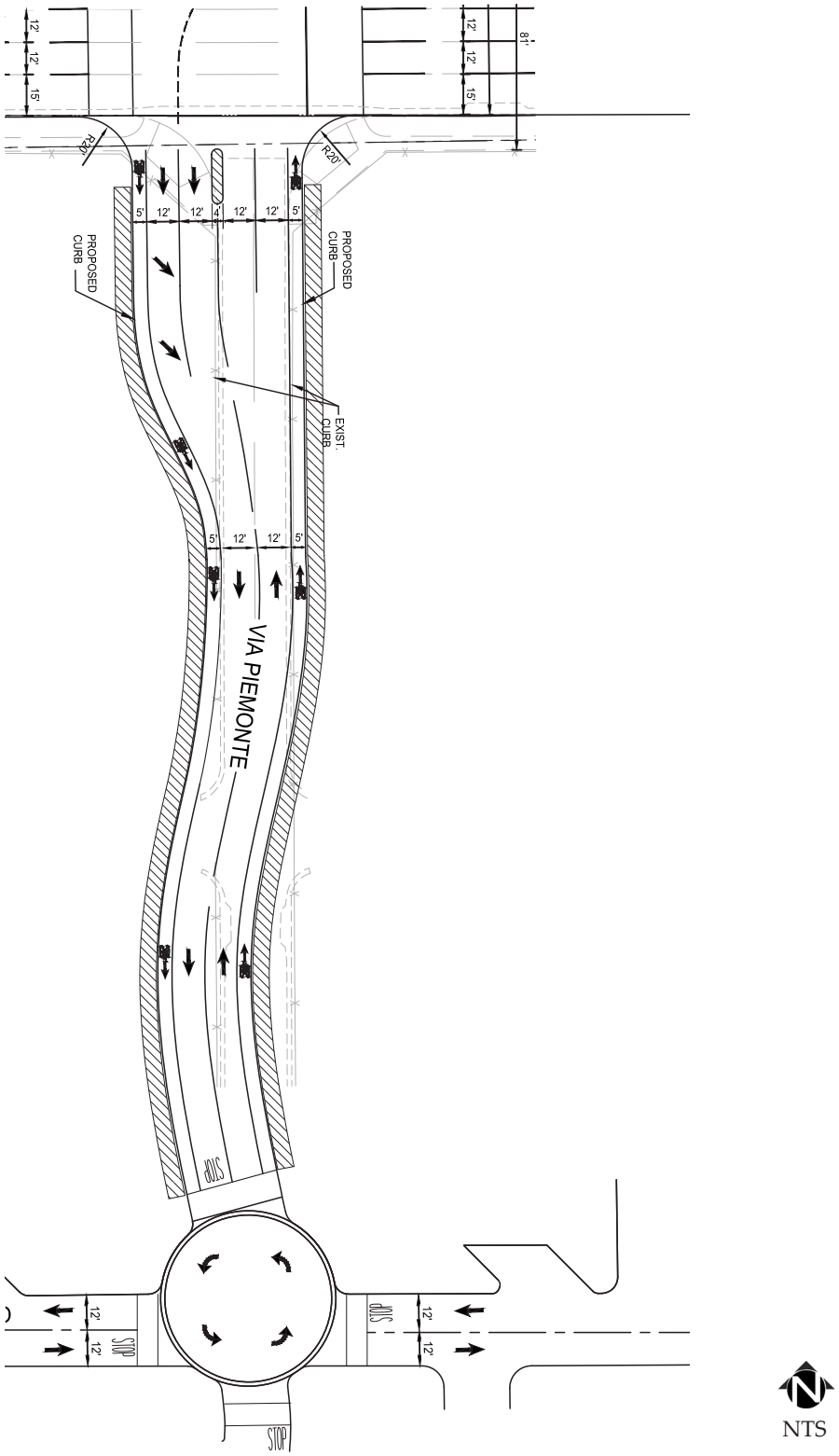


Figure 2.8b: Via Piemonte Plan (South of Fourth Street)

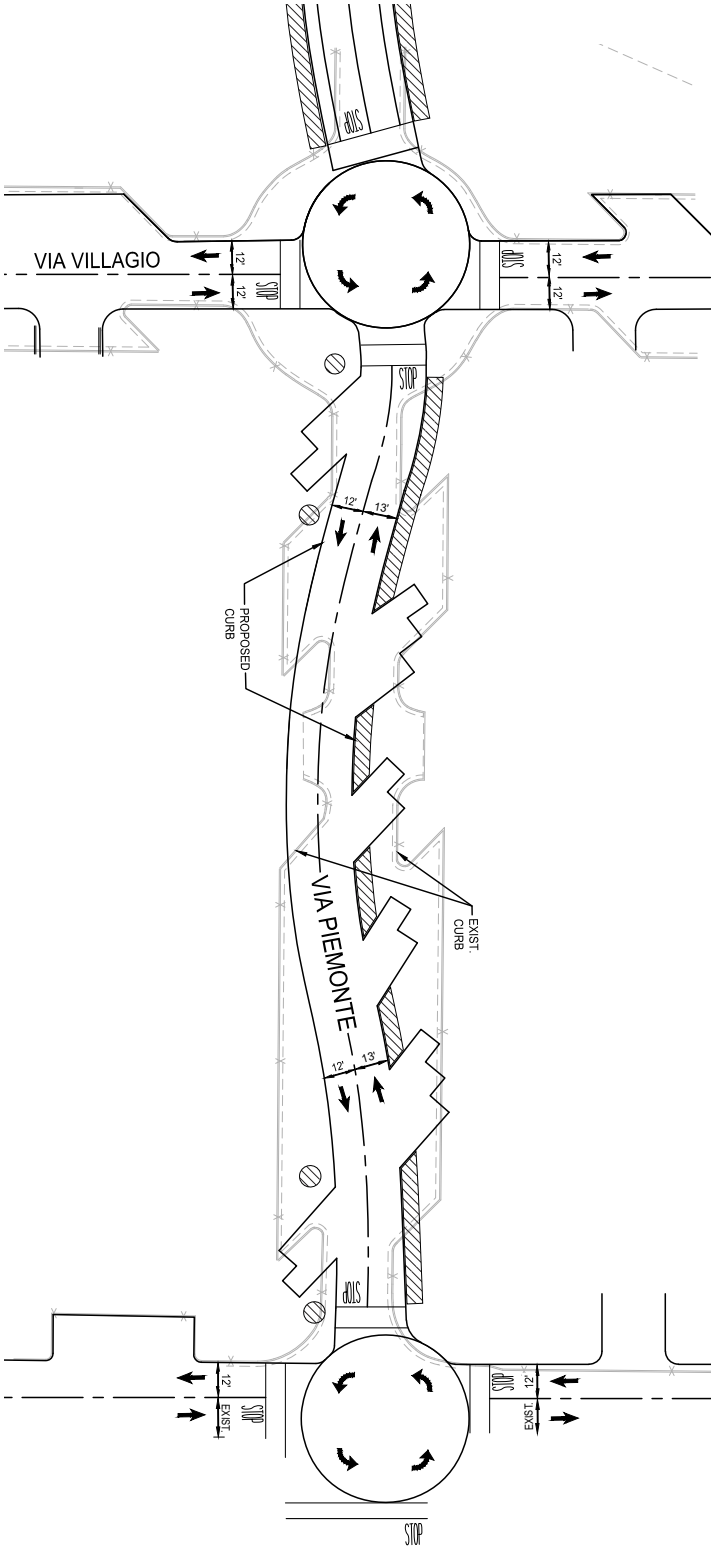


Figure 2.8c: Via Piemonte Plan (South of Via Villagio)

A proposed access from Fourth Street into the SA 1 will be permitted by the City Engineer if the proposed driveway is located as close as practicable to the east property line and the intersection is controlled with a traffic signal.

In addition to the typical street section described and depicted, additional right-of-way and travel lane designs may be required to adequately mitigate impacts identified in the Traffic Impact Analysis/Specific Plan EIR.

2.4.2 Pedestrian Circulation

As illustrated in Figure 2.9: Pedestrian Circulation, the Piemonte Overlay incorporates a pedestrian network which provides connections to, and supports interaction between, the various land uses. The pedestrian network largely parallels the roadway network.

The pedestrian network incorporates design features including enhanced paving/surface treatments and monumented entries. Typical pedestrian walkway enhancements in the Piemonte Overlay entries include the existing arbors/ pergolas with climbing grapevines, acting to identify and define entrances, while differentiating the Overlay from surrounding urban uses. New, more urban, entries may also be provided with each development application for build-out of the residential and commercial uses. Entries will be emphasized by adjacent plantings of specimen trees. Landscaping along pedestrian walkways will typically include ornamental grasses, groundcover, and shrubs, thematically employed throughout. Walkways along public streets will be canopied by planting of adjacent street trees.

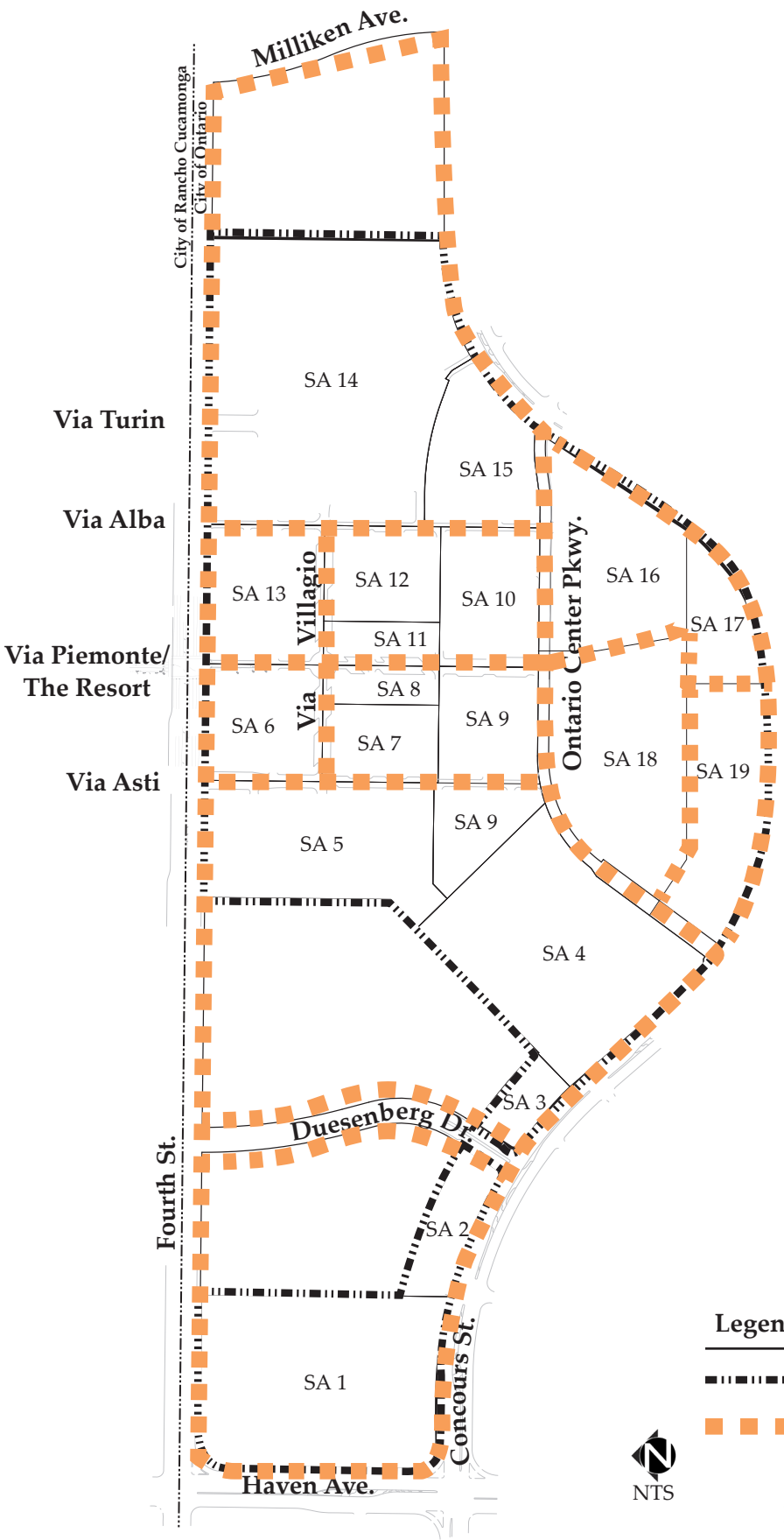


Figure 2.9: Pedestrian Circulation

2.5 LANDSCAPE CONCEPT

Figure 2.4: Piemonte Overlay Development Concept illustrates a contemporary urban landscape concept using clean simple forms, reinforcing Southern California's indoor/outdoor lifestyle, while existing monumentation (as shown in the following photos) picks up the influences of the Piemonte region of Northern Italy. ~~Skyline palms act as "way-finding" features and provide appropriate scale to this vertical urban environment. Pedestrian-scaled canopy shade trees, as well as bold colors and foliage textures of the understory plant material, will enhance the streetscape walking experience. This understory~~ Landscape patterns and street furniture will create a harmonious, functional environment. Tall trees, such as towering palms, eucalyptus, and other drought tolerant trees will act as "way-finding" features and provide appropriate scale to the vertical urban environment. Broad, spreading canopy trees will enhance and add variety to the streetscape walking experience. The multi-colored and varyingly textured understory plant material will be rich in varieties of ornamental grass, succulents, and flower groundcovers creating this semi-arid and environmentally sustainable landscape environment.

All monuments shall conform to current corner sight line and monument placement standards per City of Ontario Standard Drawing No. 1309 and the City Traffic and Transportation Guidelines, Chapter 5: Monument Placement.

Views of existing commercial at the intersection of Fourth Street and Via Turin

Looking north along Via Alba at the intersection of Via Alba and Ontario Center Parkway

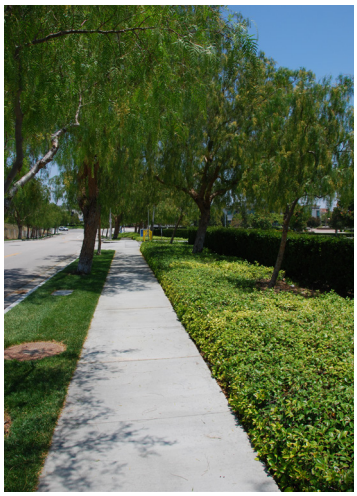
Looking north along Via Asti at the intersection of Via Asti and Ontario Center Parkway

Figure 2.10a: Photos of existing streetscape

Photos looking north along Via Piemonte at the intersection of Via Piemonte and Ontario Center Parkway

Figure 2.10b: Photos of existing streetscape

Views of streetscape along Ontario Center Parkway



Views of streetscape along Ontario Center Parkway

Views of existing residential and streetscape along Duesenberg Drive

Figure 2.10c: Photos of existing streetscape

Views of streetscape along Concours Street at central portion

Views of streetscape along Concours Street at western portion

Views of streetscape at the intersection of Haven Avenue and Concours Street

Figure 2.10d: Photos of existing streetscape

2.6 INFRASTRUCTURE

This section describes the existing backbone infrastructure system available for Piemonte Overlay development, and identifies any improvements necessary to accommodate future development in the Overlay. Please refer also to infrastructure descriptions and analyses presented within: *Piemonte Preliminary Sewer Study, Piemonte Water System Summary, Piemonte Reclaimed Water Summary,* and *Piemonte Storm Drain System Summary*, (SB&O, Inc.) January 2006 and *Feasibility Study for the Adept Development Sewer Project*, (Stantec Consulting Services Inc.) February 2022, available from the City of Ontario Planning Department. Development proposals in the Overlay area may warrant additional studies to assure adequate utility capacity, placement and design, which may differ from the information in the subsections below.

2.6.1 Wastewater

Wastewater treatment services for the City of Ontario and other nearby communities are provided by Inland Empire Utilities Agency (IEUA). This Agency is responsible for treatment of wastewater generated from development within the Overlay area. Wastewater will be transported to IEUA Regional Plant No. 1 (RP-1) via the City of Ontario wastewater collection and conveyance system. IEUA Regional Plant No. 1 is located south of the Pomona Freeway (SR-60) and west of Archibald Avenue.

The backbone sanitary sewer system and delineation of private/public sewer system components are identified in Figure 2.11: Wastewater Facilities Plan. The perimeter public streets accommodate sewer system improvements.

A 24-inch IEUA sewer interceptor exists in Fourth Street along the northerly boundary. This interceptor captures all wastewater from north of Fourth Street within Rancho Cucamonga and transfers it west along Fourth Street. Therefore, the Overlay area does not accept any off-site wastewater from the north. All wastewater flows generated within the Piemonte Overlay area are transported via 8- to 10-inch sewer lines to Concours Street. At Concours Street, these lines

are connected to the existing 8- to 12-inch sewer mains. These mains currently connect to an 18-inch main, that in turn connects to the Inland Empire Boulevard sewer main to the south.

The collection sewer main to the south of the Overlay area, originally called the Ontario Motor Speedway Outfall, was sized to handle flows from the site. This outfall line ultimately flows west along Inland Empire Boulevard, then proceeds south beneath I-10. Sanitary sewer facilities constructed south of I-10 have previously been upgraded and sized to adequately handle development within the Overlay and surrounding areas.

The existing wastewater transmission facilities within Concours Street have enough overall capacity to adequately convey wastewater generated by development based on information presented in the *Preliminary Sewer Study for Piemonte,* (SB&O, Inc.) dated January 25, 2006 (Sewer Study). ~~More specifically, as concluded in the Sewer Study, the depth to diameter (d/D) design standard of 0.50 for these transmission facilities will be maintained even with the addition of wastewater generated by Overlay area development.~~ The *Feasibility Study for the Adept Development Sewer Project*, (Stantec Consulting Services Inc.) February 2022 has identified some sections that will require sewer upgrades in terms of capacity and/or replacement of deteriorated infrastructure and Development Plans will be required to address these areas of concern.

It is further noted that the Sewer Study conservatively assumes 2.7 persons per dwelling unit within the Piemonte Overlay, with a calculated wastewater generation rate of 100 gpd/person, or 270 gpd/dwelling unit. The overall mix of residential units will likely result in reduced overall resident populations, with resulting reductions in wastewater generation when compared to the Sewer Study assumptions.

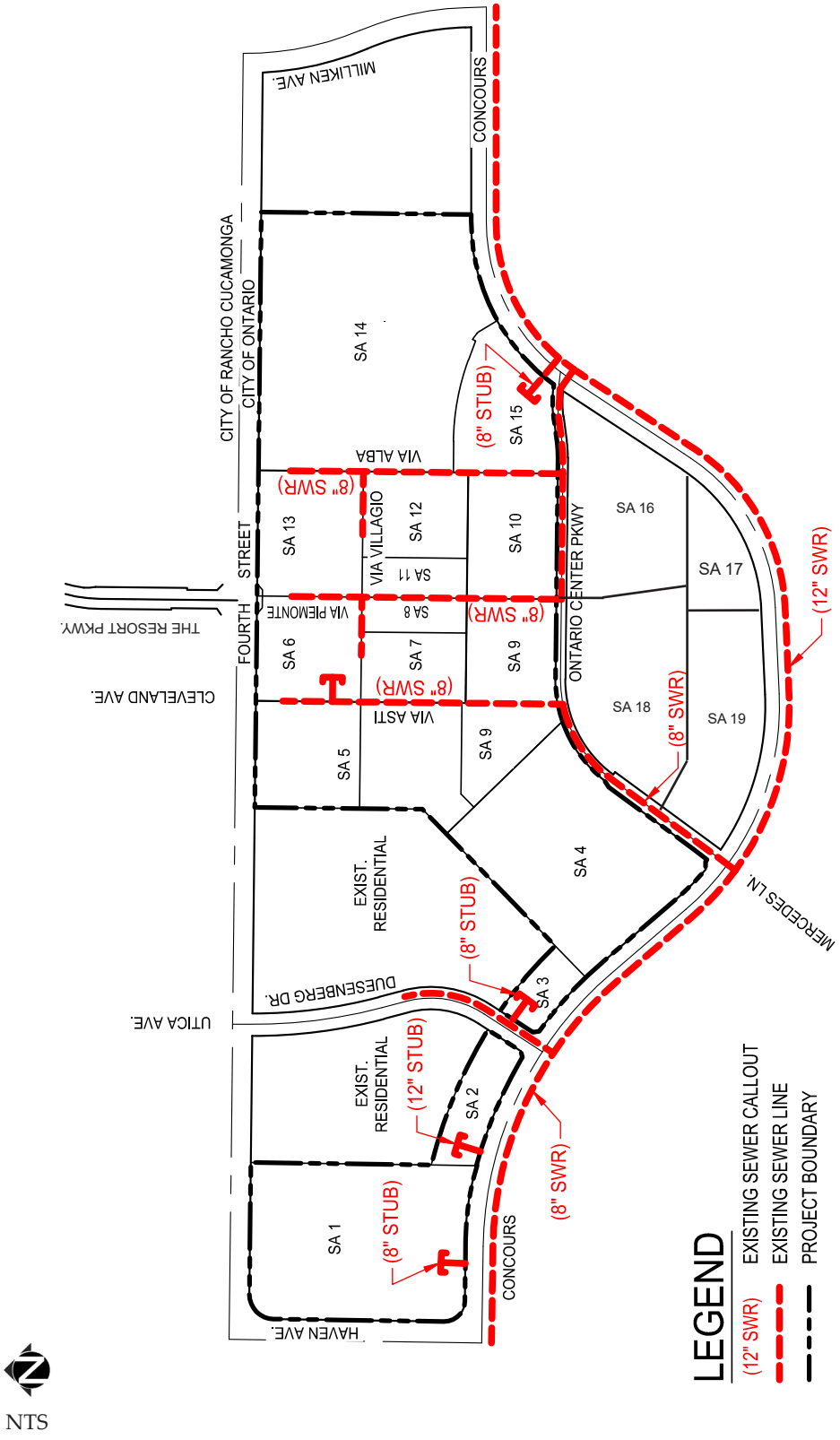


Figure 2.11: Wastewater Facilities Plan

2.6.2 Water Service

Water service to the Piemonte Overlay is provided by the City of Ontario. Existing water facilities include mains located in both Fourth Street and Concours Street. A 12-inch main in Fourth Street serves properties north of the Overlay, in Rancho Cucamonga and an existing City of Ontario 18-inch main located in Fourth Street will serve the Overlay. Fourth Street also contains a 36-inch City of Ontario transmission main. Additionally, Concours Street contains a 16-inch water main that will be used to serve the Overlay area. Water demands by use and for the entire Overlay, are contained within *Preliminary Sewer and Water Demand Study for Rancho Piemonte,* (SB&O, Inc.), dated August 8, 2005, and is available for review from the City of Ontario Planning Department. The proposed on-site water system lines and components are schematically presented in Figure 2.12: Water Facilities Plan.

The Study identifies the water demands for the various Piemonte Overlay uses, and acknowledges that use-specific fire flow requirements are the controlling factor in evaluating the hydraulic adequacy of a water distribution system. Based on the highest fire flow demand (hotel and high density residential at 3,500 gpm requirement), the Study concluded that the existing water system infrastructure surrounding the site is adequate to serve the Piemonte Overlay.

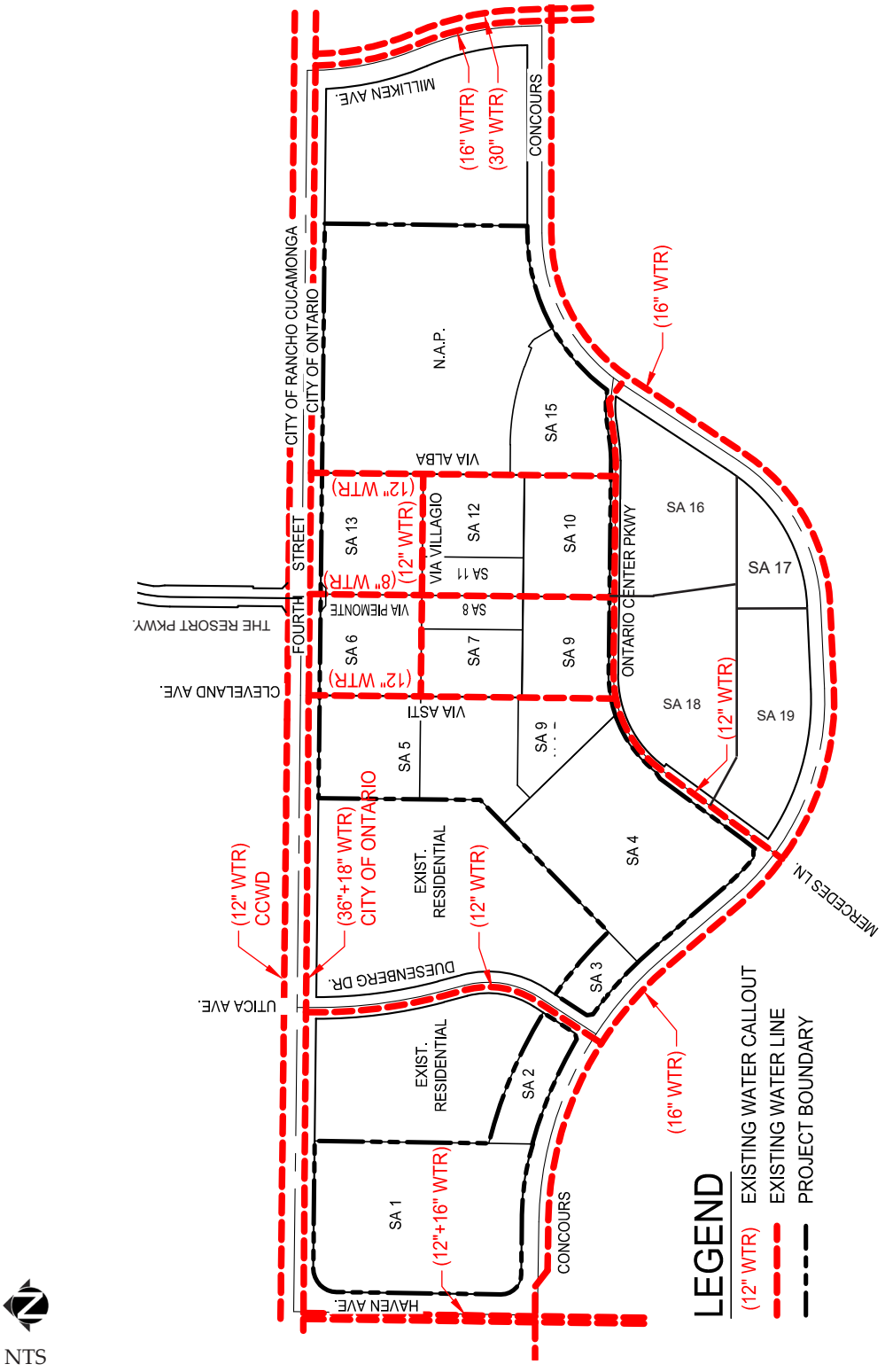


Figure 2.12: Water Facilities Plan

2.6.2.1 Recycled/Reclaimed Water System

Nearest to the Piemonte Overlay are the IUEA reclaimed water main which is installed in Sixth Street; a short segment of reclaimed water line in Haven Avenue between Sixth and Fourth Streets; with another segment located within Fourth Street, west of Haven Avenue. More specifically, a 30-inch reclaimed water main exists in Haven Avenue, turning west in Fourth Street. A 12-inch reclaimed water lateral exists in Milliken Avenue that terminates near Fourth Street. An 8-inch reclaimed water line has been installed in Concours Street, from Haven Street to Milliken Avenue. This reclaimed water line was installed as part of the Concours Street street improvements in 2002.

Additional reclaimed water facilities are constructed within the Piemonte Overlay, with connecting segment(s) in Milliken Avenue, Concours Street and Haven Avenue. Reclaimed water system improvements within the Overlay are illustrated on Figure 2.13: Recycled Water Facilities Plan, and include the following:

- Extension of the reclaimed water lateral from Milliken Avenue and Fourth Street, connecting to the reclaimed water line in Concours Street.
- Construction of a reclaimed water loop in Ontario Center Parkway to each intersection of Concours Street.
- Reclaimed water distribution lines extended northerly from Concours Street within Ontario Center Parkway and Via Alba.

New development shall comply with City Ordinance No. 2689 and make use of recycled water for all approved uses, including but not limited to landscaping irrigation.

Reclaimed water lines within public streets and public utility easements within private streets will be maintained by the City of Ontario Municipal Utilities Company (OMUC). The ownership and maintenance of common reclaimed water system components and lines within private drives in the Overlay will be the responsibility of the Piemonte at Ontario Center Property Owners Association, (POCOA) established pursuant to the Piemonte CC&Rs.

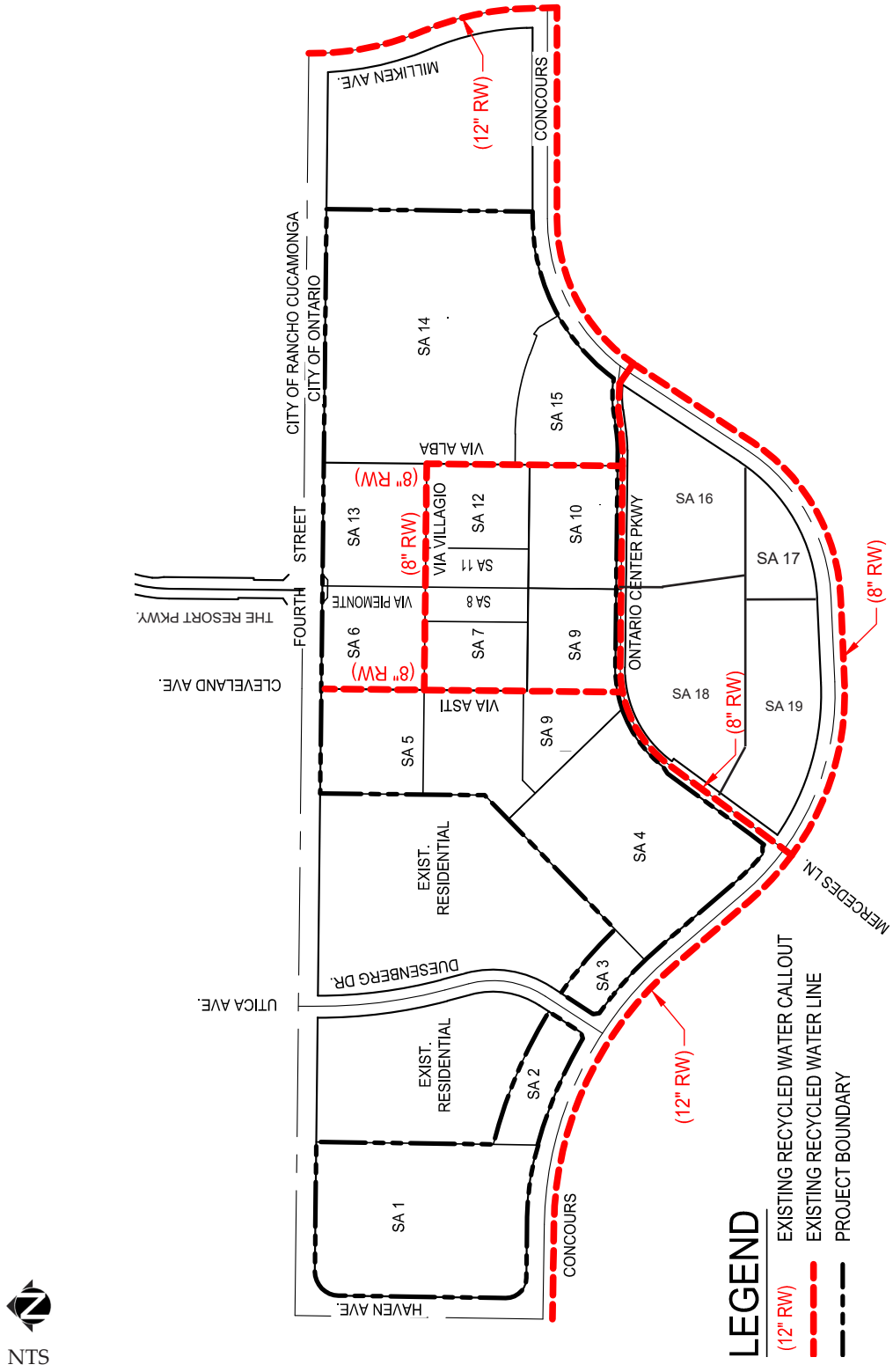


Figure 2.13: Recycled Water Facilities Plan

2.6.3 Stormwater Management

Existing and proposed stormwater management facilities, and conveyance systems and components, are schematically presented on Figure 2.15: Water Quality Management Plan. As a general note, development-related improvements and connections located within public streets will be maintained by the City. However, the ownership and maintenance of common stormwater system components and lines, as well as water quality treatment facilities, will be the responsibility of the POCOA, established pursuant to the Piemonte CC&Rs.

2.6.3.1 Stormwater Collection and Conveyance Facilities

Drainage in the Piemonte Overlay area flows in a generally north to south direction. North of the Overlay, an existing storm drain is located in Fourth Street. This storm drain collects and transports all drainage flows from the north and west, to Guasti Park. As such, the Overlay will not have to accommodate stormwater flows from the north. Stormwater run-off from the Overlay drains southerly, to Concours Street. Receiving reinforced concrete pipe (rcp) drainage facilities are located within Concours Street, and range in size from 48-inches to 72-inches in diameter. Flows from the Concours Street facilities empty into a 9-foot by 6-foot reinforced concrete box (rcb). Flows then continue southerly, toward Inland Empire Boulevard, then westerly to Mercedes Lane, and then southerly beneath I-10 in a 12-foot by 7-foot rcb to Lower Deer Creek Channel. Lower Deer Creek Channel confluences with Cucamonga Creek Channel, and flows to the Prado Basin.

The S*torm Drain System Summary for Piemonte* (SB&O, Inc.), dated January 30, 2006, concludes that the existing storm drainage facilities serving the Piemonte Overlay and vicinity have been previously sized to accommodate any proposed development. Additional internal drainage system improvements will be constructed to connect to the existing area-wide drainage system. Connection points to the existing system will be located so as to take full advantage of available carrying capacities, as shown in Figure 2.15: Water Quality Management Plan.

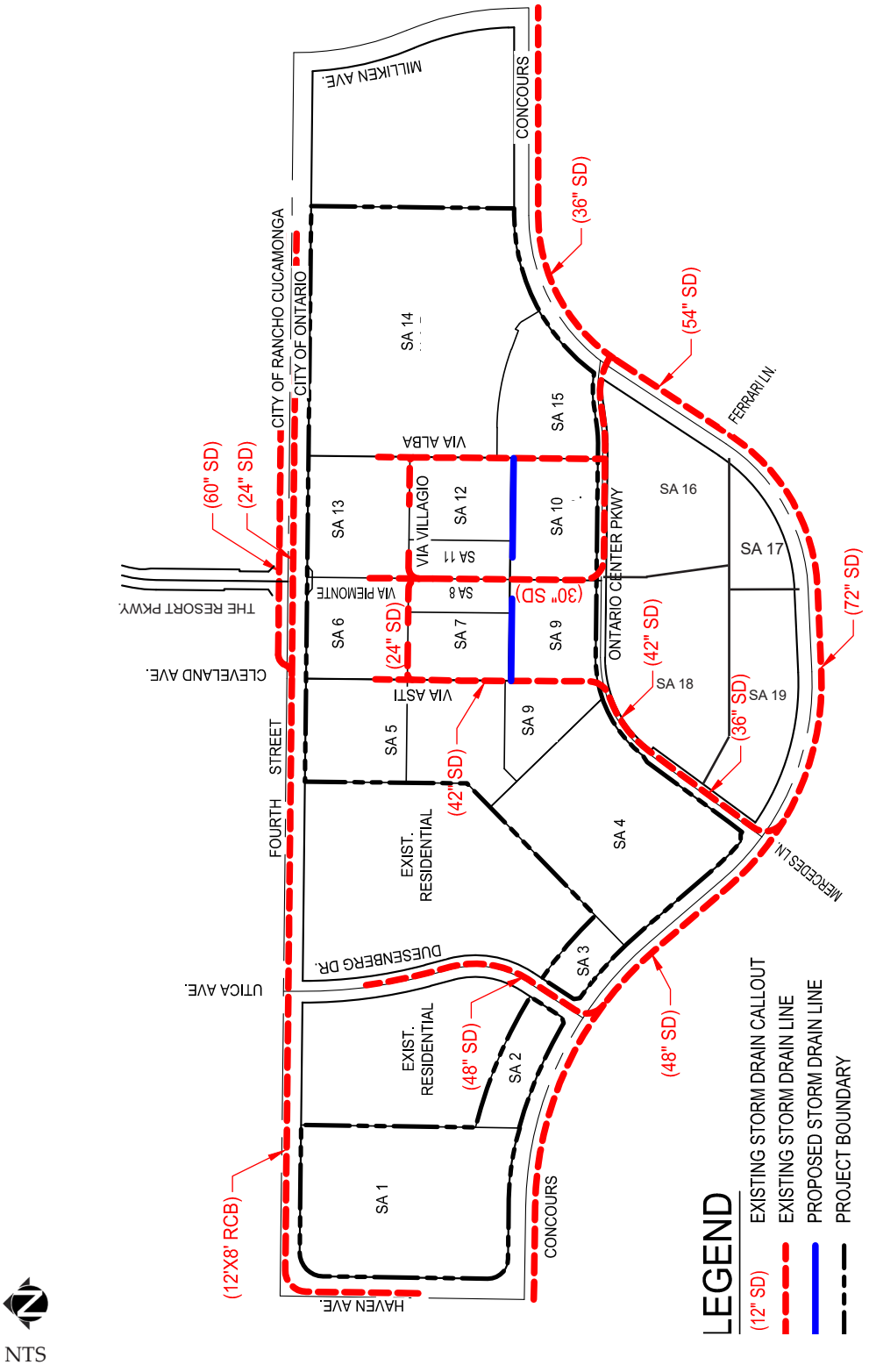


Figure 2.14: Storm Water Collection and Conveyance Facilities Plan

2.6.3.2 Stormwater Water Quality Management Plan (WQMP)

In addition to construction of required stormwater conveyance facilities described above, the City of Ontario and the governing Regional Water Quality Control Board (RWQCB) require that development in the Piemonte Overlay incorporate technically and economically feasible source control and Site Design Best Management Practices (BMPs), as discussed below.

Overview

The Santa Ana Regional Water Quality Control Board (RWQCB), under Order Number R8-2010-0036, NPDES Permit No. CAS618036, requires post-construction BMPs to be implemented for new development and significant redevelopment, for both private and public agency projects. The purpose of a Water Quality Management Plan (WQMP) is to develop and document the installation of structural stormwater quality facilities and the implementation of a program, including application of non-structural BMPs, which minimize the detrimental effects of urban stormwater run-off on the beneficial uses of receiving waters, including potential effects of increased pollutant loads and changes in hydrology.

Potentially adverse effects on receiving waters shall be minimized through the construction of Site Design/Low Impact Development (LID) BMPs with the highest priority for BMPs that retain/infilter the average 2-year, 24-hour storm run-off volume (85th percentile storm event) from the project, then other BMPs, such as harvesting and use, evapotranspiration, and biotreatment. To the maximum extent practicable (MEP), these LID BMPs must be implemented at the protect site. Where LID BMPs are not feasible at the project site, more traditional, but equally effective control measures, must be implemented. The combination of Site Design/LID BMPs, Source Control and/or Treatment Control BMPs included in project-specific WQMPs for new development within the Piemonte Overlay area shall address all identified pollutants of concern and hydrologic conditions of concern in run-off from on-site as well as proposed off-site improvements included in development projects.

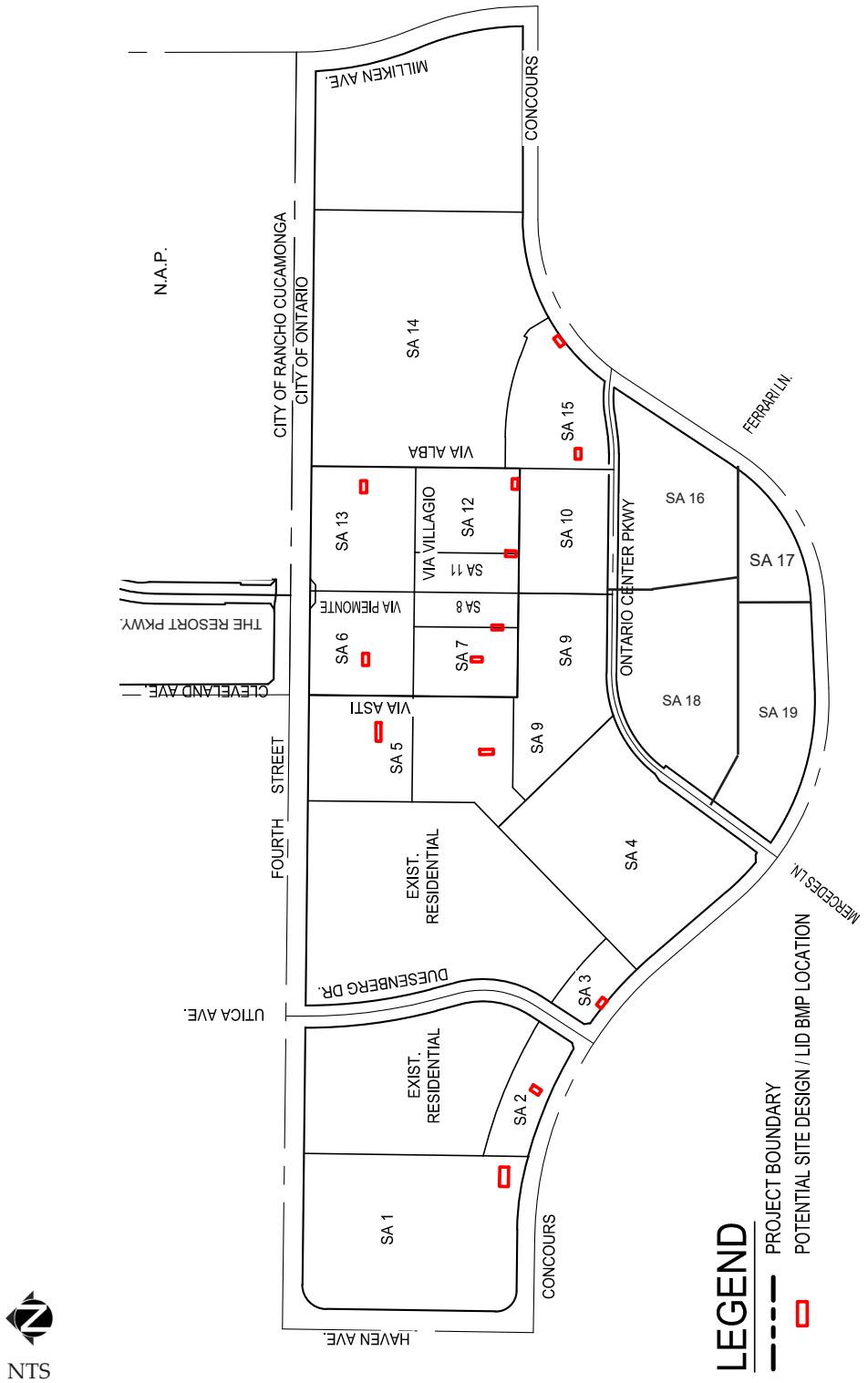


Figure 2.15: Water Quality Management Plan

Development projects within the Piemonte Overlay are required to meet the minimum ~~county~~County-side WQMP requirements applicable to Priority Projects by incorporating infiltration LID BMPs to the MEP; followed by biotreatment and harvest and use BMPS, for the remainder of the required storm run-off volume. Minimum source control BMPs and necessary treatment control BMPs shall also be documented, along with on-site LID BMPs, in project-specific WQMP plans. Where it is proven to be infeasible for a priority project to fully meet LID requirements based on implementing site design and on-site LID BMPs, a development project may alternatively participate in an available and approved regionally-based treatment program that addresses all identified pollutants and hydrologic conditions of concerns.

Project-Related Stormwater Treatment Requirements

The Piemonte Overlay is located within the Santa Ana Basin, designated as Region 8 by the RWQCB, and is tributary to Lower Deer Creek, the Chris Basin, Cucamonga Creek Flood Control Channel, Mill Creek, the Prado Flood Control Basin, and finally the Santa Ana River. In accordance with the Clean Water Act, the State of California maintains a list of impaired water bodies and the pollutant causing the impairment. The Cucamonga Creek Flood Control Channel is included on the State's list of impaired water bodies because of high coliform content. Mill Creek is also included on the impaired water body's list for nutrients, suspended solids, and pathogens. Because these receiving waters (which are tributary to the Piemonte Overlay) are impaired, development in the Overlay must incorporate BMPs that are rated high to medium in effectiveness for reducing the impairments. This assures a no net loading on the affected tributaries, and ensures that there are no additional pollutants added to the already impaired water bodies.

Project-Related Stormwater Treatment Improvements

Since the predominate soil type in the Piemonte Overlay areas is "Class A,"the mandated on-site LID/Site Design BMP measures will be designed into each development project within the Piemonte Overlay Specific Plan area will be

retention/infiltration of the required Design Capture Volume (DCV) of run-off through the use of a combination of various landscaped basins, trenches/swales, and underground infiltration systems (with pre-treatment BMPs), on individual parcels. All proposed LID/BMPs and pre-treatment facilities will be designed and implemented consistent with City and County-wide WQMP requirements. General locations and configurations of proposed LID stormwater retention/infiltration facilities are presented on Figure 2.15: Water Quality Management Plan.

2.6.3.2 Project-Related Stormwater BMP Compliance During Construction Phase

Prior to the issuance of grading or construction permits for any development project disturbing one-acre or more of land, within the Piemonte Overlay Specific Plan area, project applicants shall be required to obtain coverage under the California General Permit (CGP) for Stormwater Discharges Associated with Construction and Land Disturbance Activities and prepare and submit Erosion/ Sediment Control Plans and Storm Water Pollution Prevention Plans (SWPPPs), along with project Grading Plans, to the City of Ontario and the State Water Quality Control Board's "SMARTS"website, at the time of permit application. The SWPPP shall be prepared to comply with the requirements of the California State Water Resources Control Board's (State Water Board) current "General Permit to Discharge Storm Water Associated with Construction Activity" CGP and the current "Area Wide Urban Storm Water Runoff (Regional NPDES) Permit for San Bernardino County.

2.6.4 Solid Waste

Solid Waste services are provided by Integrated Waste. Solid waste requirements are per the City's Solid Waste Department Refuse and Recycling Planning Manual.

2.6.5 Fiber-Optics

The City of Ontario is developing a fiber-optic telecommunications system throughout the City commonly known as OntarioNet. The fiber-optic telecommunications system is capable of providing advanced internet/data services to homes and businesses in feasible areas within the City. OntarioNet will provide community related services including: traffic management; online civic services; meter reading; educational services; and a variety of other community services. OntarioNet and the high-speed data services it provides, will keep the City on par with the modern workforce and ever changing lifestyles of the people and the community.

Communication systems proposed on-site facilities will be placed underground within a duct and structure system to be installed by the Developer, as illustrated in Figure 2.16: Fiber-Optics Plan. Maintenance of the installed system will be the responsibility of the City and/or special district fiber optic entity and not that of the Developer, private homeowners association or private homeowners. Development of the project requires the installation by the Developer of all fiber optic infrastructure necessary to service the project as a stand alone development.

Trenching, joint trenching and boring shall be used to install the fiber-optic conduits. Fiber-optic conduit placement will generally be in a joint trench with street light conduits or in a separate trench/bore and in the Right-of-Way (ROW) generally placed behind the sidewalk. Resulting conduit placement will be on the north side of street and the east side of street based on the direction of the street. Properly sized handholes shall be placed along the conduit path no greater than 500 feet apart in major streets and no greater than 300 feet apart within in-tract community streets. Handholes shall be strategically placed to allow for efficient entrance into commercial buildings, and residential properties and multi-dwelling units. Refer to Figure 2.16: Fiber-Optics Plan for existing and proposed fiber-optics locations.

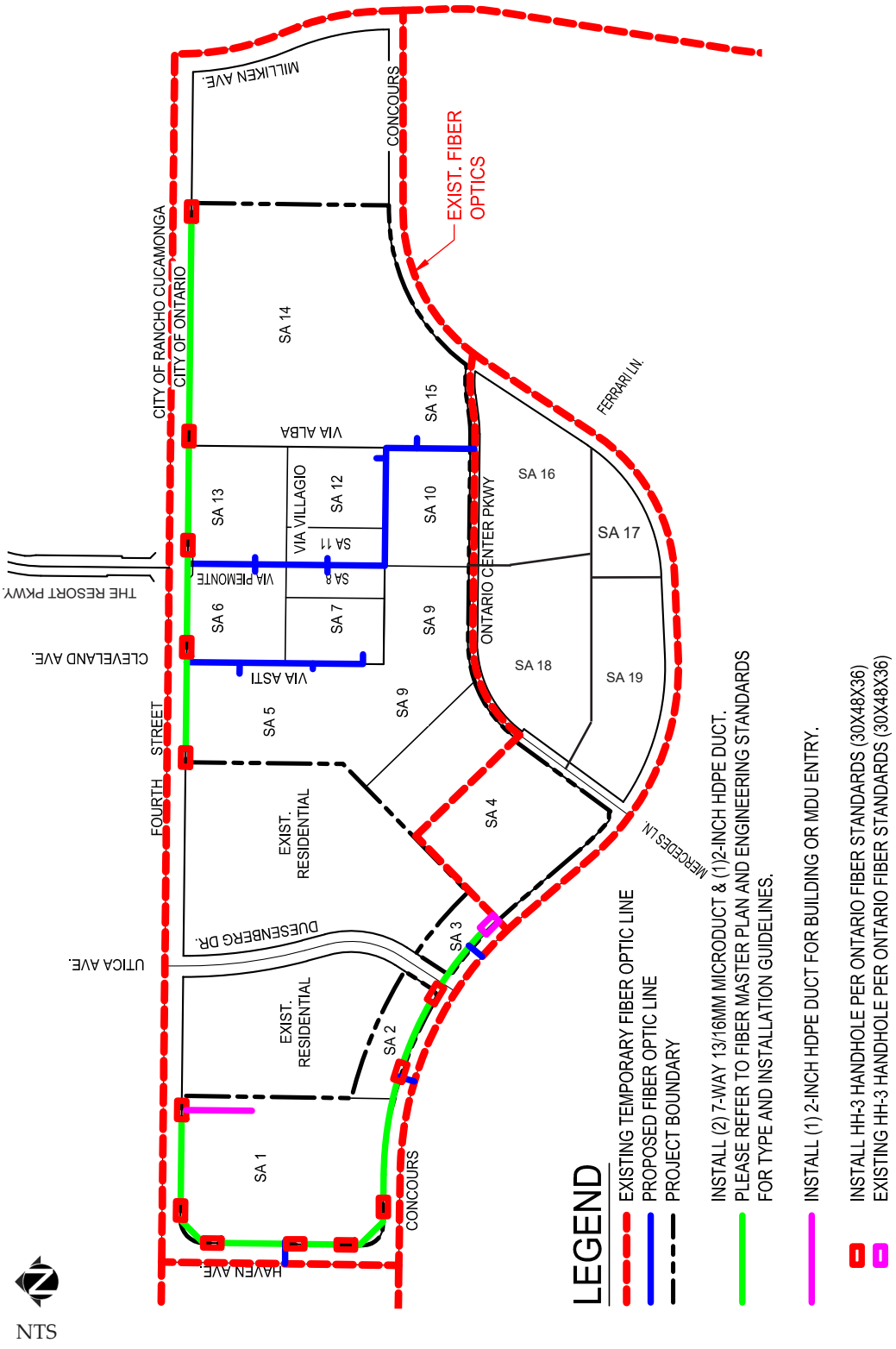


Figure 2.16: Fiber-Optics Plan

2.7 DEVELOPMENT CONSTRUCTION

~~It is anticipated that the Developer will begin preparation of residential construction plans for the Piemonte Overlay units in July 2017, with construction beginning on the sites to the west in early January 2018 after all discretionary approvals and building plans are permitted. The clubhouse and leasing facilities for those parcels, Subareas 5 and 7, on which are planned approximately 340 apartment homes, would be ready for occupancy in December 2018. First units would be ready for occupancy in January 2019; last units would be delivered for occupancy in December 2019. The parcels to the east, Subareas 12 and 15, would include approximately 232 apartment homes and would be under construction by December 2018, with the clubhouse and leasing facilities delivered for occupancy in December 2019, and the first apartment homes ready for occupancy by January 2020; last units would be available for occupancy by September 2020~~. Development of the Piemonte Overlay area is anticipated to be incremental. Subarea 12 is currently under construction for 72 multiple-family residential units. A Development Plan for Subarea 15 was approved for 110 multiple-family residential units.

Specific site grading, frontage and any off-site improvements, will occur as defined in the Tentative Map and/or Development Plan application. The final number of construction phases is unclear at this time. The number of phases and number of units in each phase may be altered from time to time, subject to City review and approval.

Where the pedestrian network is internal to a development parcel or land use, e.g. in the westerly portion of the Piemonte Overlay area, that portion of the network will be completed concurrent with development of the accommodating parcel or land use. Use and tenant-specific infrastructure connections, as well as development-specific amenities, and specific landscaping/streetscaping, will be completed concurrent with each increment of development.

3.0 DESIGN GUIDELINES AND DEVELOPMENT REGULATIONS

This Section presents the Design Guidelines and Development Regulations applicable to the Piemonte Overlay. The Design Guidelines identify physical and thematic attributes or requirements. Complementing these Design Guidelines, the Development Regulations identify permitted land uses and provide direction and requirements for development locations, configurations, orientations, and construction for each Land Use Subarea. Please refer also to the delineation of the Piemonte Overlay area and its component Land Use Subareas, presented previously on page 2-5.

All Design Guidelines and Development Regulations are comprehensively identified within this Section. In this regard, it is noted that the Design Guidelines and Development Regulations are predominantly consistent with requirements of the encompassing OCSP; however where they differ, the Piemonte Overlay supersedes the requirements of the OCSP. For ease of reference, where OCSP requirements are applicable to the Piemonte Overlay, those portions of the OCSP have been incorporated in this document.

Prior to issuance of development permits, all facilities proposed within the Piemonte Overlay will be evaluated by the City for consistency with the Piemonte Design Guidelines and Development Regulations, and applicable City regulations. Please refer also to development review and approval processes outlined in Section 4.0, Administration.

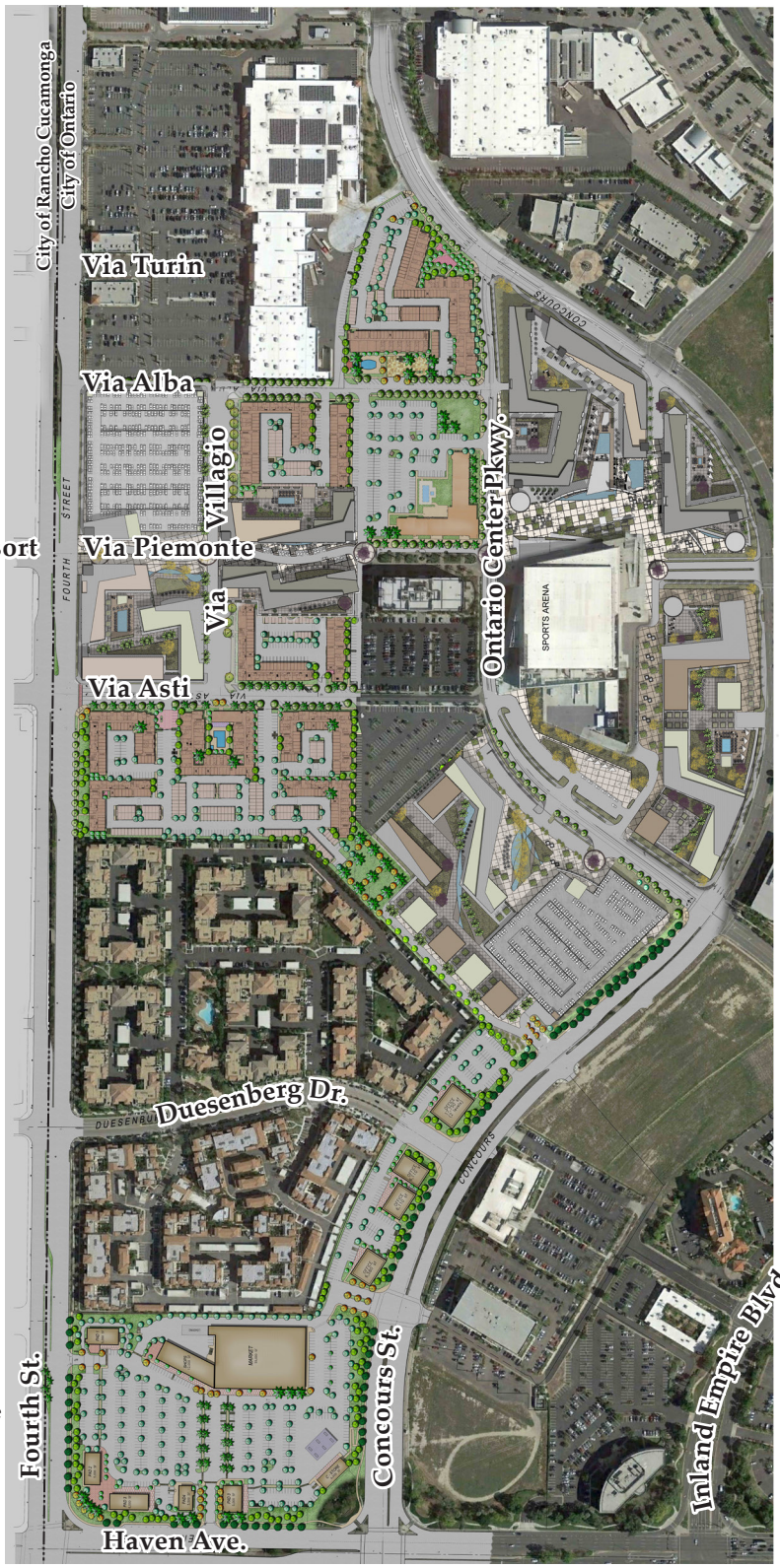
3.1 OVERVIEW

The design concept is based on the existing grid-like pattern of streets and blocks, to be developed ~~at the intersection of two private drives, Via Villagio and Via Piemonte~~ along Via Piemonte as the main corridor. ~~Oriented in an east-west alignment, Via Villagio will connect the proposed residential development, with the major retail and specialty shop sites to the east. Along the northerly side of Via Villagio, and at the four sides of the intersection with Via Piemonte, will be ground-level retail and restaurant uses, and may include offices on the second floors. Along the southerly side of Via Villagio, residential units will be constructed.~~ Via Piemonte will offer a series of retail spaces on the ground floor and residential uses above with a variety of landscape and hardscape features with a focus on pedestrian oriented areas. The building mass and placement along Via Piemonte will be used to create interesting spaces, which may include courtyard spaces, open plazas, outdoor seating and dining areas. The mixed use spaces along Via Piemonte will connect Fourth Street to an entertainment center surrounding the Arena. Parking is provided for all retail/restaurant and office uses, with separate secured parking to be provided for residents, refer to Figure 3.1: Design Concept. On street parking will be provided for guests of residents.

The north-south Via Piemonte is aligned between the ~~Citizens Business Bank~~ Arena~~,~~ and connects to Fourth Street at the northerly boundary. The intersection at Fourth Street will be widened and include a signalized intersection. The intersection of Via Villagio at Via Piemonte establishes a main activity node and focal plaza area, around which retail and restaurant uses will be constructed.

Site design and architectural themes between the residential and non-residential ~~reflect a blending of contemporary urban Southern California design and Mediterranean influences~~ reflect a contemporary urban Southern California design and include~~. These architectural and design influences act as~~ visual cues encouraging perception of a cohesive Piemonte development.

Supporting the urban setting, land use associations and configurations within the Piemonte Overlay provide for a mix of office, hotel, commercial, and high-



Note: The site design represented is conceptual in nature, and exemplifies one possible design scenario that has been developed in accordance with the design criteria of the Piemonte Overlay and may not represent ultimate building layout.

NTS

Figure 3.1: Design Concept

density residential uses, interconnected by pedestrian and vehicle corridors, with interspersed activity areas.

3.2 ALLOWED USES

Uses allowed within the Piemonte Overlay as a whole, and within each Specific Land Use are the same uses listed under the CR (Regional Commercial) zoning district in Table 5.02-1 (Land Use Matrix) of the Ontario Development Code, for permitted, conditionally permitted, administratively permitted, and prohibited, with the following exceptions:

- High Density Residential uses are permitted in Subareas 2 and 3.
- A gas station with a convenience store and a car wash is permitted in Subarea 1.
- Within the Residential Subareas, second floor individual offices above the separate, stand-alone garage buildings are allowed. The offices would be accessible via stairs, and would be rented only to existing residents of the same Subarea where the garage is situated. There would be a total of 3 to 6 offices, each about 14 feet x 14 feet. No other amenities, including bathrooms, would be included on the second floor. The offices would be rented to residents desiring an office (home occupation) separate from their apartment home. To limit traffic and parking needs, office tenants would not be allowed to entertain, consult with, or host clients or other third parties at their office.
- One office building is permitted facing 4th Street in Subarea 13; all remaining use are required to be ~~Entertainment/Retail~~ Mixed-use uses. ~~Entertainment/Retail~~ Mixed-use includes the following types of uses:
    - Multiple-family Residential
    - Food and beverage, experiential-oriented retail.
    - Craft sit-down and community table eateries.
    - Brewpubs, beer gardens, taverns, bars, clubs, wine bars distilleries.
    - Live music, or nightlife.
    - Outdoor patio dining and bar service.

- Temporary Alcohol zones permitting transport of alcoholic beverages from one establishment to another within the zone may be established with an Administrative Use Permit granted pursuant to Section 4.03.105 of the Ontario Development Code.
- Dining and entertainment destinations.
- Special street events; including but not limited to farmers' markets and holiday events.
- Loft or general offices permitted on upper floors.
- Related retail uses that support or complement the intent of entertainment commercial including small components of general and service retail, including up to one drive-through and up to three quick service retail (QSR) establishments that could be located within a single building not to exceed 10,000 square feet may be located in Subarea 13 along the eastern edge. One freestanding bank building is permitted.
- The following uses may be considered Retail Entertainment uses; however, they are also allowed in the other Commercial Land Use areas:

Primary Objectives:

- Bakery
- Banking
- Brewpub/Bars
- Candy Shop
- Cheese/Charcuterie Shop
- Coffee Shop
- Entertainment/Amusement
- Fast Food – for QSR
- Food or Beverage Specialty
- Ice Cream
- Produce/Farmers Markets
- Restaurant – Family and with Liquor

Secondary or Ancillary Objectives:

- Apparel – Activewear/Specialty (yoga, etc.)
- Art – Dealers and Supplies
- Books – Store or Library
- Boutique Fitness – such as ~~Barry's~~ Bootcamp, ~~Orange Theory~~, Spin, etc.
- Florist
- Gift Specialties (Stationary/ Office Supplies)
- Jewelry
- Museums
- Salon – Blowdry Bar/Barbershop
- Sound Recording Facilities

- Sporting Goods – Outdoor
  Sports Specialty
- Tobacco/Cigars

- Uses are permitted to operate for 24 hours a day, subject to CUP and/or ABC requirements.
- Notwithstanding anything to the contrary in this Overlay, any store, restaurant or other establishment which includes a vehicular drive-through (whether covered or not) shall be permitted in SA 1 or SA 13 (and only along the eastern edge of SA13). In the northwest corner of SA6, one building including a QSR or a bank will be permitted; in the event the bank~~,~~ includes an ATM/drive-through facility, such ATM/drive-through shall be located on the ~~eastern~~ western or southern sides of the building and shall be sufficiently shielded from adjacent residential units such that any noise, light or use is mitigated to imperceptible levels within the residential units.
- ~~Further, notwithstanding anything to the contrary in this Overlay, no building shall be situated at the southwest corner of SA 6 and no building shall be situated at the southeast corner of SA 13 without the prior written consent of the owner or owners of SA 7 and SA 12 in their sole and absolute discretion. A building shall be deemed to be situated at either corner for purposes of the preceding sentence if any outer wall of the building itself (but not retaining wall, perimeter wall, or other wall not supporting the building) is located within 30 feet of the property lines making up such corner.~~

3.3 GENERAL DEVELOPMENT STANDARDS

Unless otherwise noted herein, Table 3.1: Piemonte Development Requirements lists the requirements applicable throughout the Piemonte Overlay.

3.3.1 Setbacks

Reflecting the urban design, buildings may extend up to public access/utility easement limits and prescribed setbacks, except as otherwise provided for herein. Precise building setbacks will be a function of final site and building design plans, and will be determined through City's review processes.

3.3.2 Landscaping and Open Space

All required setbacks from streets shall be permanently landscaped in an attractive manner with sidewalks, trees, shrubs, groundcover, and other supplementary materials. Low walls are permitted in the streetscape area. Please refer also to related discussions presented in Section 3.8.2 Landscape/Streetscape Development Regulations.

Table 3.1: Piemonte Development Requirements

	Commercial & ~~Entertainment/~~ Retail Mixed-use	Office	Special Use/Hotel	Residential
Minimum Setbacks - Buildings				
Public Streets (measured from P/L)				
Fourth Street	30′	N/A	N/A	30′
Haven Avenue	15′	N/A	N/A	N/A
Duesenberg Drive	N/A	15′	N/A	N/A
Ontario Center Parkway	N/A	15′	15′	15′
Concours Street	15′	N/A	N/A	15′
Private Drives (measured from face of curb)				
Via Asti	15' ~~20'~~	15' ~~20'~~	N/A	14′
Via Piemonte+	5′ ~~20'~~	5′ ~~20'~~	5′ ~~20'~~	N/A
Via Alba	16′	N/A	20′	14′
Via Villagio+	15' ~~5'~~	N/A	N/A	15' ~~20'~~
Interior				
Property Line	0′	0′	0′	5′
Minimum Setbacks - Parking Lots				
Fourth Street (measured from P/L)	15′	N/A	N/A	15′
All other Public Streets (measured from P/L)	10′	10′	10′	10′
Private Drives (measured from face of curb)	10′	10′	10′	5′
Other Requirements				
Minimum Building Separations	16′			
Maximum Building Coverage	100% minus required building setbacks and landscaping requirements ~~75%~~			

Minimum Residential Open Space/ Dwelling Unit	Common Active*	10′ minimum dimension, 10′ from residential units; 0′ from recreation facilities ~~N/A~~	N/A	N/A	10′ minimum dimension, 10′ from residential units; 0′ from recreation facilities
	Common Passive**	5' minimum dimension ~~N/A~~	N/A	N/A	5′ minimum dimension
	Subtotal Common Open Space (Common Active & Common Passive)	150 SF ~~N/A~~	N/A	N/A	215 SF
	Private	50 SF; 6' minimum dimension ~~N/A~~	N/A	N/A	50 SF; 6′ minimum dimension
	Total Open Space	200 SF ~~N/A~~	N/A	N/A	265 SF
Residential Storage Space***		160 CF ~~N/A~~	N/A	N/A	160 CF

+ Average 15' building setback.
* Includes club, business center, fitness facilities, and roof decks.
** Include building setback areas and can be adjacent to residential units.
***Adequate lockable private storage space shall be provided within a garage or storage building, or a space directly accessible from the dwelling. Exterior closets accessed from patios or balconies may be used if screened from public view.

3.3.3 Maximum Building Height

There is no maximum building height except that all buildings shall comply with the height limits set forth in the ONT ALUCP. Furthermore, northern portions of the project area are located within the ONT ALUCP High Terrain Zone where buildings are limited to 70 feet in height. Refer to ONT ALUCP for more information regarding height criteria and policies.

3.3.4 Open Space

Common Residential Open Space will be provided as identified Table 3.1: Piemonte Development Requirements. Please refer to related discussions presented under the SPA topical heading of "Landscape/Streetscape." Active open spaces shall be provided that include a pool and spa, clubhouse, dog

park, and roof-top amenity deck and comply with the minimum requirements for common recreation amenities stipulated in Ontario Development Code Table 6.01-5, except as otherwise stated in Table 3.1: Piemonte Development Requirements of this document.

3.3.5 Parking

Livability of a community can be greatly impacted by the type and availability of parking. In urban settings, parking can be uncoupled from individual units for practical design and financial reasons, enabling an environment that promotes pedestrian access over vehicular storage. Parking may be "un-coupled" from a use where a parking demand study validates the approach, enabling development of creative development that focuses on living, mobility and access over parking storage. There is the potential for reciprocal parking between Piemonte Overlay uses and the adjacent ~~Citizens Business Bank~~ Arena.

All on-site, off-site, and on-street parking will count toward a development's required parking calculations; all on-street parking used to meet vehicle parking requirements shall be shown on plans during the development review and/or Tentative Map approval process, and may only be allocated to a single parcel or development (if comprised of multiple parcels). Residential parking spaces may be located up to 250 feet from the assigned unit.

All development is highly encouraged to leverage transit, multi-modal, and shared parking opportunities to reduce required parking demand. Parking reductions may be achieved through shared parking, or other strategies that reduce the amount of area devoted to parking and to increase the use of alternative forms of mobility, as validated by a Parking Analysis Study as provided in Section 6.03.020 Reduction in the Required Number of Parking Spaces of the Ontario Development Code.

3.3.5.1 Minimum Parking Requirements

Off-site parking and loading facilities for each of the Piemonte Overlay Land Use Subareas shall be provided pursuant to the requirements of Ontario Development Code Division 6.03 (Off-Street Parking and Loading), except that parking facilities for residential uses shall be provided as follows:

- Studio Unit – 1.0 space per unit.
- One bedroom unit – 1.0 space per unit.
- Two bedroom unit – 1.75 spaces per unit.
- Three or more bedroom unit – 2.0 spaces per unit.
- Residential guest parking for Subareas 8, 11, 16 and 17 - 0.0 space per unit.
- Residential guest parking for all other Subareas – 0.2 space per unit. Guest parking shall be accommodated within the host lot/building, in common parking areas along abutting private drives, or on adjacent private drives.

3.3.5.2 Parking Supply and Design

Parking spaces, lots, and facilities shall optimize the unique development opportunity in the Piemonte Overlay and design ways to creatively integrate parking spaces, lots and facilities into development projects through elements such as architectural design, amenities, and multi-purpose features. Parking supply and design shall comply with the development standards of Ontario Development Code Division 6.03 (Off-Street Parking and Loading) and the take into account the following:

- A parking management plan shall be submitted for Planning Director approval, prior to issuance of building permits. This plan shall justify the mix and sizing of compact and tandem spaces, shall indicate how the residential parking will be restricted to avoid overflow into the commercial parking area, and shall ensure that tandem parking spaces will be assigned to residents of the same dwellings.
- Parking spaces shall not obstruct access to building entrances, trash storage areas or loading areas.

3.3.5.3 Parking Structure Design Guidelines

Parking structures shall be designed to be compatible with the surrounding develoment and incorporate architectural features that create visual interest, distinction, and enhances the development project's identity. These guidelines are applicable to all parking structures with the Piemonte Overlay.

General:

- Below-grade parking is encouraged with garage entries placed at the rear or sides of the project whenever possible. Garage entries should be recessed as much as possible from the building facade.
- Where full below-grade parking is not feasible, consider placing some of the parking below grade (e.g., one or two floors) to reduce the size and bulk of the above-grade parking.
- Automated mechanical parking systems may be considered. Benefits such as smaller space requirements, lower lighting needs and reduced ventilation requirements will factor into the deci-sion. A Parking Management Plan will be required for approved mechanized parking systems.

Site Development shall take into account the following:

- Above-grade parking structures will be expected to be located away from major street frontages unless it can be demonstrated that other locations are not viable.
- Vehicular entries for parking structures should be placed on the street on which it will have the least negative impact.
- The layout of a parking garage should take into account and be integrated with existing traffic circulation patterns of surrounding streets and/ or internal site circulation systems. Entrances and exits should be located to minimize vehicles entering or exiting onto residential streets or busy intersections.
- Pedestrian circulation should be delineated and separated from automobile circulation. The use of landscaping, walkways and decorative hardscape is encouraged to emphasize pedestrian areas.

- Pedestrian routes from the parking structure lobby to the principal buildings served should provide an aesthetic transition compatible with the quality of the building.
- Trash enclosures should not be placed adjacent to points of pedestrian or vehicular access. Any trash enclosure located within the footprint of the parking structure should be enclosed on four sides.
- Locate and design vehicle entries so that they do not dominate the streetscape. Recess the garage vehicular entry portion of the facade or extend portions of the structure over the garage entry to help subordinate its impact.
- Subordinate the garage entrance to the pedestrian entrance in terms of size, prominence on the streetscape, location and design emphasis.
- Whenever possible, avoid vehicular entries along major pedestrian routes.
- Provide sufficient vehicle queuing space on-site to avoid backups onto public thoroughfares. Pay particular attention to stacking and queuing space if there are entry gates or other impediments to smooth traffic flow.
- Locate vehicular parking structure entries on a clear path and sequence from a building or drop off area, if one exists.
- Minimize the visibility of parking structures from the public realm. Avoid corner locations whenever possible.
- Parking structures shall meet the minimum setback and landscape standards of Section 3.3 General Development Standards, of this document.
- All appurtenances (i.e., transformers, ventilation shafts, etc.) should be located outside of any required setback and should be screened from public view.

Landscaping:

- The edges of any garage structure and vents into the garage visible above grade should be screened with evergreen plant materials. Earth berms and

other techniques to tie the garage structure into the surrounding grade level should be considered.

- Architectural treatments, artwork, lattices and other design features are encouraged for use on parking structures where blank walls occur. The design features should cover a minimum of 60% of the blank wall.
- If lattice is used, the material should be decorative and durable to enable vines to attach themselves for support.
- Water conservation should be an important consideration when selecting a plant palette. Plant materials should consistent with the landscape requirements of Section 2.5 Landscape Concept, of this document. An automatic irrigation system should be designed to provide deep watering for trees, shrubs and vines along with moisture sen¬sors to monitor and minimize water usage.

Parking Structure(s) Layout:

- Vehicle circulation within the parking structure should be continuous and uninterrupted at all levels. Dead-end parking aisles are not an ac¬ceptable solution to parking circulation unless all parking is designated as Reserved Parking. Where dead end aisles are unavoidable (e.g., for guest parking within a sloped ramp garage) provisions should be made for dedicated No Parking areas at the end of the aisle for easy turn around.
- Interior pedestrian paths should be visible to drivers and delineated to differentiate them from vehicle travel aisles.
- Maximum vehicle ramp grade the California Building Code requirements.
- Elevator and stair shafts, mechanical rooms and similar visual disruptions should be located to minimize the blockage of views between drivers and pedestrians.
- Pedestrian access should be designed to safely avoid pedestrian entry and exit of the garage via vehicular ramps and provide a minimum four (4)-foot wide pedestrian sidewalk along the side of every vehicular access driveway.

- Internal garage layouts should make provisions for car sharing priority spaces and electrical charg¬ing stations.
- Stall width and depth and aisle width should gen¬erally be in accordance with the City of Ontario Development Code Off-Street Parking Requirements (Chapter 6.0, Division 6.03).
- Parking structures should provide a minimum floor to ceiling height of eight (8) feet exclusive of structural elements and appurtenances. Ad¬ditional height will be required per California Building Code for disabled access.
- Tandem parking and mechanical lifts may be considered only when consistent with parking requirements of Section 3.3.5 Parking of this document.
- Avoid garage vehicular exit locations where the glare of headlights on departing cars would have adverse impact on uses across the street.

Architectural Designs and Details:

- The design of all parking structures should be more than a rectangular utilitarian box composed of concrete or steel beams and columns. Variation in forms and detail along with high quality facing materials are expected where viewable by project users and the general public.
- Special attention should be given to emphasizing the pedestrian entries of parking garages with special materials, landscaping, paving, architectural details and public art.
- Parking structures with frontages on public streets will receive additional design review scrutiny and will be expected to include high quality materials and finishes on those facades. The incorporation of brick, stone and precast concrete are pre¬ferred choices. The integration of metal panels or metal mesh screens may be considered.
- Exterior elevations should incorporate design components and materials utilized and compat¬ible with the primary building(s) within the Piemonte area.

Lighting:

- Parking garages should utilize full spectrum light¬ing to increase safety and comfort. The placement of fixtures should be designed to minimize light pollution from the garage.
- Utilize shielded fixtures to minimize light pollu¬tion and glare from both within and outside the garage.
- Design lighting levels for the unique circum¬stances and location of the garage. Higher levels are recommended for remote areas subject to security considerations (e.g., stairways, elevators and pedestrian access points.
- Interior walls and ceilings should be painted a light color to improve illumination.
- All mechanical equipment and piping should be painted to match the interior of the structure.

Security:

- For public safety, non-gated secured parking structures should provide natural surveillance by providing high visibility into the structure from adjacent activity and public areas.
- Locate and design elevators and stairways to allow internal and external visibility.

3.3.6 Structured Wiring

Residential (single-family and multi-family), commercial and industrial developments shall adhere to the City's Structured Wiring ordinance. An integrated structured wiring system (low-voltage wiring) provides infrastructure for today's technology applications and the framework for the future technology advances. Requirements and benefits of a structured wiring system include:

- Allows for uniform receipt and distribution of technology services.
- Ensures scalability of wiring for future technology advances.
- Provides consistent and identical wiring protocols throughout developments.

- Enables the property infrastructure to interface efficiently with broadband networks for highest bandwidth capacity.
- Adoption of these standards will minimize retrofitting required to ensure new property owners are capable of the latest technologies and services.

3.4 COMMERCIAL AND ~~ENTERTAINMENT/RETAIL~~ MIXED-USE DESIGN GUIDELINES

These two Land Use areas continue certain defining architectural elements evidenced elsewhere within the Piemonte Overlay e.g., archways, pitched roofs, articulated cornices, and accent elements. These elements will be incorporated and interpreted within the Commercial and Entertainment/Retail Land Uses, thereby establishing thematic design tie-ins with other Piemonte land uses, while providing flexibility to accommodate established corporate architectural features, building elevations, and footprints of nationally-recognized major tenants. These Land Uses will also incorporate other unifying thematic features and elements of the Piemonte Overlay including but not limited to: landscaping, streetscape, lighting, and signs.

Commercial, ~~Entertainment/Retail~~ Mixed-use, and Office building form and massing play a critical role in framing urban environments. Buildings should incorporate design and construction methods that add a human scale to the building massing and three dimensional detailing that casts shadows and creates visual interest on the facade.

- Buildings shall be oriented toward the street, where feasible, and designed to promote a pedestrian-friendly environment.
- Buildings may also be oriented away from the street, to frame interior courts, pedestrian walks and parking areas.
- Shadow patterns of adjacent buildings should be studied during the conceptual design phase so as to limit obstructed solar access.
- Blank walls facing Haven Avenue, Fourth Street, Concours Street and Ontario Center Parkway shall be avoided.

- Adjacent to the Via Villagio and Via Piemonte, building facades should consider a pedestrian orientation. This includes variation in massing, roof forms, ~~and~~ wall planes, and surface articulation. It is expected that the highest level of articulation will occur at front entries.
- Primary building entrances shall be clearly defined, visible and inviting. Building entrances shall incorporate one or more of the following:
    - Change in wall plane including recessed doors, archways, or enhanced trim around openings.
    - A projecting element above the entrance, such as an awning, shade device or architectural design feature.
- Loading and delivery areas should be clearly marked with directional signage and located to the side or rear of the structure.
    - Loading docks and service bays shall be a minimum of 20~~'~~ feet from any public street.
    - Service and delivery areas should be placed away from Haven Avenue, Fourth Street, Concours Street and Ontario Center Parkway.
    - Loading or unloading of trucks is prohibited between 10 PM and 7 AM unless it can be demonstrated that such activities would not exceed the noise limits of the Development Code.
- Trash enclosures should be designed using similar materials and colors as the surrounding buildings within the development. They shall be sited where least visible to the public and shall be roofed to prevent exposure to wind and rainfall. Where feasible, trash enclosures should be combined among parcels and tenants and pedestrian access should be provided.
- Work areas, equipment, and outdoor storage shall be screened from public view or be designed to complement the architecture.
- Buildings and on-site circulation systems shall be coordinated to minimize pedestrian and vehicle conflicts.
- Fire Department sprinkler assemblies shall be designed into the building or site plan, such that the assemblies are not in the public right-of-way or obstruct vehicle or pedestrian circulation.

3.4.1 Architectural Guidelines

The architectural styles for the Commercial, ~~Entertainment/Retail~~ Mixed-use and Office areas include architectural styles complementary to the existing buildings within the OCSP and the new residential buildings. These architectural styles include:

- Contemporary.
- Main Street.
- Mediterranean.
- Agrarian Industrial.

Additional styles may be proposed; however, they must follow the same principles and attention to detail as the specific vernaculars listed here.

3.4.2 Contemporary Style Guidelines

The Contemporary Style guidelines promote cutting edge architectural design appropriate to residential uses by using intersecting linear planes, flat roofs, cubic forms, wide overhangs, stacked stones, and the integration of landscape with the buildings. Exterior building materials may include stucco, concrete

horizontal or vertical siding, curtain walls, brick or stone veneers, glazing, architectural panels, and metal accents.

Mixed-use projects present a prime opportunity to create a distinctive development that would cater to high levels of pedestrian activity, entertainment venues, multi-family units, dining, passive and active recreation, botique retail, etc. Utilizing contemporary style architecture would allow design creativity in how the mixed-use spaces could be integrated together, such as placing retail on the ground floor retail and groupings of residential buildings with irregular angles and orientation on the upper floors. Color variations on building exteriors could be implemented to complement layers in building facades and architectural features to create visual interest and appropriate scale.

Table 3.2: Commercial Contemporary Style Guidelines

Element	Standards*	Permitted Enhancements
Roof Components	• Flat roof with or without ledges • Simple unadorned OR detailed parapet walls	• Accent roof features as appropriate • Signature towers OR vertical projections can extend above roof line • Cantilevered projections • Curved or arched roof
Architectural Components	• Utilitarian and "edgy" • Simple, clean forms	• Projections OR wall planes articulate facade
Wall Materials	• Stucco, metal, concrete OR cementitious siding • Contrasting wall materials and textures	• Asymmetrical facade • Horizontal OR vertical elements • Brick OR stone veneer • Metal accents • Concrete • Sunshades • Glass • Architectural panels
Trim & Details	• Color blocking as appropriate	• Metal awnings OR overhangs
Windows	• Aluminum store front OR curtain wall • Variety of window patterns	• Larger window modules • Long ribbons of windows sometimes wrapping around corners

* All of the standard characteristics shall be incorporated into the design of any building using this architectural style. Variations shall be subject to review and approval by the City.

3.4.3 Main Street Style

In the 19th century, typical Main Street architecture was built as a single building or in groups of buildings, with party walls. Brick store fronts could extend up to a block in length. These buildings varied in height from one to three or more stories. In urban settings, this style was often occupied by a business on the ground floor and offices, apartments or owner's residence above. Typically the building had a tripartite organization of base, middle and top. Entrances were located on- or off-center. The lower level was dominated by large windows framed by the building's corners and the panel of brick between floors. The upper levels sometimes included single or double bay windows, brick friezes, panels and decorative cornices. Other options include the use of corniced parapets, continuous sills or decorative lintels and string or belt courses dividing the wall laterally. The cornice functioned as a cap under which other elements were arranged and balanced.

Table 3.3: Main Street Style Guidelines

Elements	Standards*	Permitted Enhancements
Architectural Components	• Simple box, multi-story 'storefront' form with accent elements at entries • Recessed doorways, tower elements OR applied architectural accents at entries • Tripartite organization of base middle and top through use of horizontal belt course, change in material or massing offset	• Multiple building heights created by varied parapets, towers, vertical projections at corners and cornice design • Balconies • Colonnade • Raised stoop • Decorative pilasters • Horizontal modulation of about 25'
Roof Components	• Flat roof with parapet • Roof pitches not applicable • Accent roof forms OR projecting awnings encouraged	• Decorative cornice detail that unified the facade OR provides variety
Wall Materials	• Stucco with accent materials (siding, brick veneer, metal, scored stucco in accent color, etc.) • Neutral and accented colors appropriate to the materials used	
Trim & Details	• Awning OR projecting feature accenting overall design	• Features borrowed from traditional American Main Streets, appropriate to scale and massing of building
Windows	• Vertical, may be single OR multi-paned on upper stories, often grouped • Large single-paned OR vertical multi-paned on ground floor	• Projecting OR angled awnings • Pedimented windows at ground level • Transoms • Storefronts may have bulkheads

* All of the standard characteristics shall be incorporated into the design of any building using this architectural style. Variations shall be subject to review and approval by the City.

3.4.4 Mediterranean Style Guidelines

The Mediterranean style is a good example of a transplanted style developed in a climate zone similar to the Southern California climate. This old-world prototype has been refined, adapted and embellished into a truly eclectic classic style. The shallow pitched hipped roof, often with decorative brackets, identifies this style.

Table 3.4: Mediterranean Style Guidelines

Elements	Standards*	Permitted Enhancements
Architectural Components	• Simple box, multi-story 'storefront' form with accent elements at entries • Precast surrounds	• Medallions • Niches • Decorative Vents
Roof Components	• Flat roof with parapets or mansards and cornice elements OR hip ancillary roofs • "S" concrete tile if applicable	• Closed/shaped eave with corbels at accent elements
Wall Materials	• Stucco finish	• Brick OR stone accents
Trim & Details	• Awning OR projecting feature accenting overall design such as arcades, towers and loggias	• Horizontal belt course • Cast stone surrounds, precast trim • Base trim • Tile accents • Wrought iron grilles
Windows	• Arched, round top, OR pedimented accent windows at selected locations	• Paneled OR louvered shutters

* All of the standard characteristics shall be incorporated into the design of any building using this architectural style. Variations shall be subject to review and approval by the City.

3.4.5 Agrarian Industrial Style Guidelines

The Agrarian Industrial style has grown out of the early colonial development in the 1700s. As the American Frontier moved westward, the Agrarian style evolved according to availability of materials and technological advancements. Modern day architects have adapted this style to have an industrial twist with standing seam metal roofs and asymmetry. Roof ornamentation is a characteristic detail consisting of cupolas or ~~weather vanes~~weathervanes.

Table 3.5: Agrarian Industrial Style Guidelines

Elements	Standards*	Permitted Enhancements
Architectural Components	• Simple box, multi-story 'storefront' form with accent elements at entries	• Protruding wood headers, decorative, exposed rafter tails • Wood posts with brackets
Roof Components	• Flat roof with parapets OR mansards OR gable OR shed roofs	• Wrought iron details, • Standing seam metal roofs • Couplas
Wall Materials	• Stucco finish	• Brick OR stone accents • Siding
Trim & Details	• Siding accents	• Siding accents
Windows		• Dormer window accents • Shutters • Divided lites

* All of the standard characteristics shall be incorporated into the design of any building using this architectural style. Variations shall be subject to review and approval by the City.

3.5 OFFICE DESIGN GUIDELINES

Architectural concepts developed for free-standing office buildings will reflect modern interpretations of classic design elements. For example, office buildings will evidence classical orders of architecture including pilasters, entablatures, and pedestals. Building features and elements are typically more massive and grand at lower levels, transitioning to smaller expressions at the upper levels, with attention to details such as cornices, multi-mullioned windows, and articulated moldings. The overall building organization and visual presentation may be symmetrical with axial entryways or non-symmetrical.

Figure 3.2: Conceptual "Class "A" Office Building Elevation

In general, office uses are recognized as autonomous occupancies and will not necessarily reflect architectural features or design elements evidenced elsewhere within the Piemonte Overlay. However, office land uses will be thematically tied to other land uses by common site features such as landscaping, lighting, streetscaping, and sign elements.

Site features within the Office Land Use area will evidence materials and material contrasts employed elsewhere in the Overlay. Walkways, plazas, and other surface treatments evidencing flora recalling the Piemonte region could provide additional visual cues tying office land uses to other areas of the Overlay. Landscaping within the Office Land Use area may continue Italian-influenced planting schemes and landscape arrangements employed throughout the Piemonte site. For example, at the pedestrian level, plantings in planting beds, raised containers, and pots may be provided. Light fixtures on the building faces, walkway light bollards, and street lights, as well as street furniture selections within office properties will heighten this theme.

It is also noted that prominent signs proposed along Ontario Center Parkway and Concours Street will identify and announce the Piemonte site, and by visual inference, will include all adjacent properties northerly of these roadways, including proposed office land uses. Signs for individual office uses may also employ signature design elements common to other areas and land uses within the Piemonte site.

The more massive Class "A" office building concept to be implemented is presented in Figure 3.2: Conceptual "Class "A" Office Building Elevation. These major office structures will be located adjacent to Ontario Center Parkway. Other, one-and-two-story office buildings will be located to the west and east, proximate to Concours Street. At a reduced scale, one-and-two story offices will interpret the Class "A" office design elements described above.

Figure 3.3: Photographs of Existing Office Buildings in the OCSP

3.6 SPECIAL USE/HOTEL DESIGN GUIDELINES

One hotel is allowed within the Piemonte Overlay located at the northeast corner of Ontario Center Parkway and Via Piemonte, immediately north of the Arena in Subarea 10. The hotel ~~will be~~ is constructed as an autonomous free-standing occupancy. The hotel architecture ~~will~~ incorporates modern designs and materials selections similar to those employed for office uses. The hotel is thematically tied to the other land uses by such site features as common landscaping treatments, streetscape elements, and signage.

Site features within the Special Use/Hotel Land Use area include materials and material contrasts employed elsewhere in the Overlay. Landscaping within the Special Use/~~hotel~~Hotel Land Use area continues southern Italian-influenced planting schemes and arrangements. For example, at the pedestrian level, generous plantings in both planting beds and raised containers and pots will include aromatics such as rosemary.

Additionally, at key locations and entrances, arbors and monument statements identify the hotel property as part of the Piemonte at Ontario Center. Walkways, plazas, and other surface treatments evidencing the themes of grapes and flora recalling Italy's Piemonte region provide additional visual cues which tie hotel land use to other areas.

It is also noted that prominent signs proposed along Ontario Center Parkway and Concours Street identify and announce the Piemonte Overlay, and by visual inference, will include the adjacent hotel property northerly of these roadways. Signs for hotel use may also employ signature design elements common to other areas and land uses within the Piemonte Overlay.

3.7 RESIDENTIAL GUIDELINES

3.7.1 Site Planning Criteria

The following site planning criteria should be treated as design guidelines for parcel site planning and community placemaking.

3.7.1.1. Planning for Active Spaces

- Building massing, design, and setbacks shall reinforce a pedestrian-scale for the street scene without generating unusable pockets or dead spaces.
- Buildings are encouraged to be built to the minimum setback line to create a continuous street edge.
- Buildings should be oriented toward streets, pedestrian pathways and/or active spaces.
- Where building design undulates, spaces along the pedestrian realm should be large enough to foster visual interest, but not too deep to disrupt the continuity of the street.
- Coordination between parcels is encouraged for building scale, massing, architecture, and pedestrian amenities.
- Open spaces and community facilities should be visible from adjacent dwellings to help promote site safety.

3.7.1.2 Privacy

Privacy is an important consideration in residential and mixed use site planning. Innovative site planning and design techniques should be used to preserve privacy while promoting social opportunities. In particular, windows of units should be located to minimize visual intrusion on neighbors' bedroom windows. Thoughtful and innovative techniques, including landscaping, should be incorporated where appropriate to provide privacy to residents.

3.7.1.3 Drive Aisle Treatments

Drive aisle areas have evolved from purely functional space to a space that residents experience daily, and may include front doors and garage access. Design of these areas shall address the functional and aesthetic features to create a pleasant experience for residents. At least three of the following shall be implemented along the parking areas:

- Massing offsets (layered wall planes, recesses or cantilevers) of at least 6 inches.
- Window trim, colors, and selected details from the front elevation.
- Pedestrian gates.
- Enhanced garage door patterns or finishes.
- Variety of garage doors using color or design elements.

Fire Department connections, sprinkler post indicator valves, fire hydrants, and standpipes will be installed and screened as required by NFPA 13, 24, and City of Ontario standards.

3.7.1.4 Trash Enclosures

- Refuse and recyclable materials storage areas shall be enclosed consistent with paragraph 6.01.010.F.4 Refuse Storage Areas of the Ontario Development Code, except that trash enclosures may be attached to structures.
- All refuse/recyclable materials areas, mechanical devices, and utility area screening shall be finished using materials, vocabulary, and details compatible with the surrounding architecture.
- Gates shall be view-obstructing and constructed of decorative tubular steel, painted to match or complement the adjacent buildings.
- All refuse/recyclable material enclosures shall be constructed with a solid roof to prevent exposure to wind and rainfall.

3.7.2 Residential Building Form and Massing

Building form and massing play a critical role in framing urban environments. Buildings should incorporate design and construction methods that add a human scale to the building massing and three dimensional detailing that casts shadows and creates visual interest on the facade.

- The highest level of articulation shall occur on the elevations facing the street or drive.
- All elevations shall include wall plane offsets to add visual interest consistent with the following:
    - Massing offsets (layered wall planes, recesses or cantilevers) of at least 6 inches.
    - Window trim, colors, and selected details from the front elevation.
- The overall composition of massing, scale, material, color, and design detail is more important than the level of articulation.
- Prominent vertical or horizontal building features may be used to accentuate key elements and provide variation in wall planes.
- Projections, overhangs, and recesses should be used to enhance shadow, articulation, and scale of primary edges.
- Architectural elements that create shadow, relief, and sheltered pedestrian areas, such as balconies, trellises, recesses, overhangs, awnings, stoops, and porches are encouraged.

3.7.2.1 Roofs

Roof forms contribute to the overall building design and have a large impact on the mass, scale, and design of the community where visible from the street level where visible.

- Roof design shall incorporate variation in roof forms such as an aesthetic combination of changes in plane, form, ridgelines, and/or heights appropriate to the architectural style.
- Roof forms, material, and fascia elements shall be consistent with the overall

design vocabulary of the building and should appear authentic.

- Variety in pitch (sculpted).
- Roof vents should be painted to match or contrast the color of the roof material.
- Fascia design should be complementary to the architectural vernacular.
- Skylights, if used, shall be designed as an integral part of the roof; "bubble" skylights are not permitted. Skylight framing materials should be bronze anodized or colored to match the adjacent roof materials.

3.7.2.2 Parapets

If parapets are used, one or more of the following detail treatments should be included:

- Pre-cast or simulated pre-cast elements.
- Contiguous banding or projecting cornice.
- Dentils.
- Caps.
- Corner details.

3.7.2.3 Materials and Detailing

Architectural detailing of building facades is a key feature of quality design. Special attention is required in the treatment of entries (doors, vestibules, porches, courtyards) using enhanced trim or details to emphasize these as primary focal points. Articulated or unique window treatments further enhance wall surfaces, can provide shade and wind protection, and contribute to the character of the neighborhood.

- All building elements, such as materials and color, detail elements (porches, balconies, courtyards, awnings, surface treatments, and materials), and functional elements (garage door lights, exterior stairs, guardrails, gutters, downspouts, screen walls, electrical enclosures, or similar features) should be integral to the buildings design, consistent with the architectural vernacular of the building, and complement the surrounding neighborhood.

- Construct buildings using quality materials to create a community of character and long-term value. A variety of materials and textures shall be incorporated within the design theme of the community.
- Durable, quality materials designed to appear as an integral part of the design shall be used.
- Material changes should occur at intersecting planes, preferably at inside corners of walls or other meaningful locations where architecture elements intersect.
- Garage doors should have varied door patterns, colors or finishes.

3.7.2.4 Functional Elements

- All roof-mounted equipment shall be screened from ground level view through the use of parapets or other effective architectural elements.
- Ground mounted equipment and meters shall be visually concealed and designed to not detract from the architecture of a building.
    - Air conditioning units shall be screened by walls or landscaping a minimum of 6 inches taller than the equipment and located away from project amenities, except when located in courts and lanes with limited or no screening.
    - Where possible, group equipment.
    - Electrical meters should be ganged and located behind doors.
    - Natural gas meters should be grouped.
- Mechanical devices such as exhaust fans, vents, pipes, gutters, and downspouts shall be painted to match adjacent surface, or colored to match accent colors.

3.7.2.5 Color Palette and Application

The color and materials palette should be selected with the design objectives of avoiding monotony, provide depth and interest with a variety of colorful schemes, and promoting visual diversity.

- Colors should complement the architectural style and overall color scheme

of the building.

- Selected finish materials should be appropriate in their use and application, be durable, and of high quality.
- Color blocking, or the use of multiple colors, should be used only where appropriate to the architectural style.
    - Changes should occur at logical termination points, generally at inside corners.
    - Field color used at the base of the building should continue down to the foundation or finished grade.
- Accent colors should be used on architectural features and ornamentation elements.
- Grout colors should harmonize and blend with the colors found in the stone rather than contrast with it.
- All exposed woodwork, beams, posts, railings, etc. should be colored to match the fascia.
- Trim colors on window trim and recesses should be complementary but discernible from the building color.

3.7.3 Contemporary Architectural Style

All residential buildings shall have a fresh and Contemporary style suited to the more urban setting within the OCSP area. Based heavily on the modern remodeling of warehouse spaces to contemporary and "hip" loft or flat spaces, this style is suited for dense residential buildings in neighborhoods that blend business, industry, and living in a single environment.

The Contemporary style includes simple and clean forms detailed with materials, projections and windows for indoor/outdoor living. The style emphasizes interlocking volumes with a collage of colors and materials. Architectural elements such as awnings, balconies, and trellises can be appended to the volumes, allowing indoor/outdoor spaces to be created. Vertical and horizontal elements provide interest to the residential structures. The roofs may be flat with parapets, sloped, or a combination of both. Windows should be placed in areas to overlook common areas and increase surveillance for these areas. Refer to Table 3.6: Residential Contemporary Style Guidelines.

Contemporary Elements:

- Plan form is more cubic, expressed in bold, simplified forms.
- Roofs are typically shielded by parapets and may have accent roof features such as curves, gables, hips or sheds.
- Wall materials typically consist of stucco, metal, brick, stone and/or siding; it is recommended that design be comprised of at least two different surface materials.
- Projections to articulate facades are typical and may include building wall planes, awnings, overhangs, canopies, window trim or accent roof forms.
- Braces in conjunction with projections are typical.
- Windows are typically a primary feature of the elevation; design sometimes includes groupings, unique size or shape or oversized and symmetrical mullions.
- Handrails and guardrails enhance the elevations.
- Color blocking is typical.

Table 3.6: Residential Contemporary Style Guidelines

Element	Standards*	Permitted Enhancements
Roof Components	• Flat roof with or without ledges OR shallow pitched roofs with broad low facing gables and hips • Simple unadorned OR detailed parapet walls • Concrete flat tiles • Wide eave overhangs OR no overhangs	• Accent roof features as appropriate • Signature towers OR vertical projections can extend above roof line • Varied roof heights • Shed roof • Cantilevered projections • Roof decks
Architectural Components	• Utilitarian and "edgy" • Simple, clean forms	• Projections OR wall planes articulate facade
Wall Materials	• Stucco, metal OR cementitious siding • Contrasting wall materials and textures	• Projections OR horizontal banding between floors • Asymmetrical facade • Horizontal OR vertical elements • Brick OR stone veneer • Metal accents • Concrete • Sunshades • Glass
Trim & Details	• Color blocking as appropriate	• Metal awnings OR overhangs • Metal, cable, glass OR panel balcony railings
Windows	• Variety of window patterns • Minimal trim	• Simple industrial dark window trim • Larger window modules • Long ribbons of windows sometimes wrapping around corners • Nontraditional window shapes and placements • Glass blocks • Round windows • Bay windows
Entries	• Understated	

* All of the standard characteristics shall be incorporated into the design of any building using this architectural style. Variations shall be subject to review and approval by the City.

3.8 LANDSCAPE

3.8.1 Landscape/Streetscape Design Guidelines

The Piemonte Overlay landscape concept merges the vineyard influences of the Piemonte region of northern Italy with contemporary low~~-water~~ water-use plant material. ~~Skyline palms act as "way-finding" features and provide appropriate scale to this vertical urban environment. Pedestrian-scaled canopy shade trees, as well as bold colors and foliage textures of the understory plant material, enhance the streetscape walking experience. This understory~~ Landscape patterns and street furniture create a harmonious, functional environment. Tall trees, such as towering palms, eucalyptus, and other drought tolerant trees, act as "way-finding" features and provide appropriate scale to the vertical urban environment. Broad, spreading canopy trees enhance and add variety to the streetscape walking experience will be rich in varieties of ornamental grass, succulents, and flower groundcovers creating this semi-arid and environmentally sustainable landscape environment.

Plant materials will be derived from an arid environmentally sustainable palette, including Eucalyptus, Olives, Oaks, and Palms. Areas of low water-~~using~~use shrubs, groundcovers and ornamental grass shall also be employed where appropriate. Other major components of the Piemonte landscape/streetscape concept include pedestrian paths and sidewalks linking the Piemonte Overlay with surrounding areas. Refer to Figure 3.4: Characteristic Landscape Features.

Lighting will be employed throughout to highlight pedestrian areas, reinforce architectural character, and enhance safety and security. Thematic lights and light standards along major streets and within parking areas will act as defining and cohesive design elements, identifying properties as components of the Piemonte Overlay.

Other characteristic and defining design elements of the landscape/streetscape concept will include distinctive monumented entries, pedestrian amenities, and

Figure 3.4: Characteristic Landscape Features

detailed accents such as potted plants. Enhanced paving and embossed/engraved surface treatments will be provided at key locations reinforcing a sense of place.

Characteristic examples of hardscape features to be provided within the Piemonte site are illustrated in Figure 3.5: Characteristic Streetscape Features. Figure 3.6: Landscape Section Location Diagram identifies locations which provide illustrative examples of landscape/hardscape features. Subsequently, Figures 3-8 through 3-10 illustrate integration and application of these features within the Piemonte Overlay.

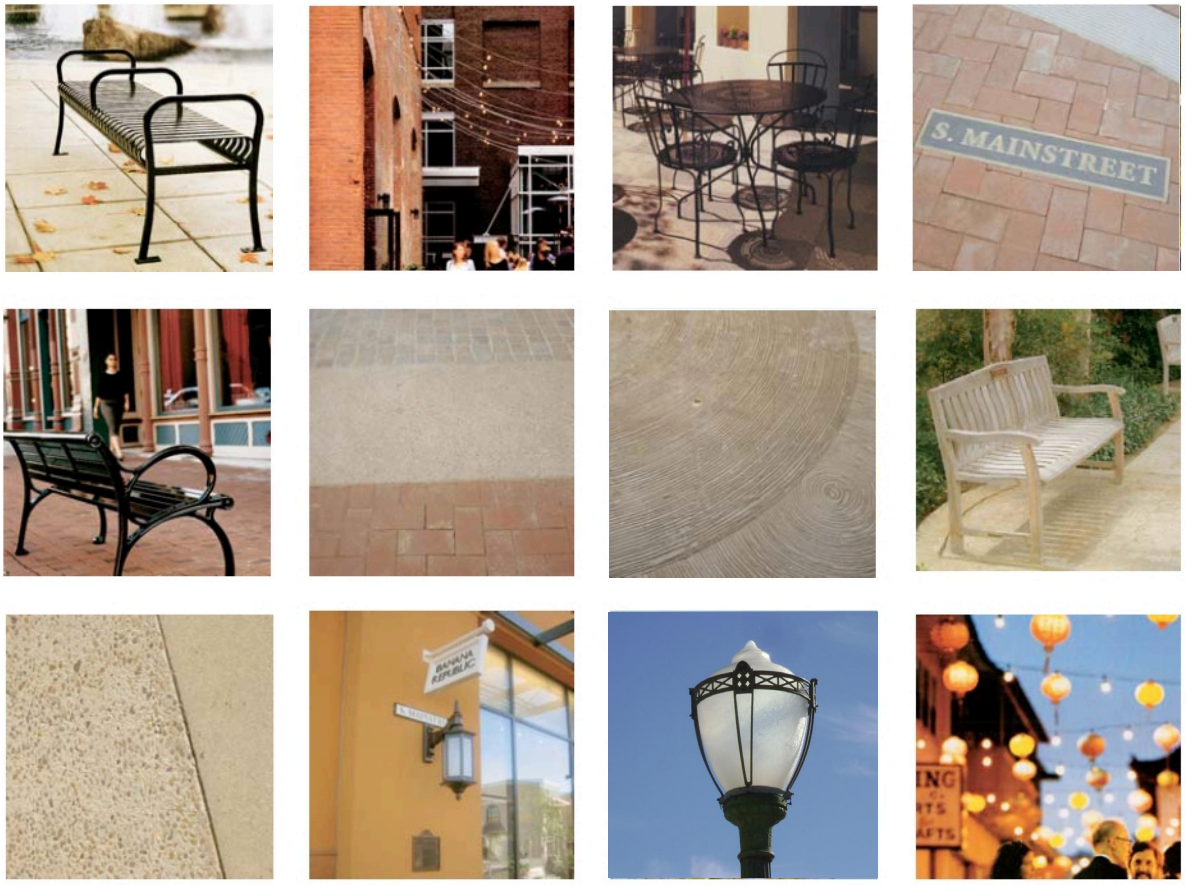


Figure 3.5: Characteristic Streetscape Features

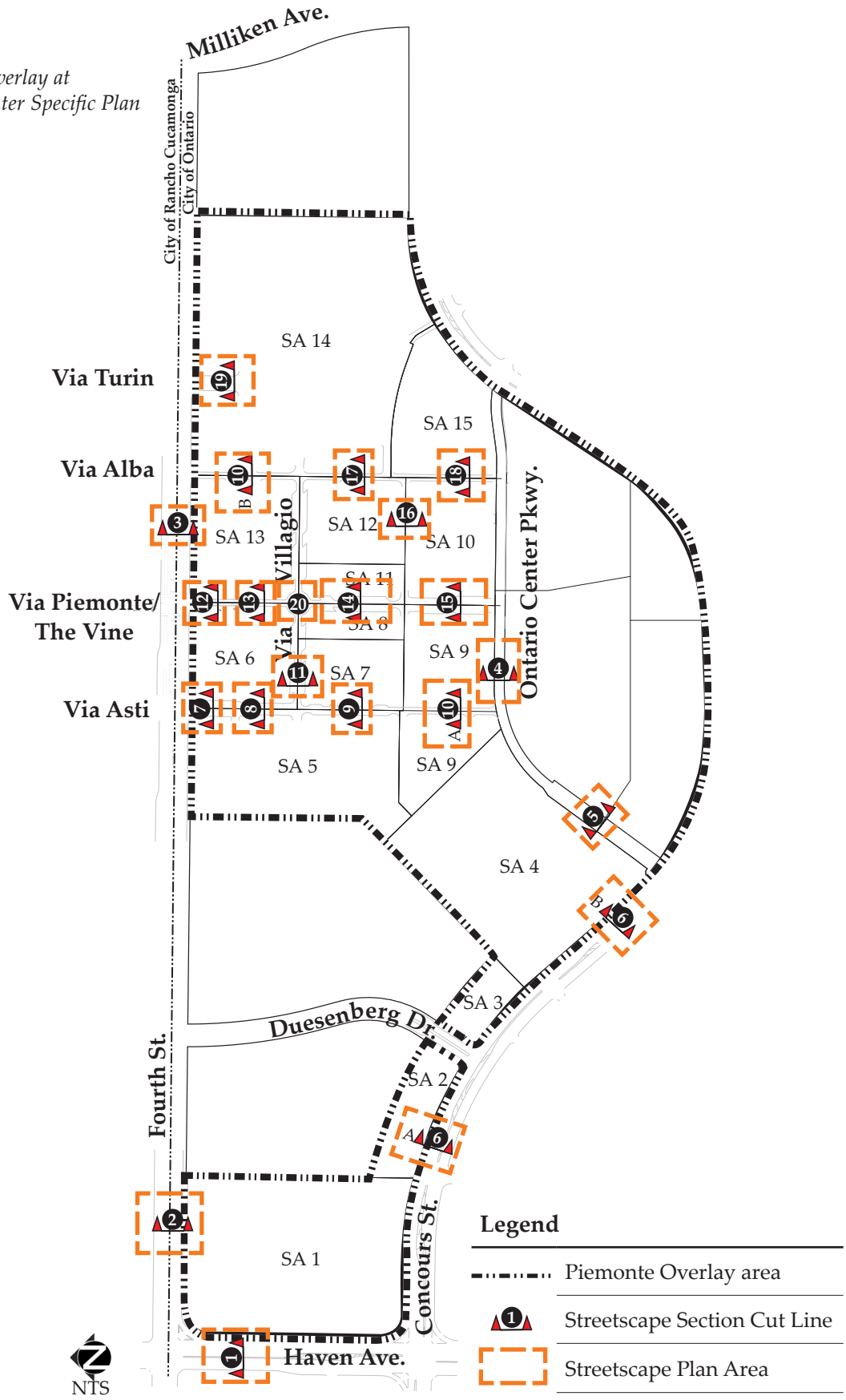
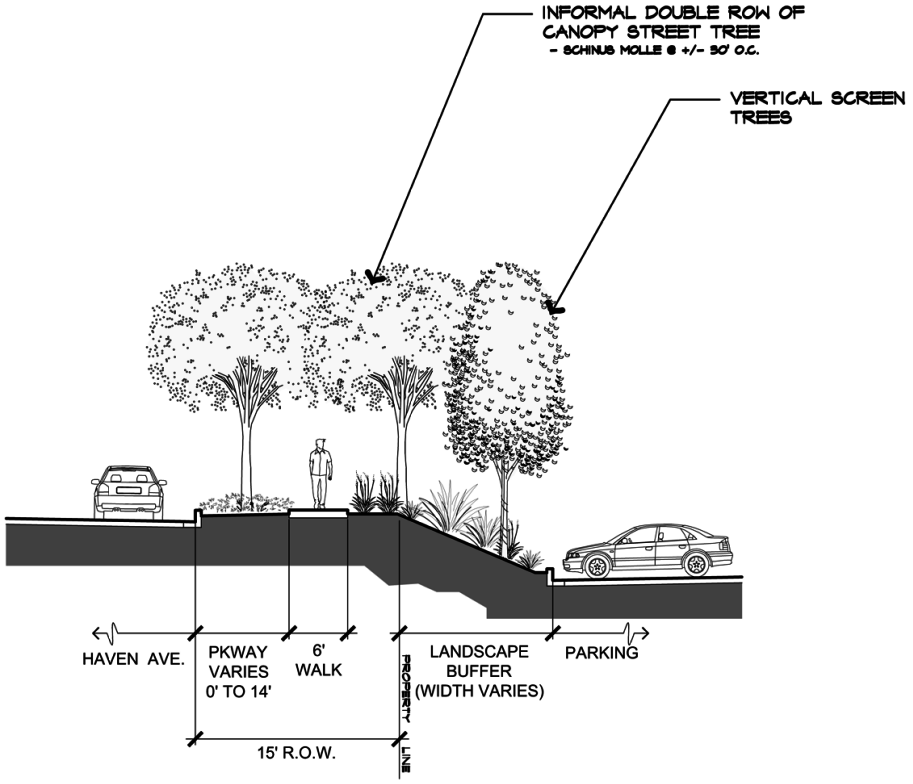
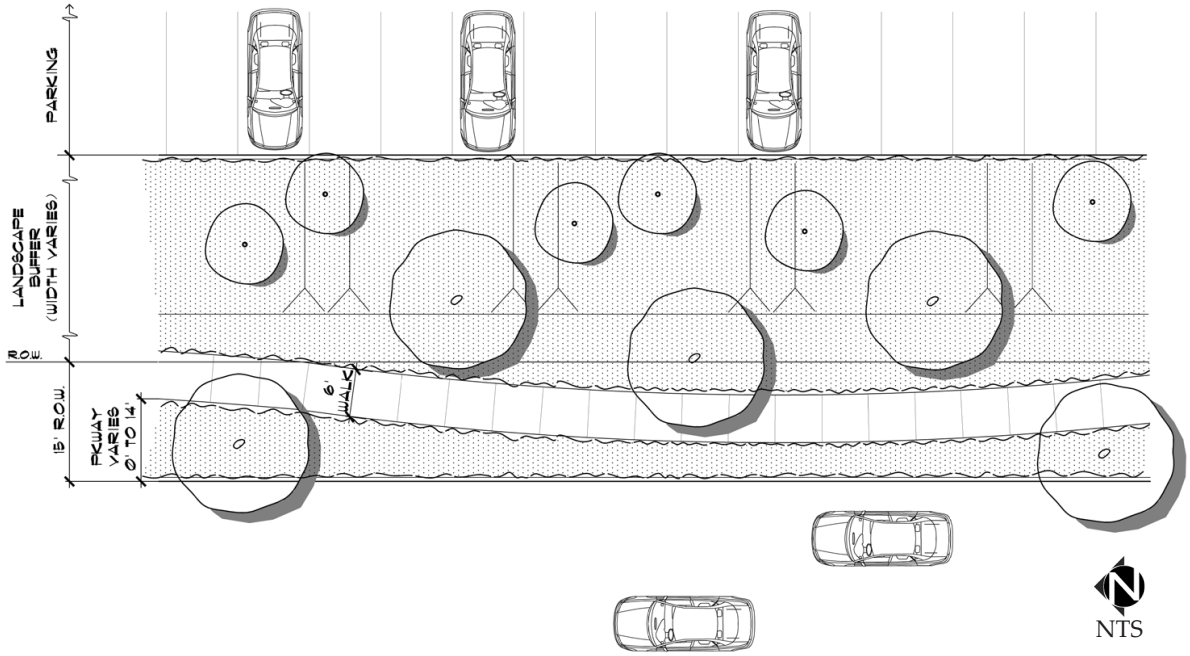


Figure 3.6: Landscape Section Location Diagram

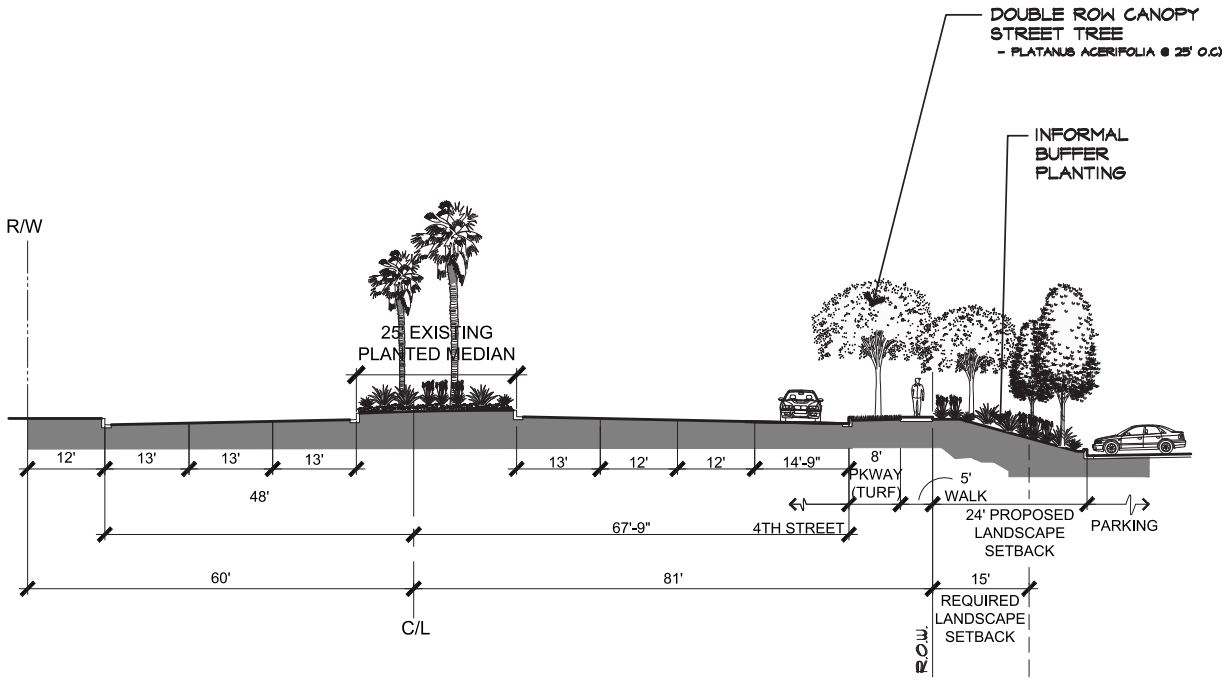


1. Haven Avenue Section

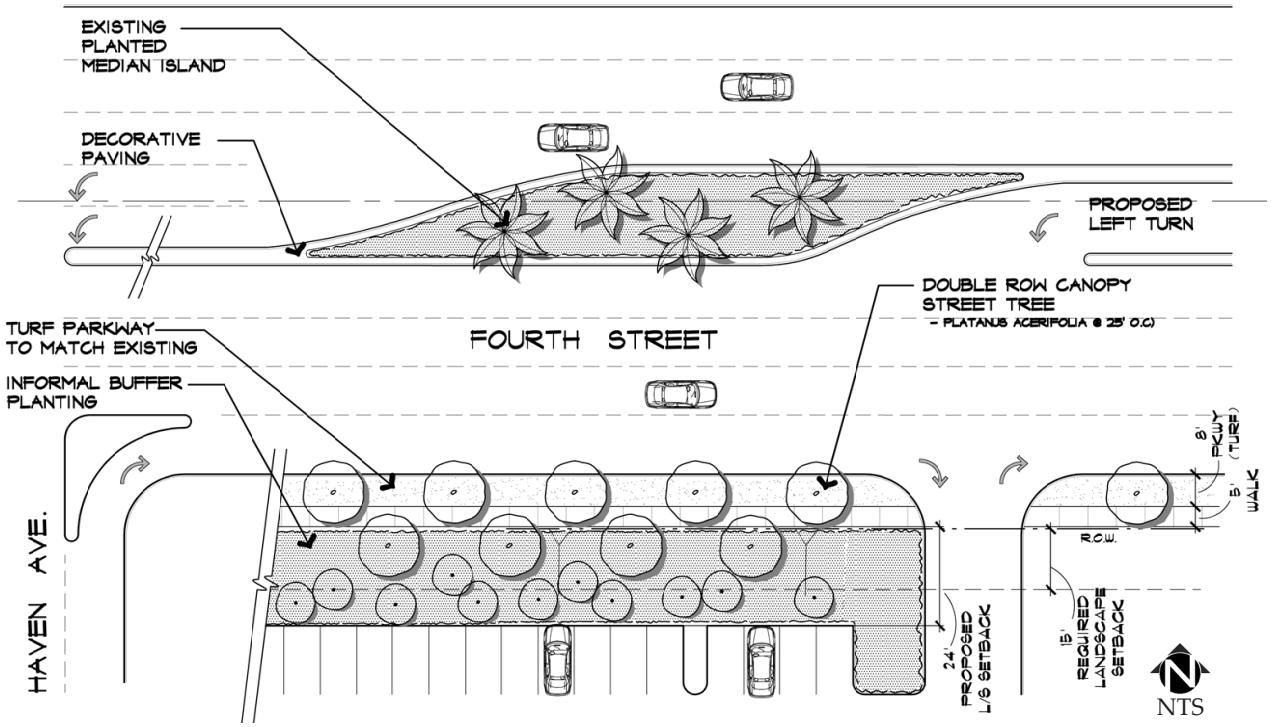


1. Haven Avenue Plan

Figure 3.7a: Haven Ave. Public Streetscape Section and Plan

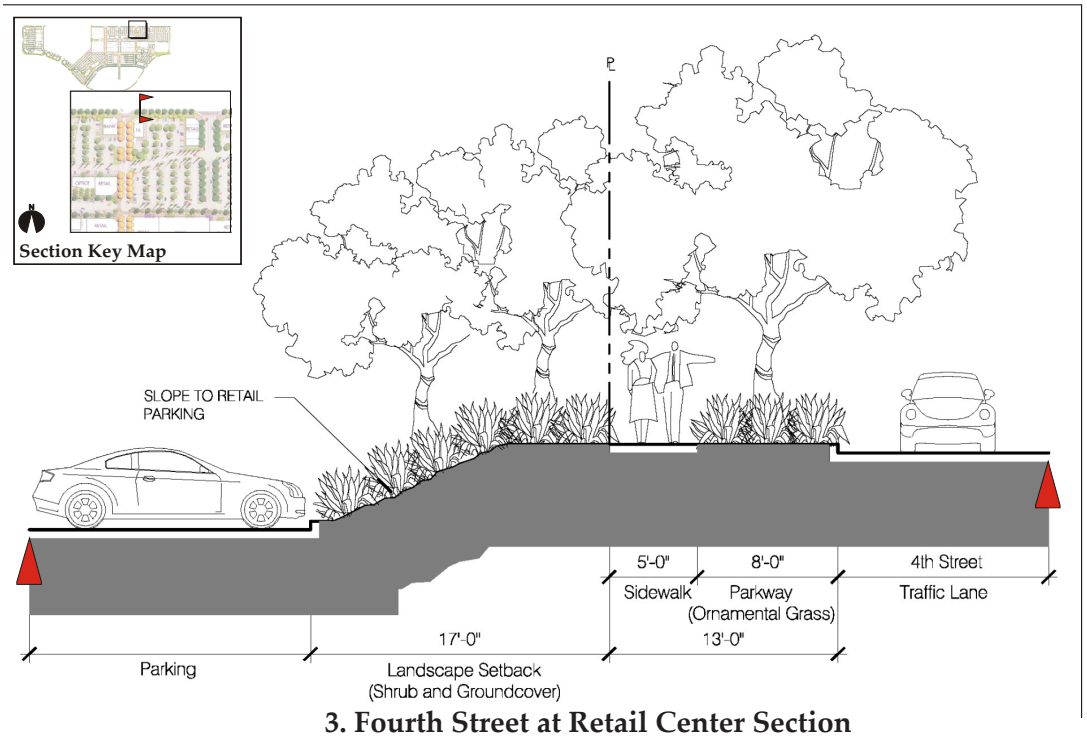


2. Fourth Street (East of Piemonte) Section

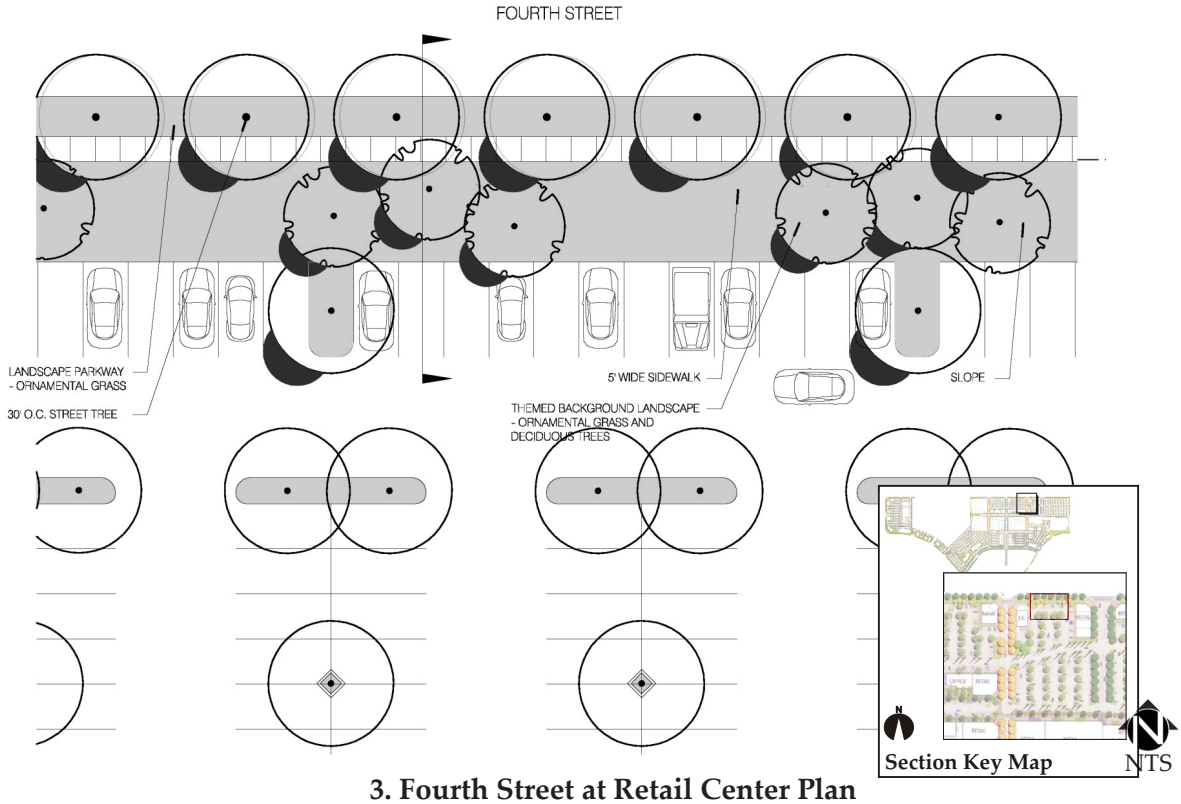


2. Fourth Street (East of Piemonte) Plan

Figure 3.7b: Fourth Street (East of Piemonte) Public Streetscape Section and Plan

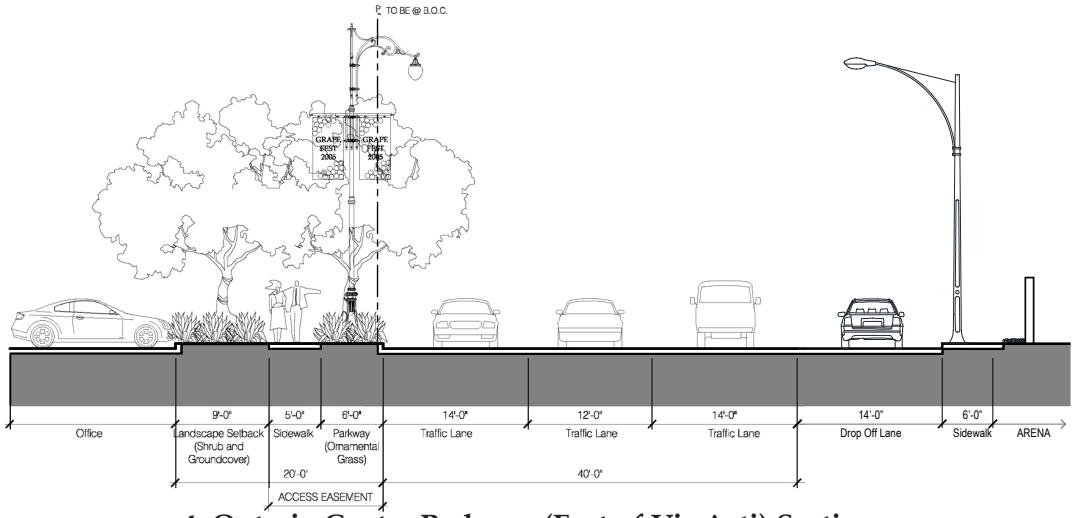


3. Fourth Street at Retail Center Section

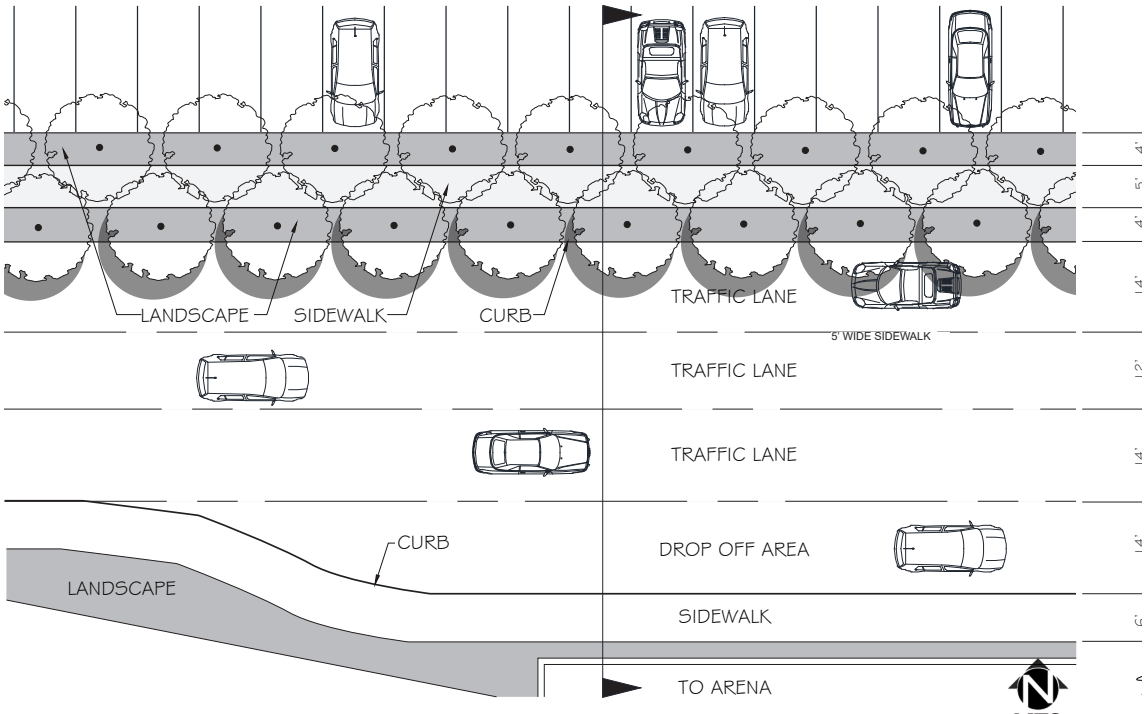


3. Fourth Street at Retail Center Plan

Figure 3.7c: Fourth Street at Retail Center Public Streetscape Section and Plan

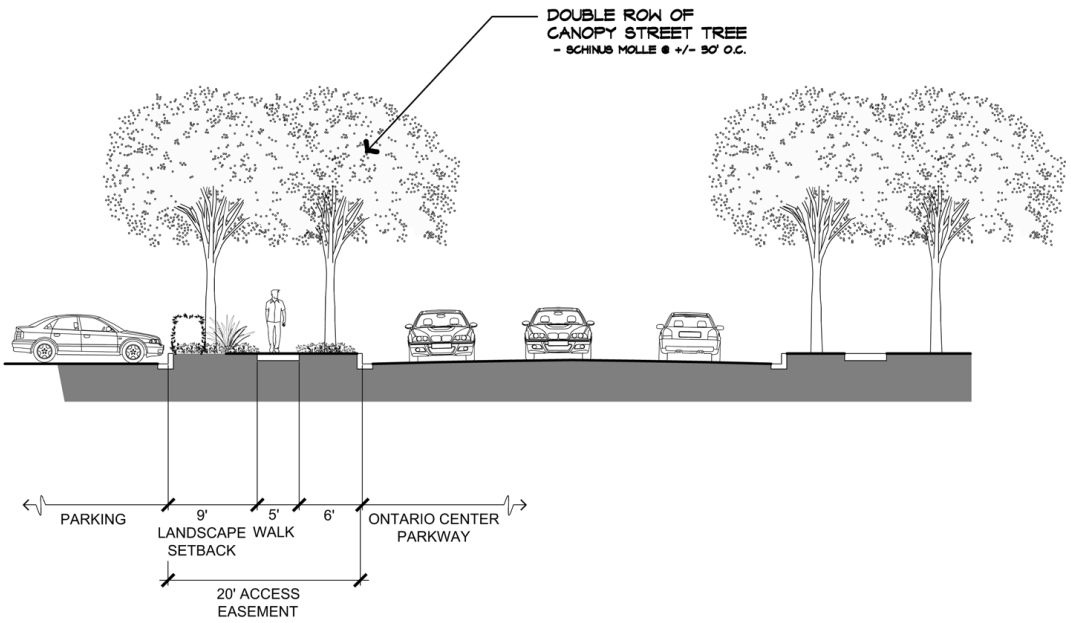


4. Ontario Center Parkway (East of Via Asti) Section

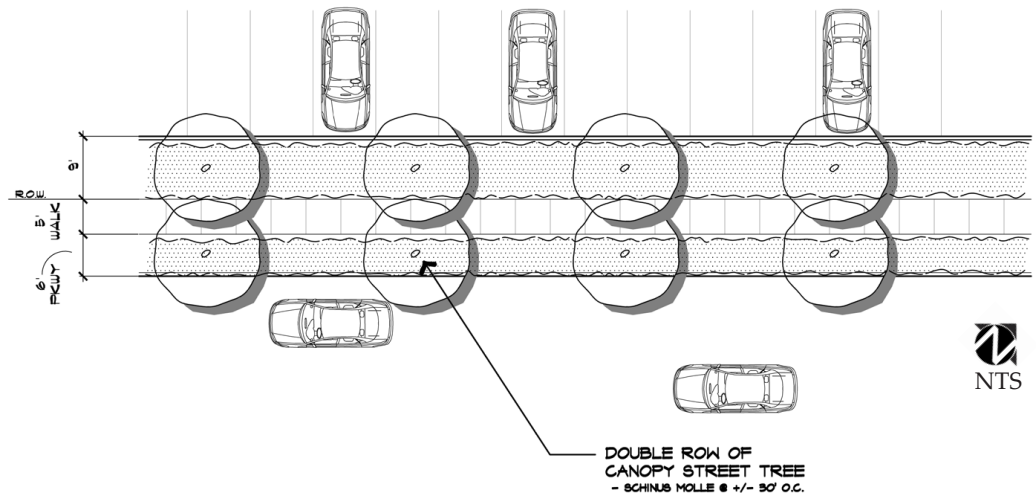


4. Ontario Center Parkway (East of Via Asti) Plan

Figure 3.7d: Ontario Center Parkway (East of Via Asti) Public Streetscape Section and Plan

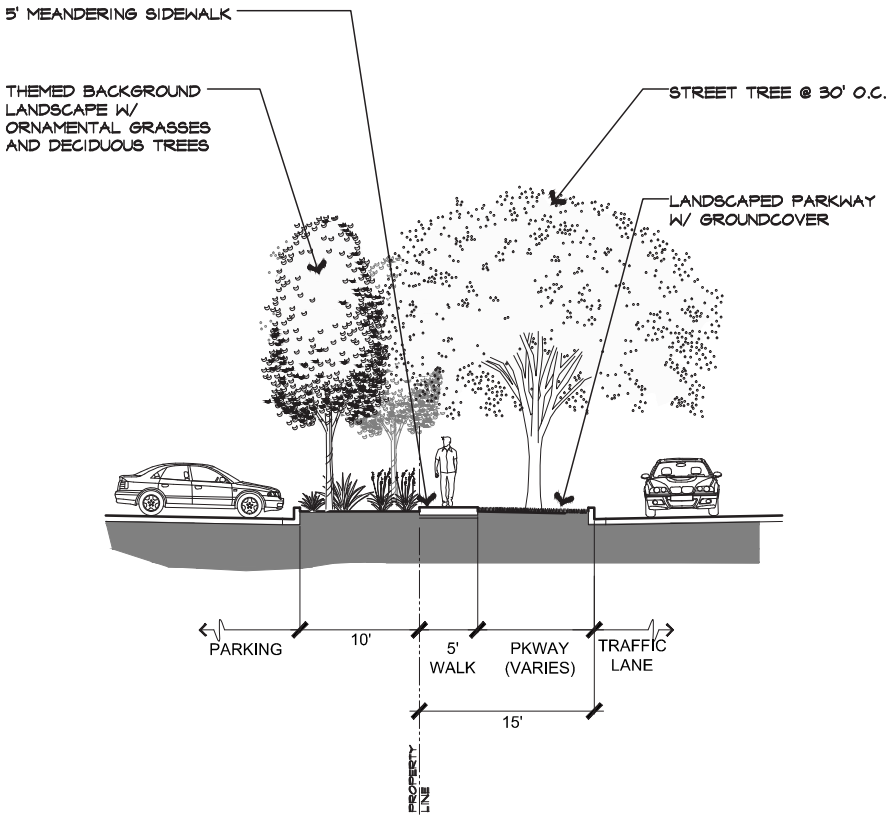


5. Ontario Center Parkway (West of Via Asti) Section

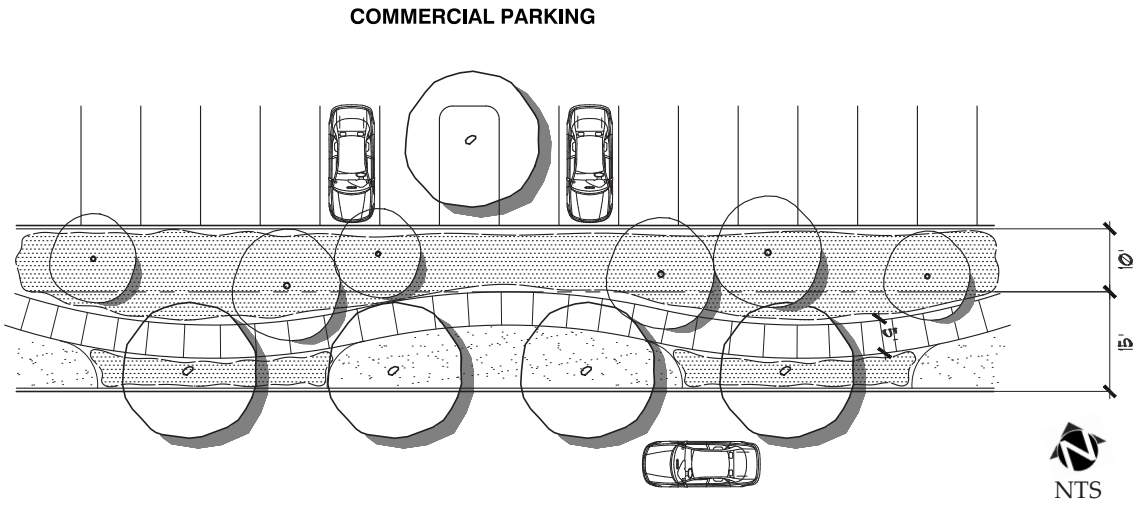


5. Ontario Center Parkway (West of Via Asti) Plan

Figure 3.7e: Ontario Center Parkway (West of Via Asti) Public Streetscape Section and Plan

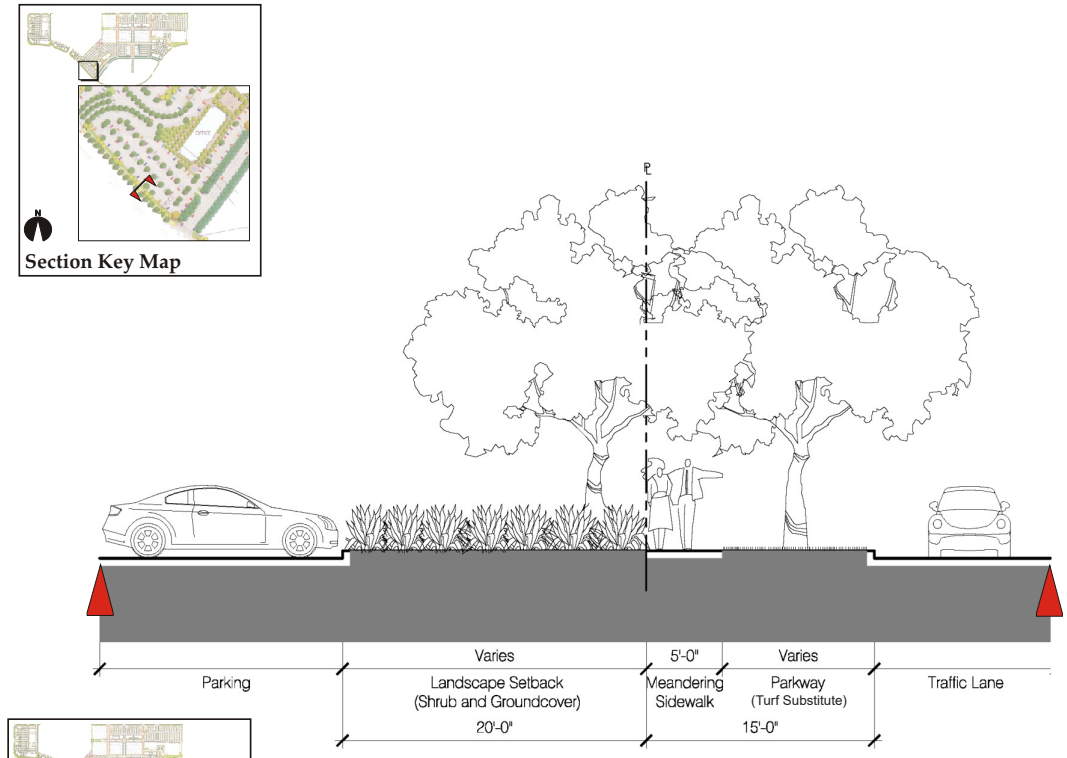


6A. Concours Street (West of Duesenberg Dr.) Section

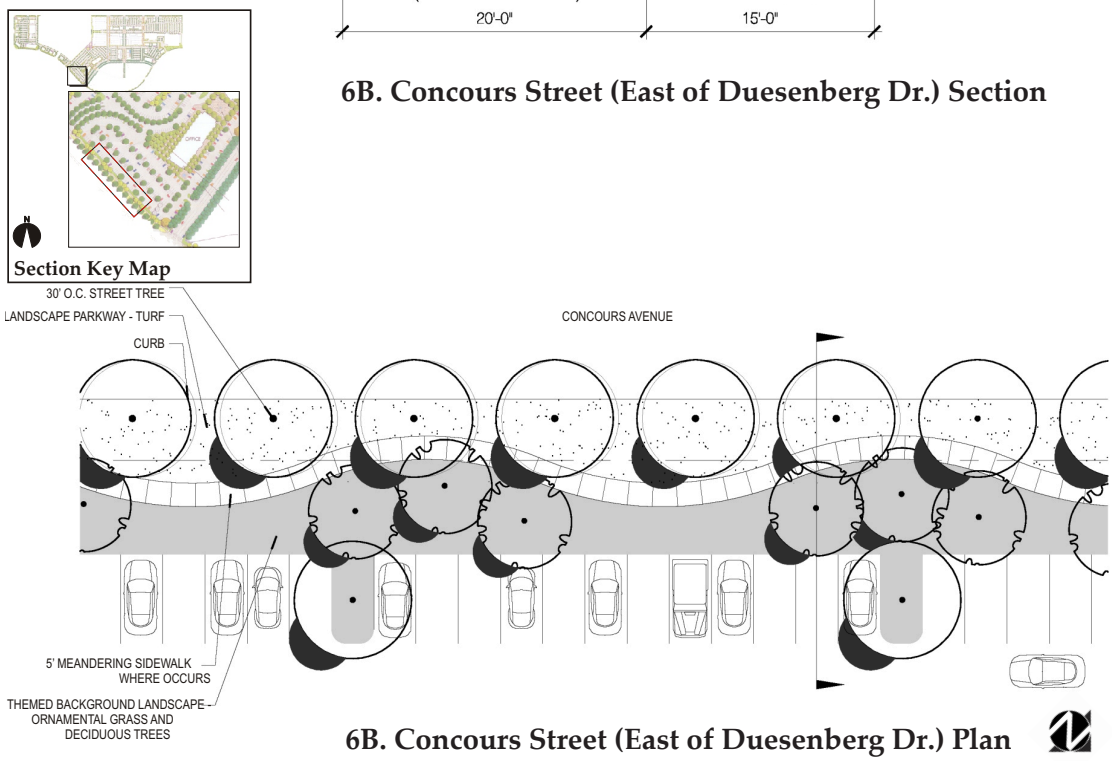


6A. Concours Street (West of Duesenberg Dr.) Plan

Figure 3.7f: Concours Street (West of Duesenberg Dr.) Public Streetscape Section and Plan



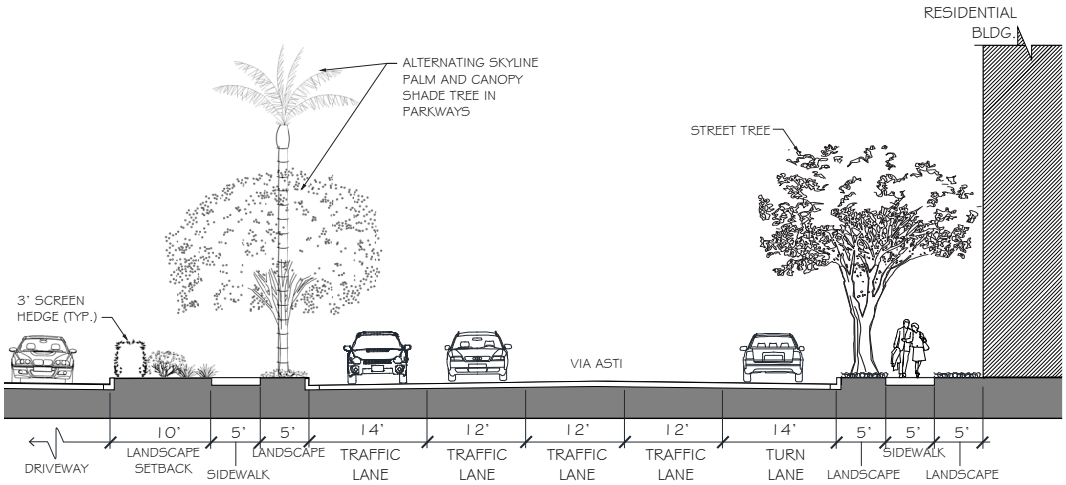
6B. Concours Street (East of Duesenberg Dr.) Section



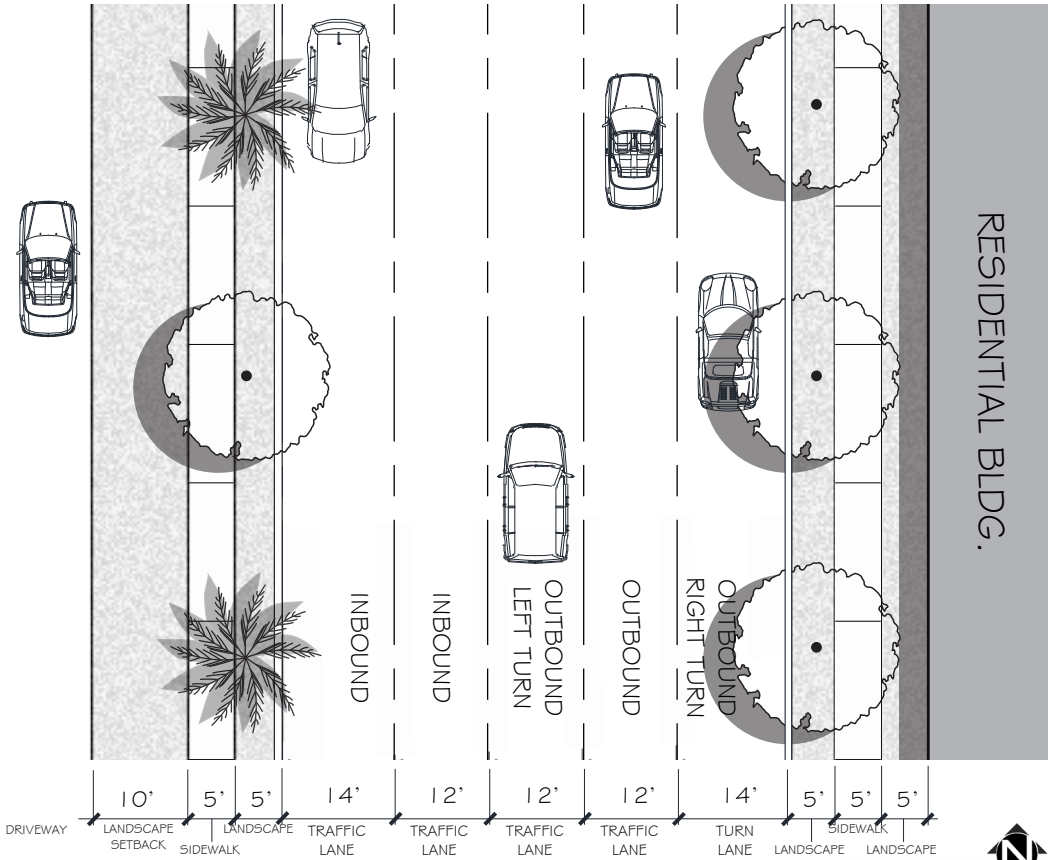
6B. Concours Street (East of Duesenberg Dr.) Plan

NTS

Figure 3.7g: Concours Street (East of Duesenberg Dr.) Public Streetscape Section and Plan

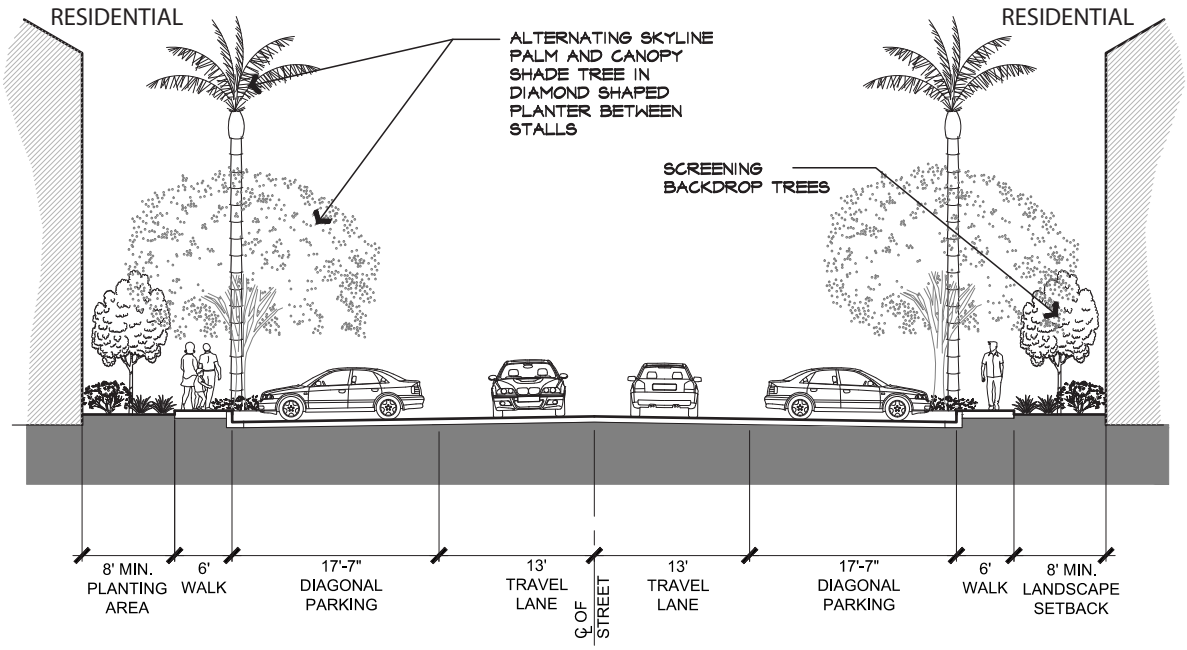


7. Via Asti - North Section (North Entrance) Section

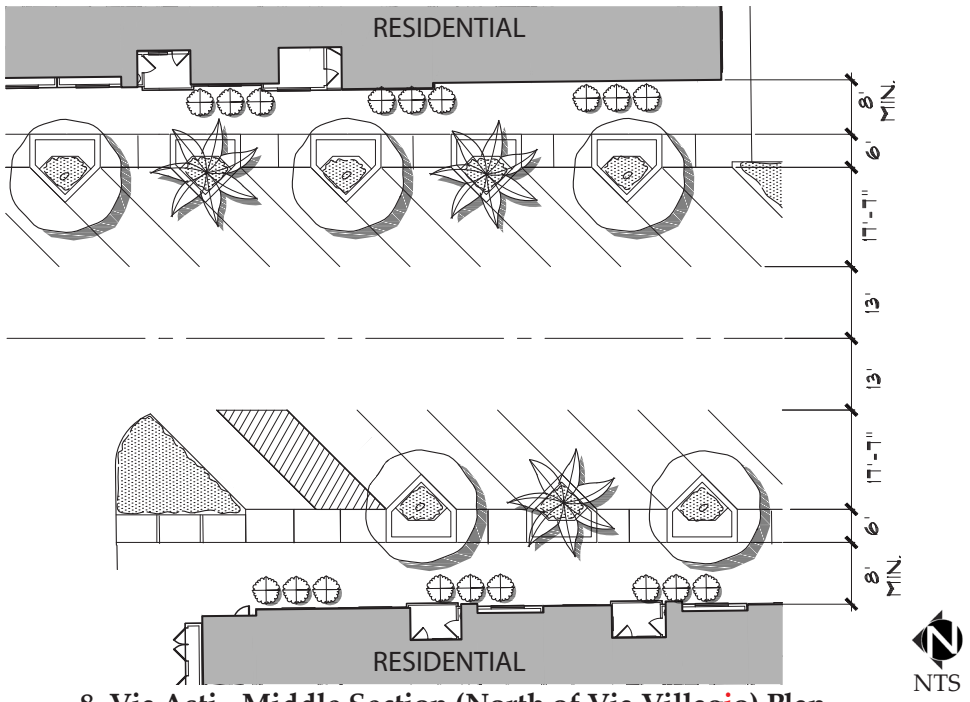


7. Via Asti - North Section (North Entrance) Plan

Figure 3.8a: Via Asti - North Section (North Entrance) Private Streetscape Section and Plan

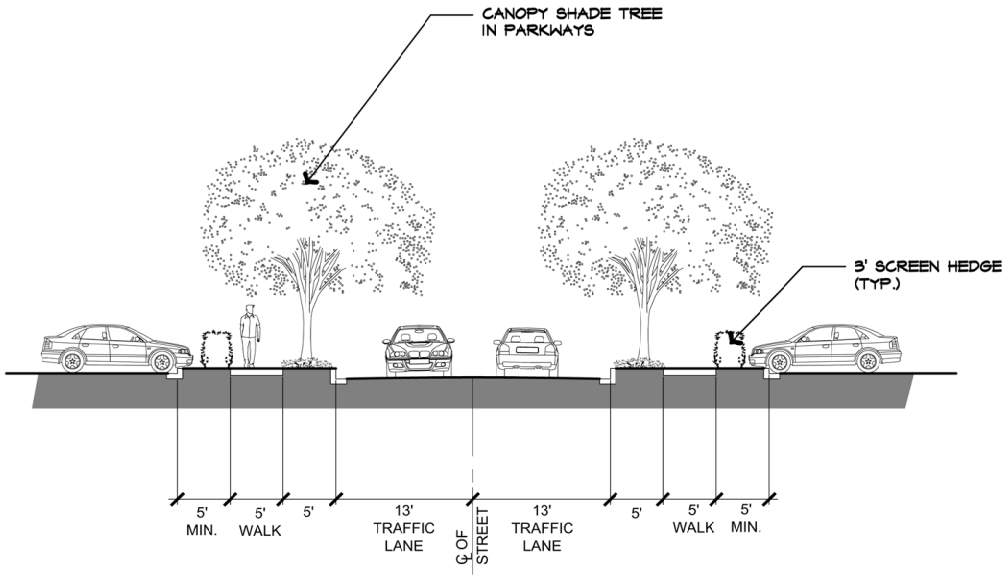


8. Via Asti - Middle Section (North of Via Villagio) Section

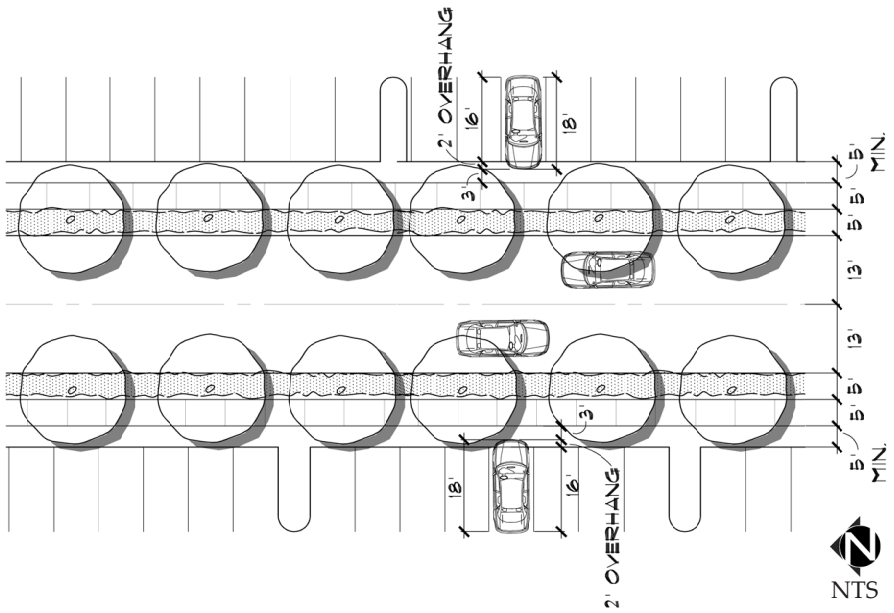


8. Via Asti - Middle Section (North of Via Villagio) Plan

Figure 3.8b: Via Asti - Middle Section (North of Via Villagio) Private Streetscape Section and Plan

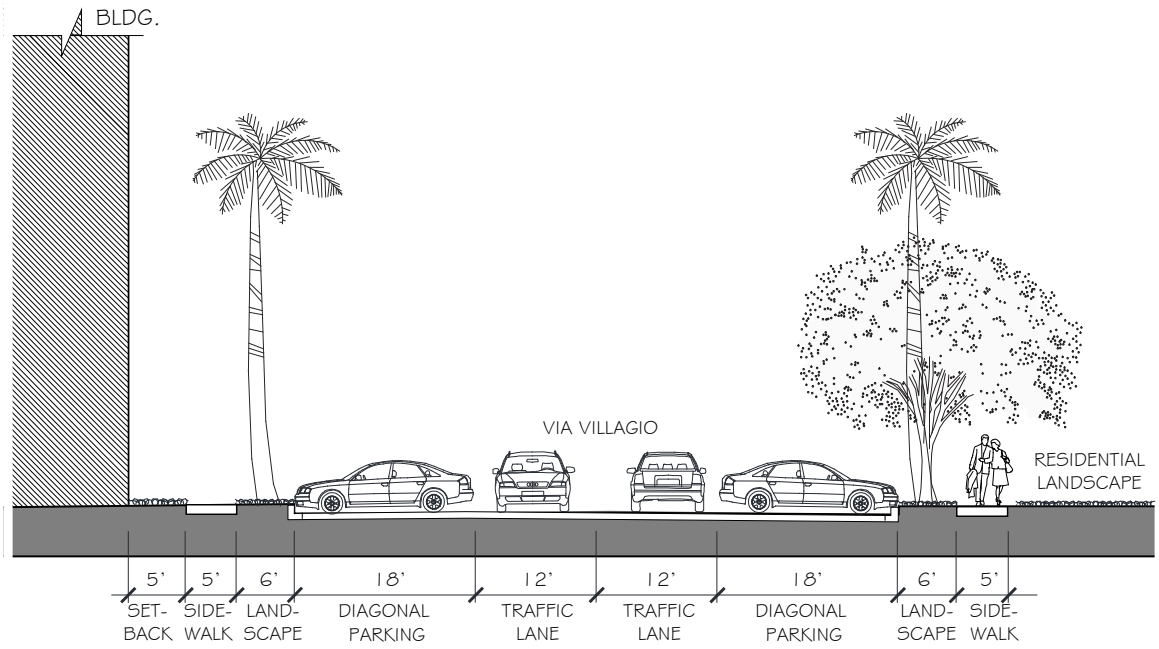


~~10a~~ 9. Via Asti - South Section (North of Ontario Center Parkway)

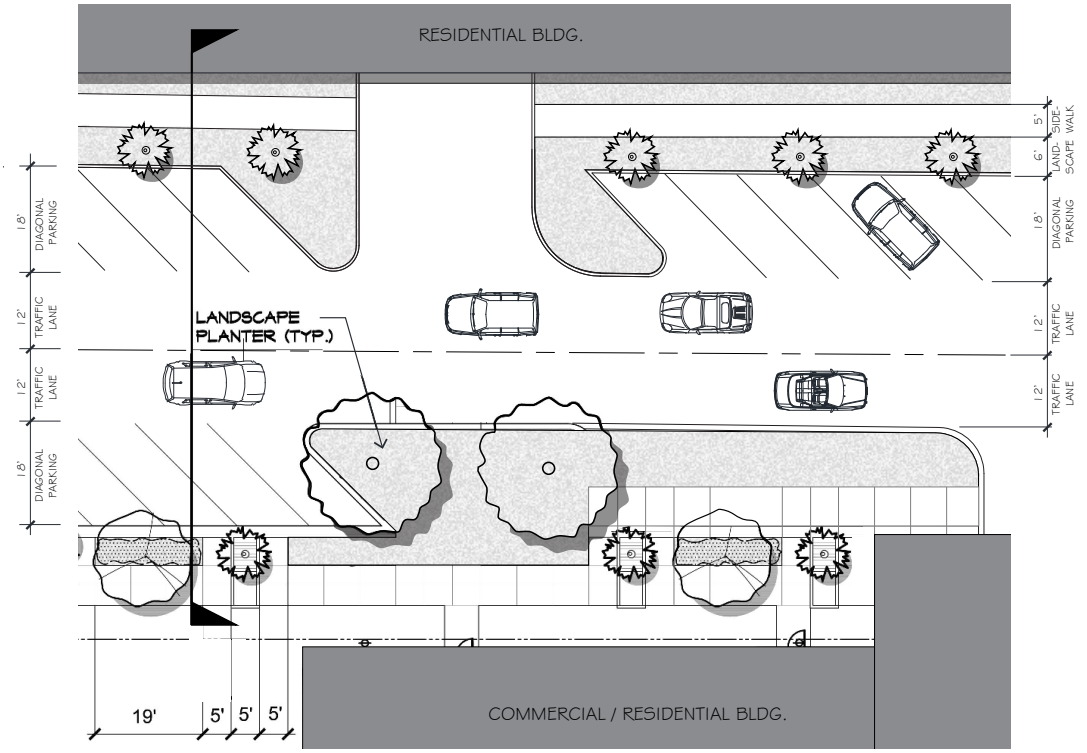


~~10a~~ 9. Via Asti - South Section (North of Ontario Center Parkway)

Figure 3.8~~d~~c: Via Asti - South Section (North of Ontario Center Parkway) Private Streetscape Section and Plan



~~11~~ 10. Via Villagio Section



~~11~~ 10. Via Villagio Plan

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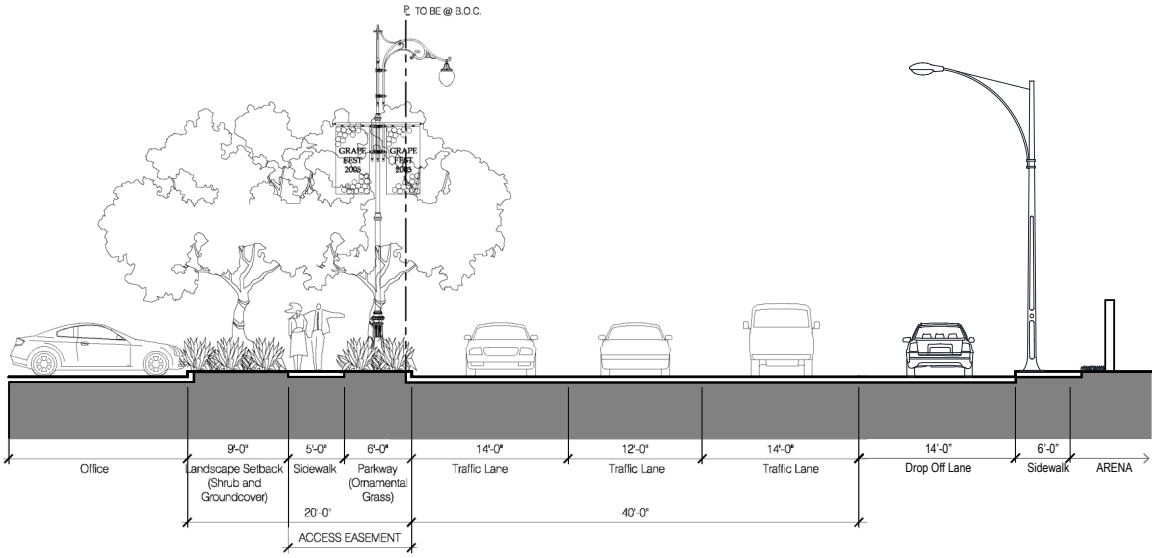
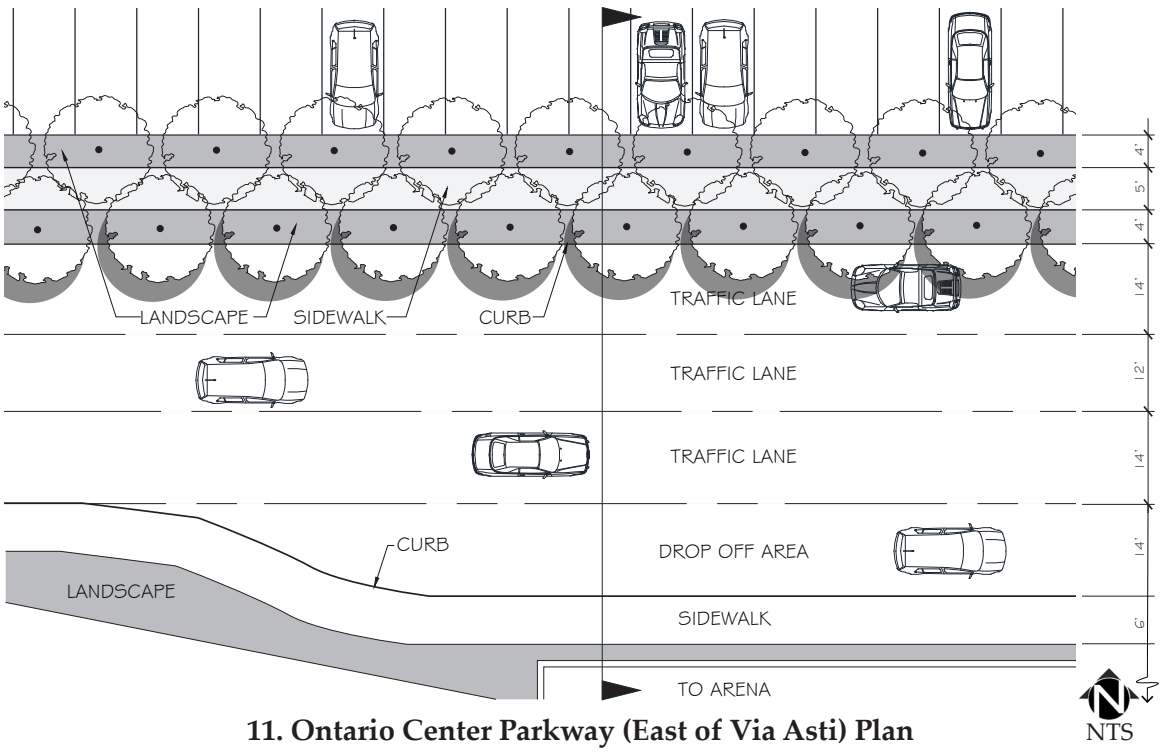
Figure 3.8~~f~~d: Via Villagio Private Streetscape Section and Plan



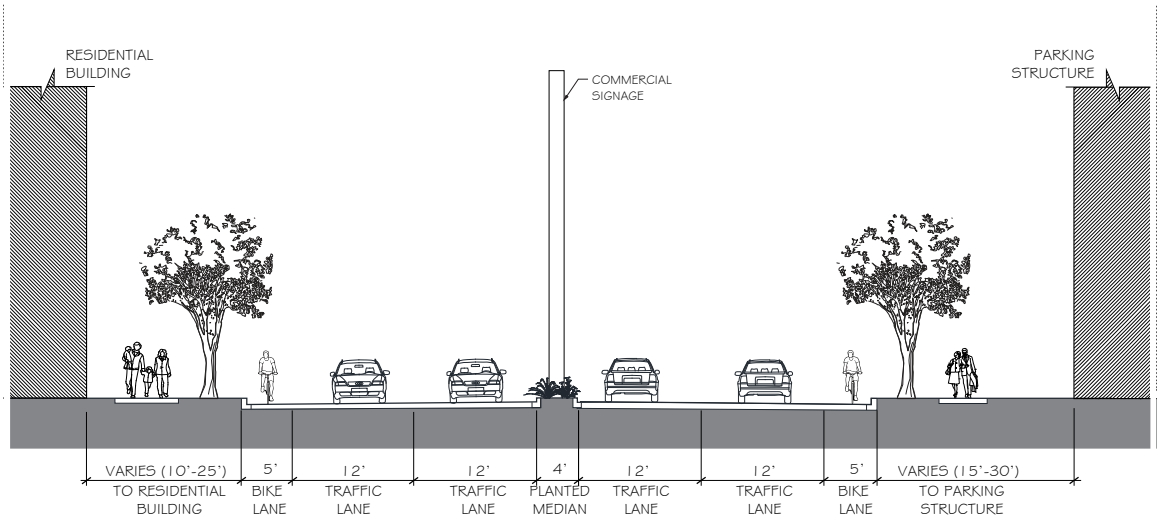
11. Ontario Center Parkway (East of Via Asti) Section



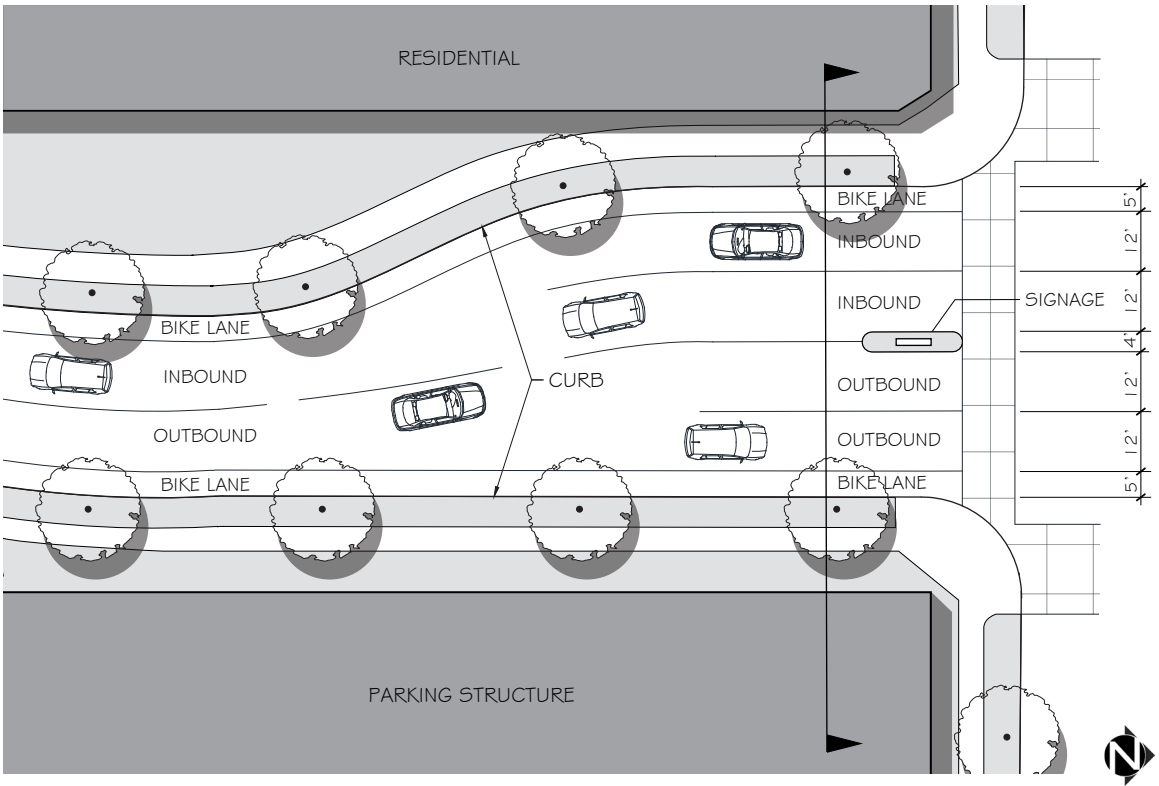
11. Ontario Center Parkway (East of Via Asti) Plan

Figure 3.8e: ~~Via Alba - North Section (North of Via Villago) Private Streetscape Section and Plan~~

Ontario Center Parkway (East of Via Asti) Public Streetscape Section and Plan

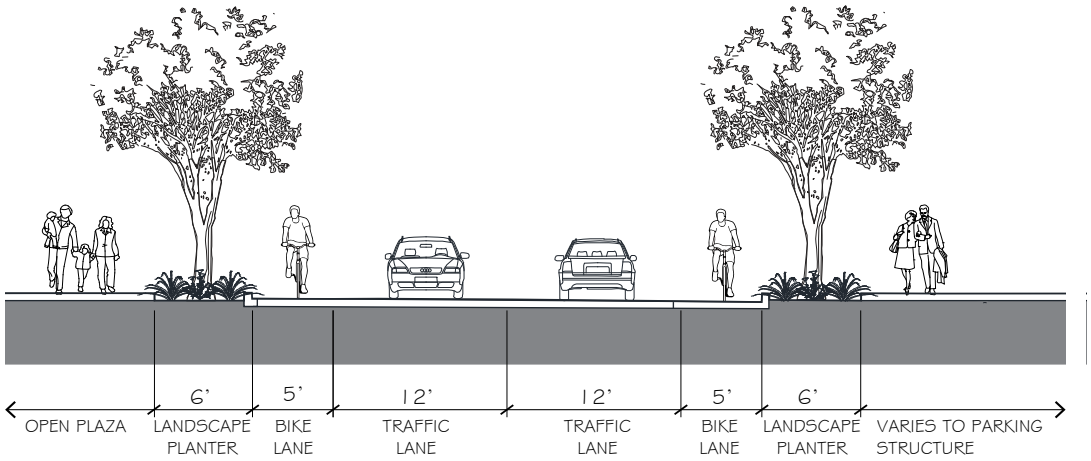


12. Via Piemonte - North Section (North Entrance)

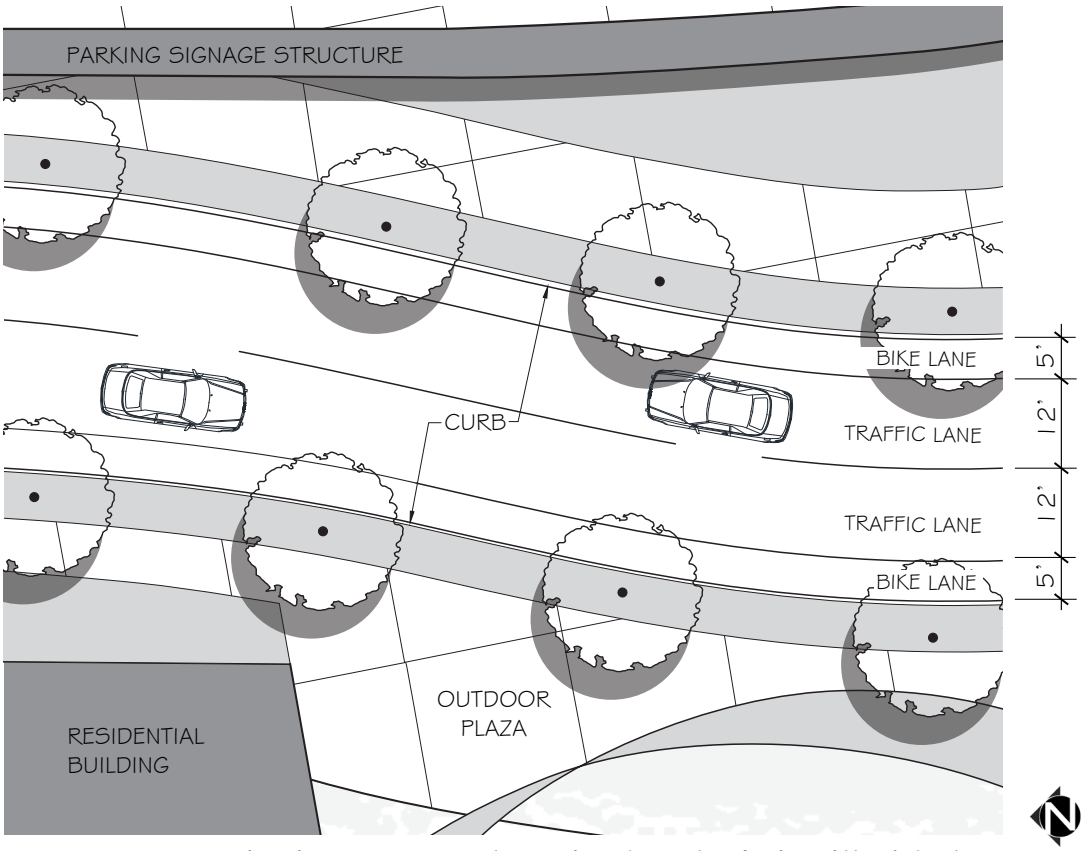


12. Via Piemonte - North Section (North Entrance)

Figure 3.8fg: Via Piemonte - North Section (North Entrance) Private Streetscape Section and Plan

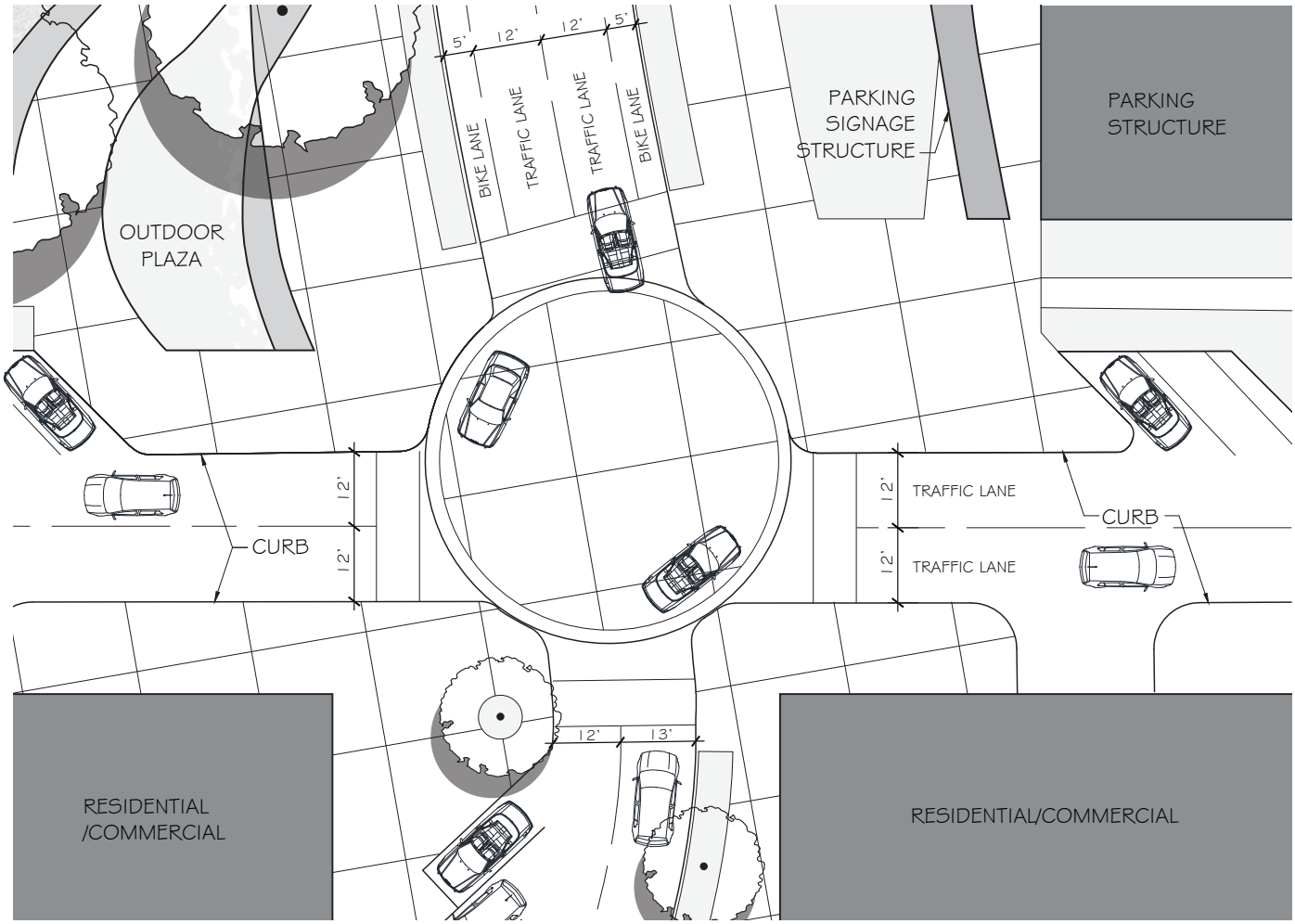


13. Via Piemonte - North Section (North of Via Villagio) Section



13. Via Piemonte - North Section (North of Via Villagio) Plan

Figure 3.8~~hg~~: Via Piemonte - North Section (North of Via Villagio) Private Streetscape Section and Plan



14. Via Villagio Roundabout Plan

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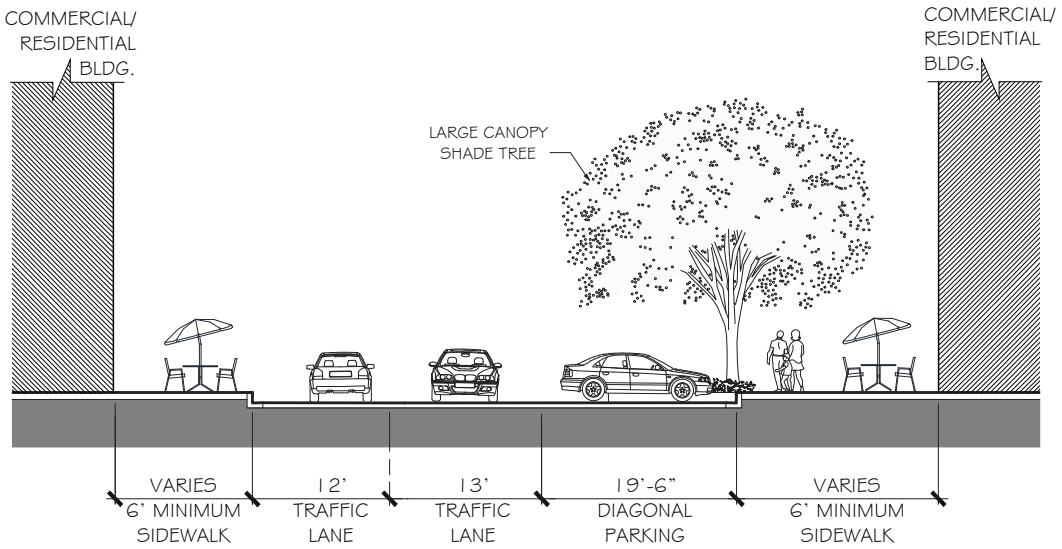
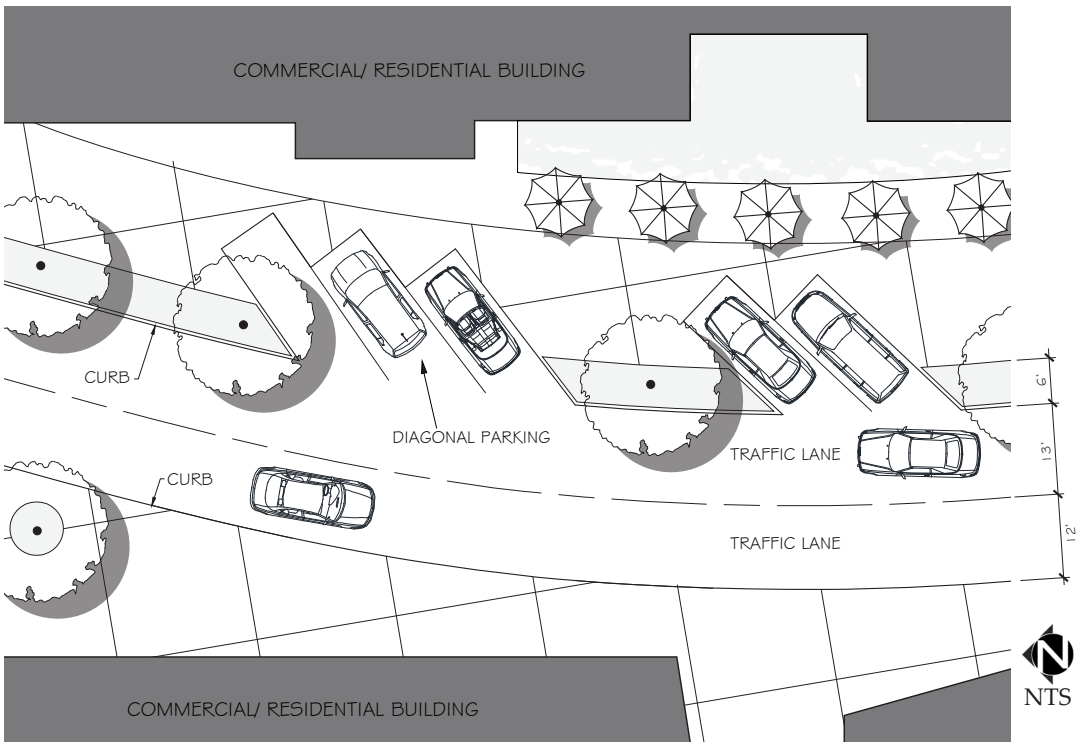
Figure 3.8h: Via Villagio Roundabout Private Streetscape Plan

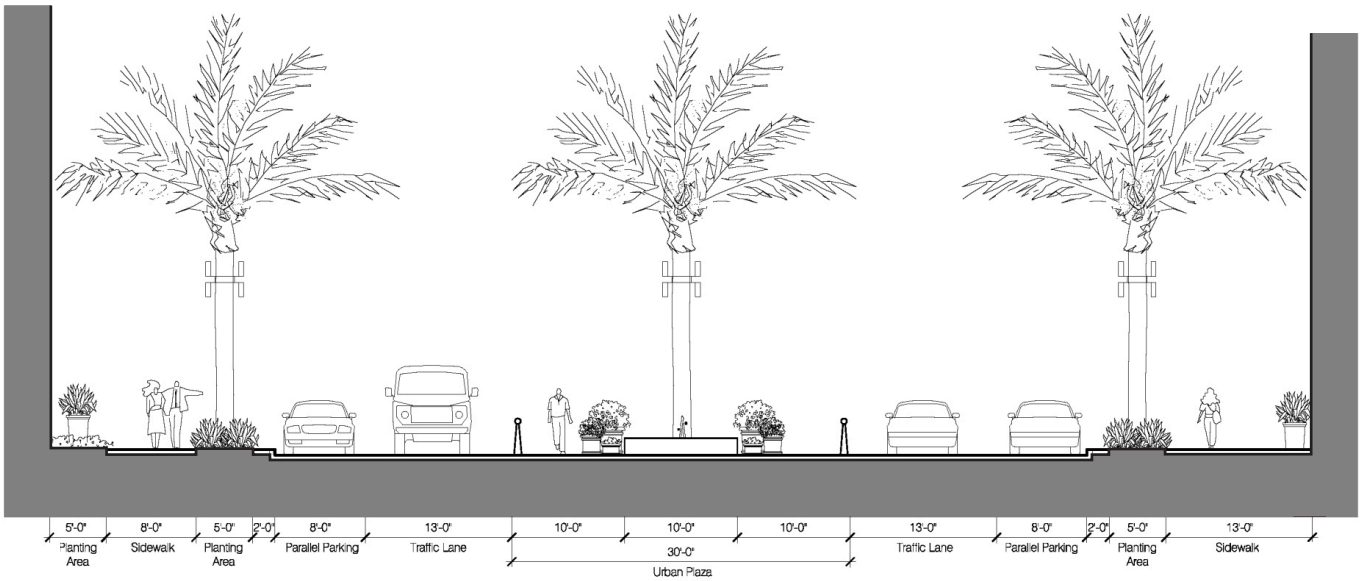


~~14~~ 15. Via Piemonte - Middle Section (South of Via Villagio) Section

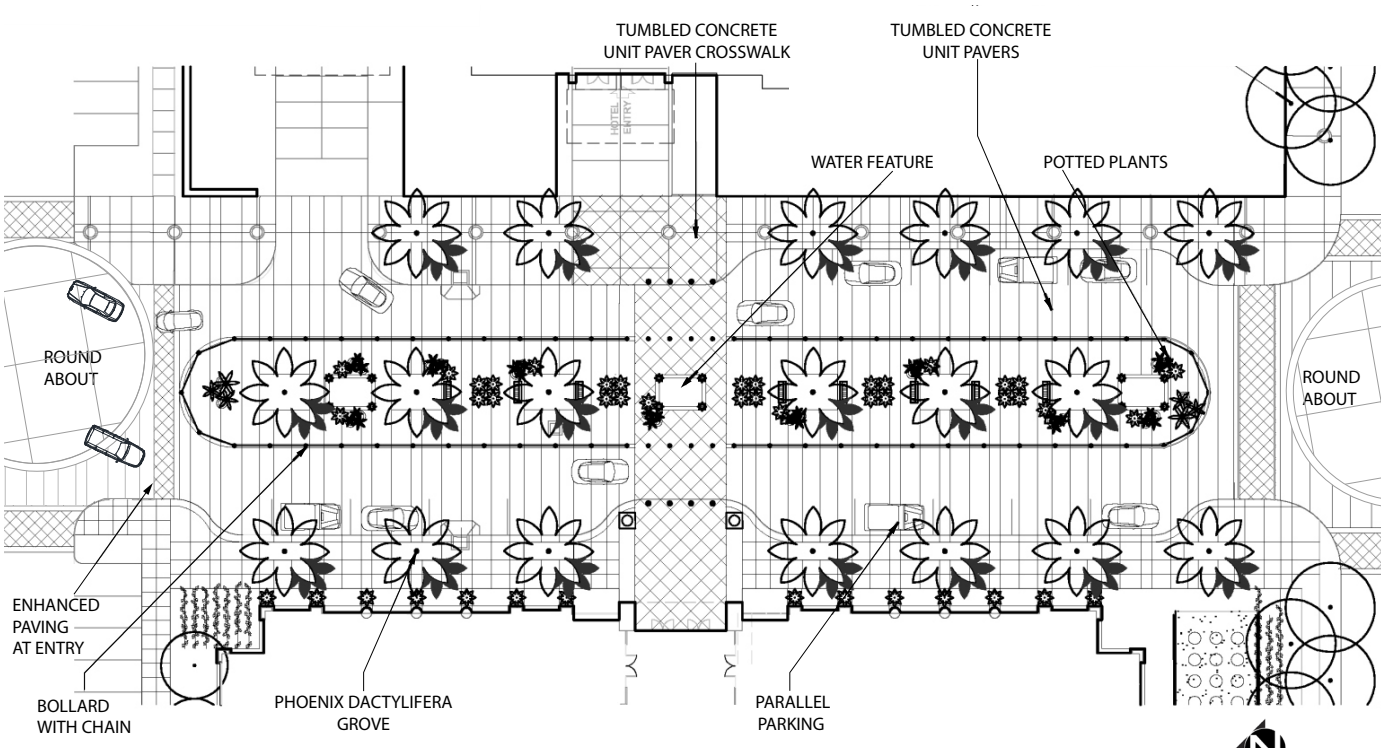


~~14~~ 15. Via Piemonte - Middle Section (South of Via Villagio) Plan

Figure 3.8i: Via Piemonte - Middle Section (South of Via Villagio) Private Streetscape Section and Plan

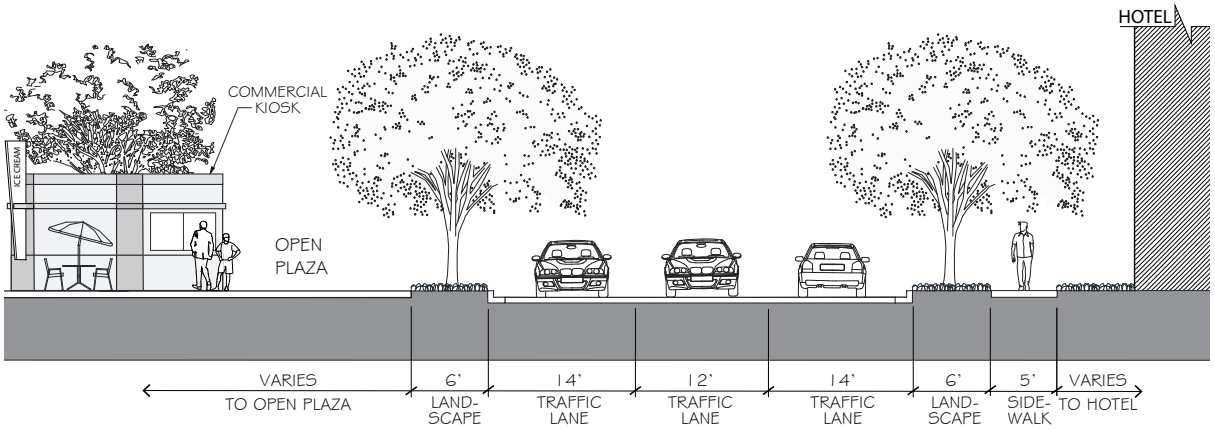


~~15~~ 16. Via Piemonte - South Section (North of Ontario Pkwy) Section

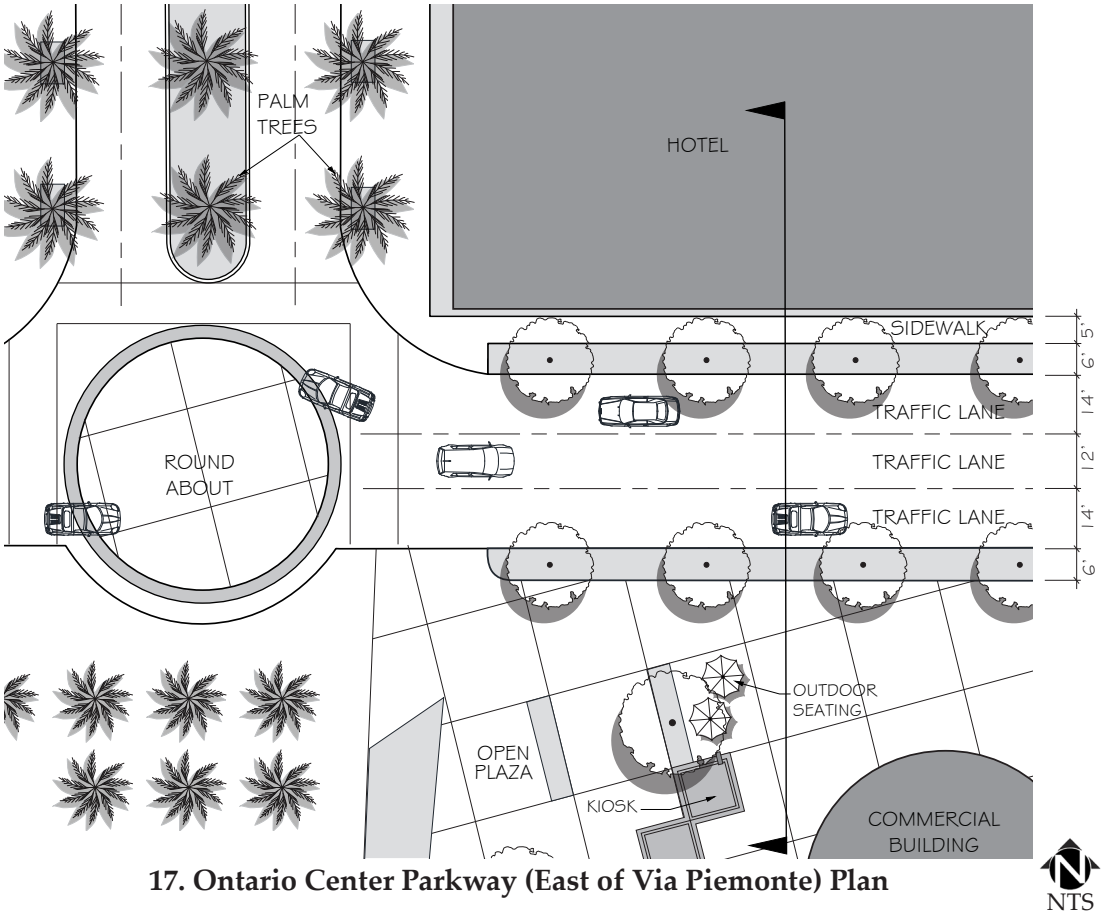


~~15~~ 16. Via Piemonte - South Section - (North of Ontario Center Pkwy) Plan

Figure 3.8j: Via Piemonte - South Section - (North of Ontario Center Pkwy) Private Streetscape Section and Plan

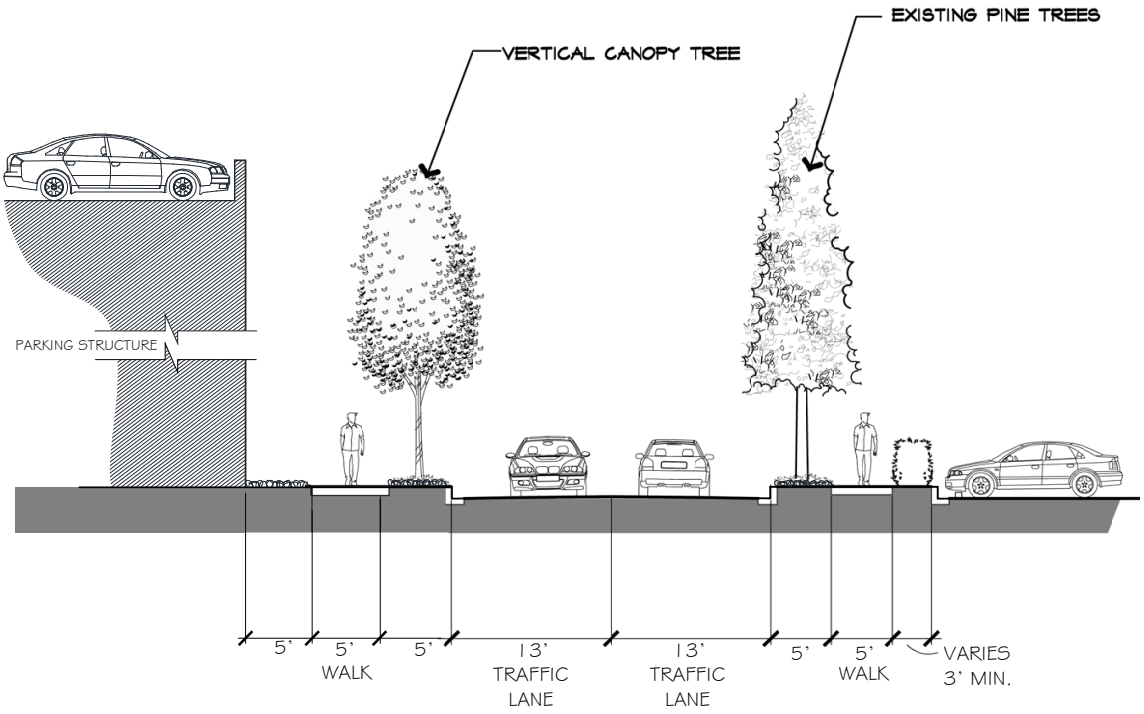


17. Ontario Center Parkway (East of Via Piemonte) Section

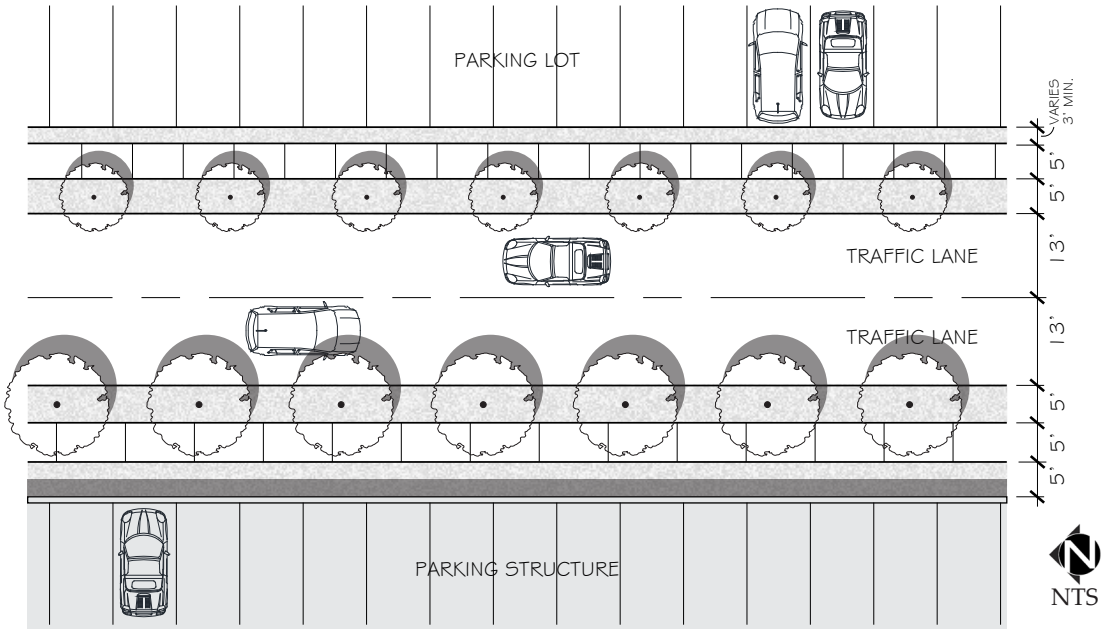


17. Ontario Center Parkway (East of Via Piemonte) Plan

Figure 3.8k: Ontario Center Parkway Roundabout Public Streetscape Section and Plan ~~Shared Drive Between SA 10, 11, & 12 (South of Via Villagio) Private Streetscape Section and Plan~~

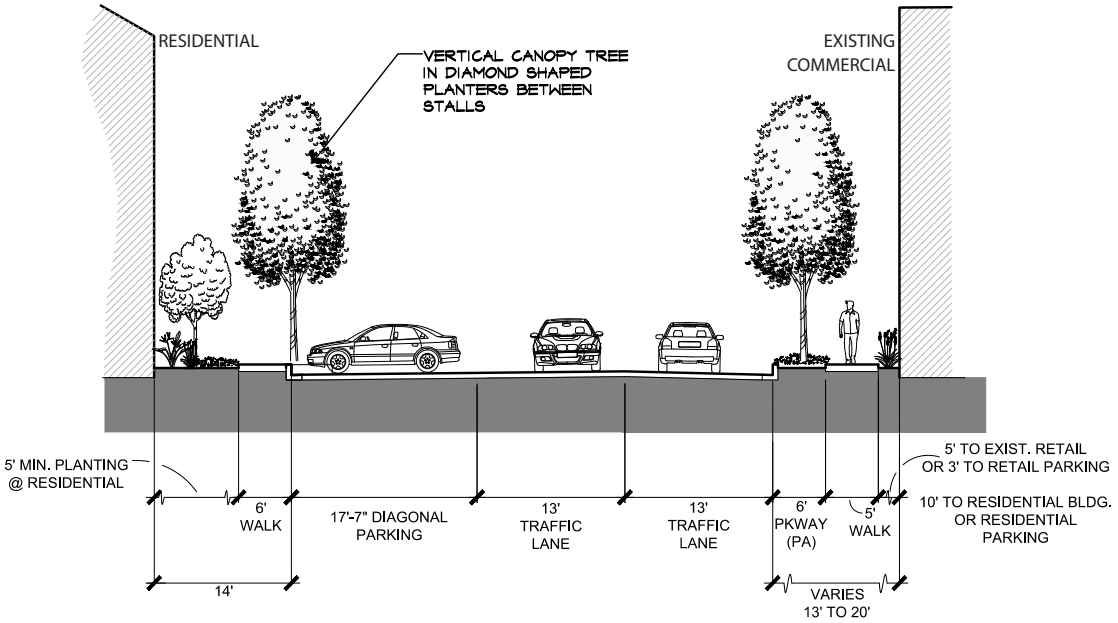


18. Via Alba - North Section (North of Via Villagio)

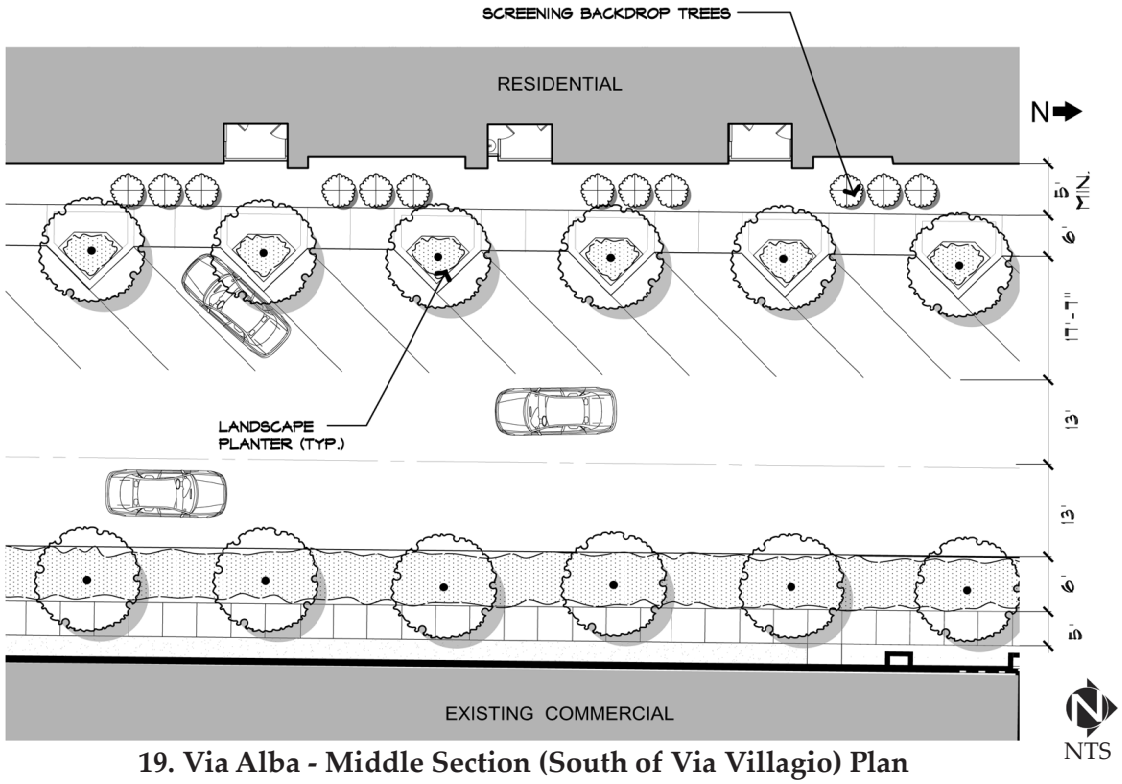


18. Via Alba - North Section (North of Via Villagio)

Figure 3.8l: Via Alba - North Section (North of Via Villagio) Private Streetscape Section and Plan

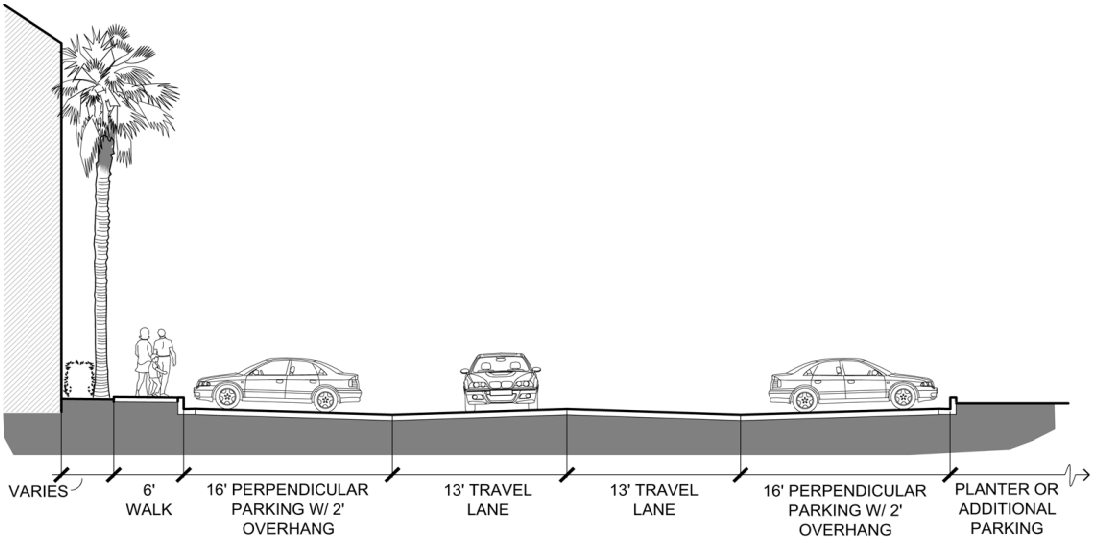


19. Via Alba - Middle Section (South of Via Villagio) Section

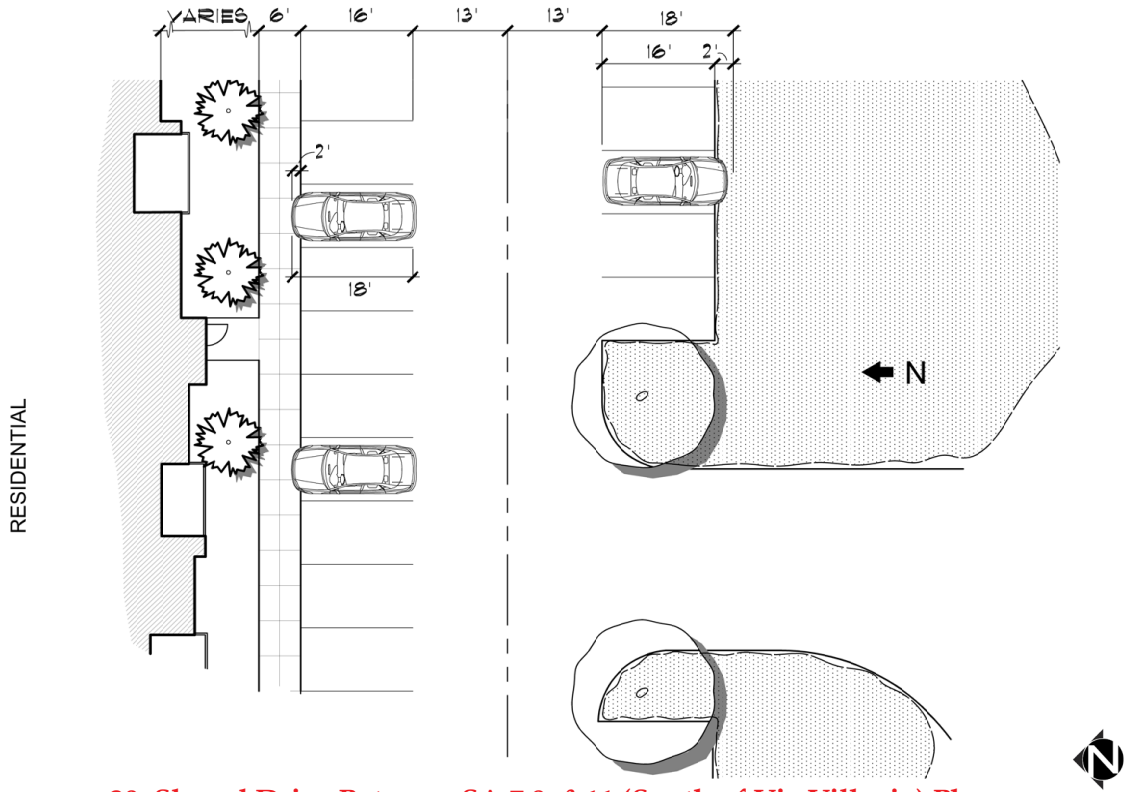


19. Via Alba - Middle Section (South of Via Villagio) Plan

Figure 3.8~~l~~m: Via Alba - Middle Section (South of Via Villagio) Private Streetscape Section and Plan

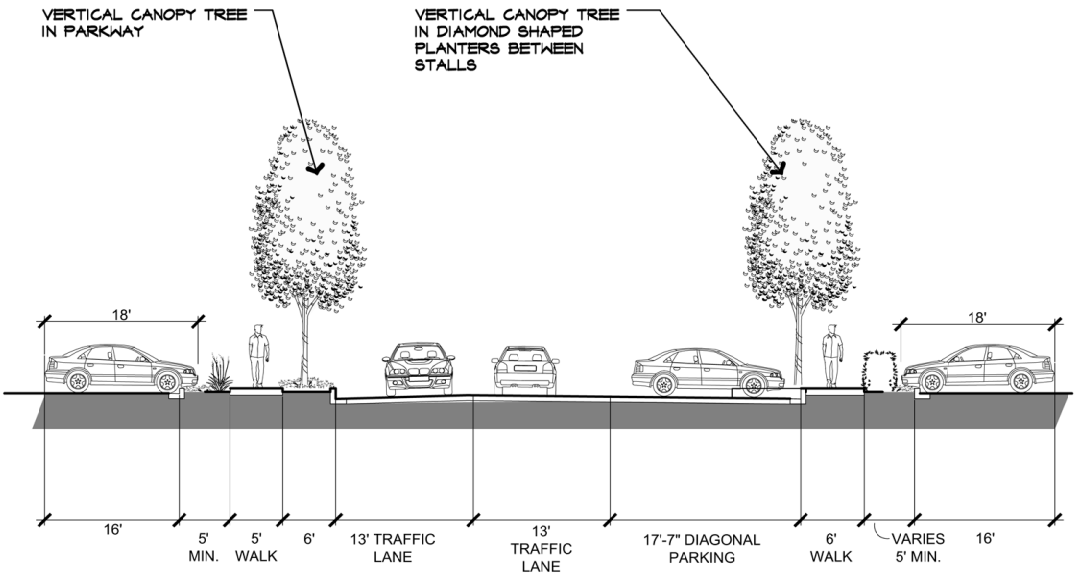


20. Shared Drive Between SA 7, 8, & 11 (South of Via Villagio) Section

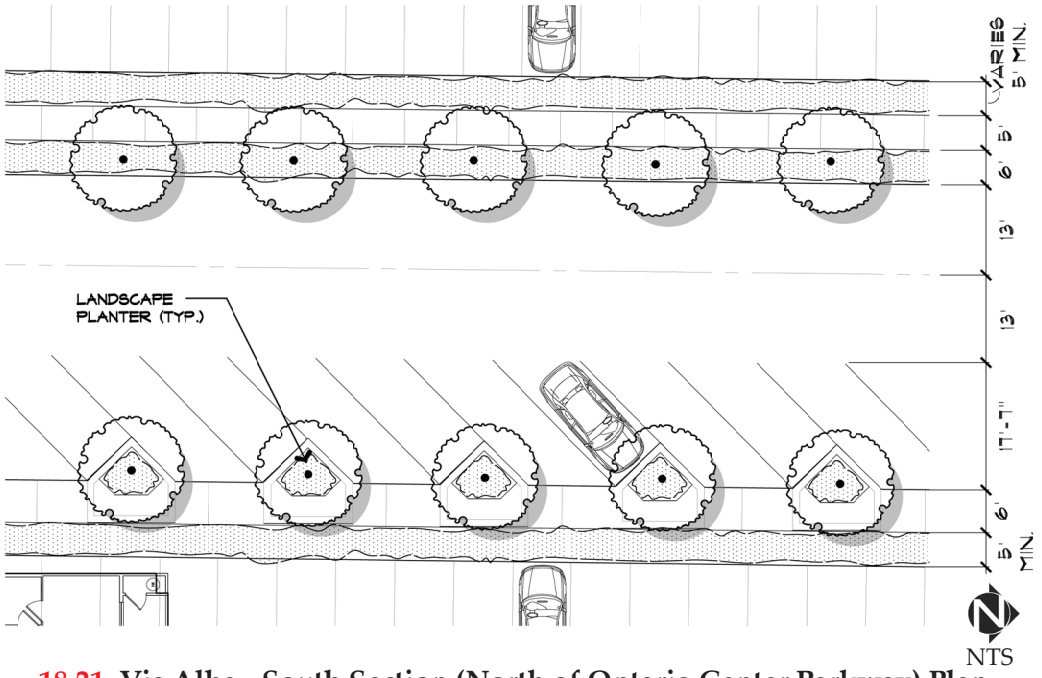


20. Shared Drive Between SA 7,8, &11 (South of Via Villagio) Plan

Figure 3.8n: Shared Drive Between SA 7, 8, & 11 (South of Via Villagio) Private Streetscape Section and Plan

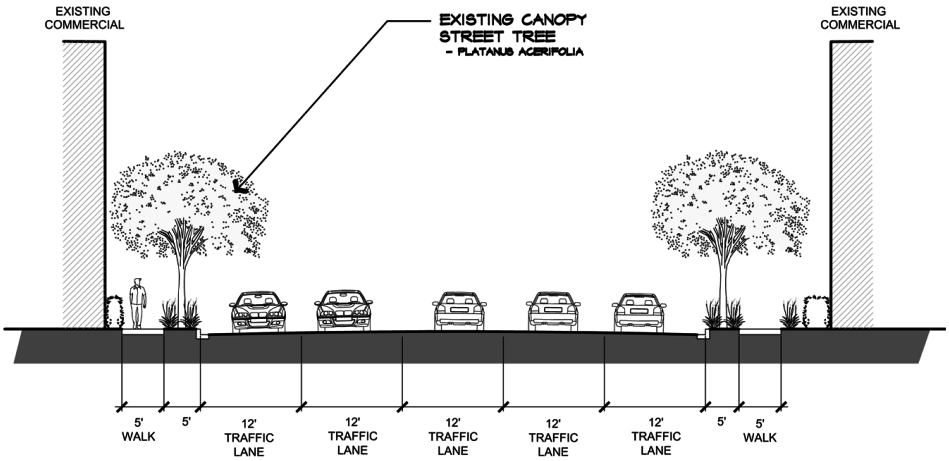


~~18~~ 21. Via Alba - South Section (North of Ontario Center Parkway) Section

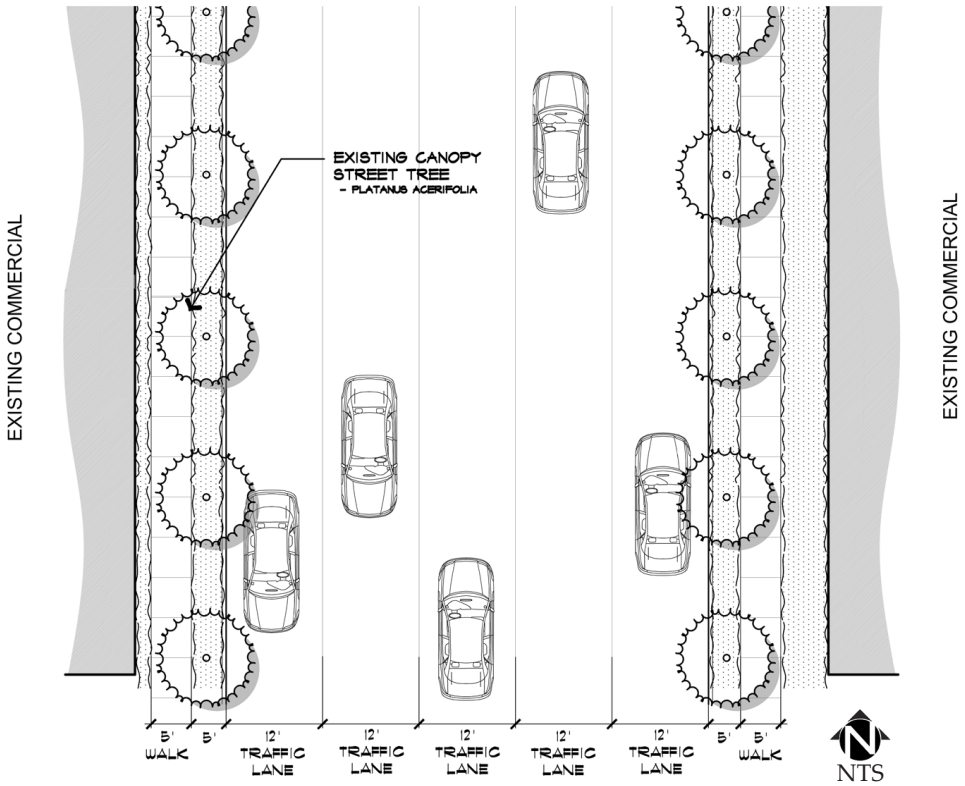


~~18~~ 21. Via Alba - South Section (North of Ontario Center Parkway) Plan

Figure 3.8~~mo~~: Via Alba - South Section (North of Ontario Center Parkway) Private Streetscape Section and Plan

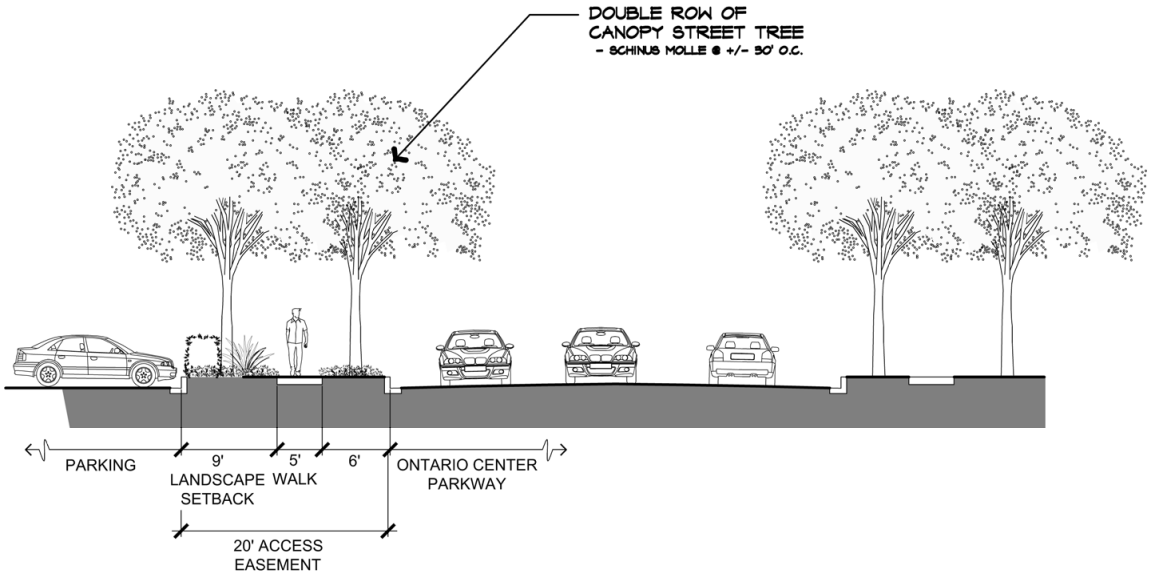


~~19~~ 22. Via Turin Section

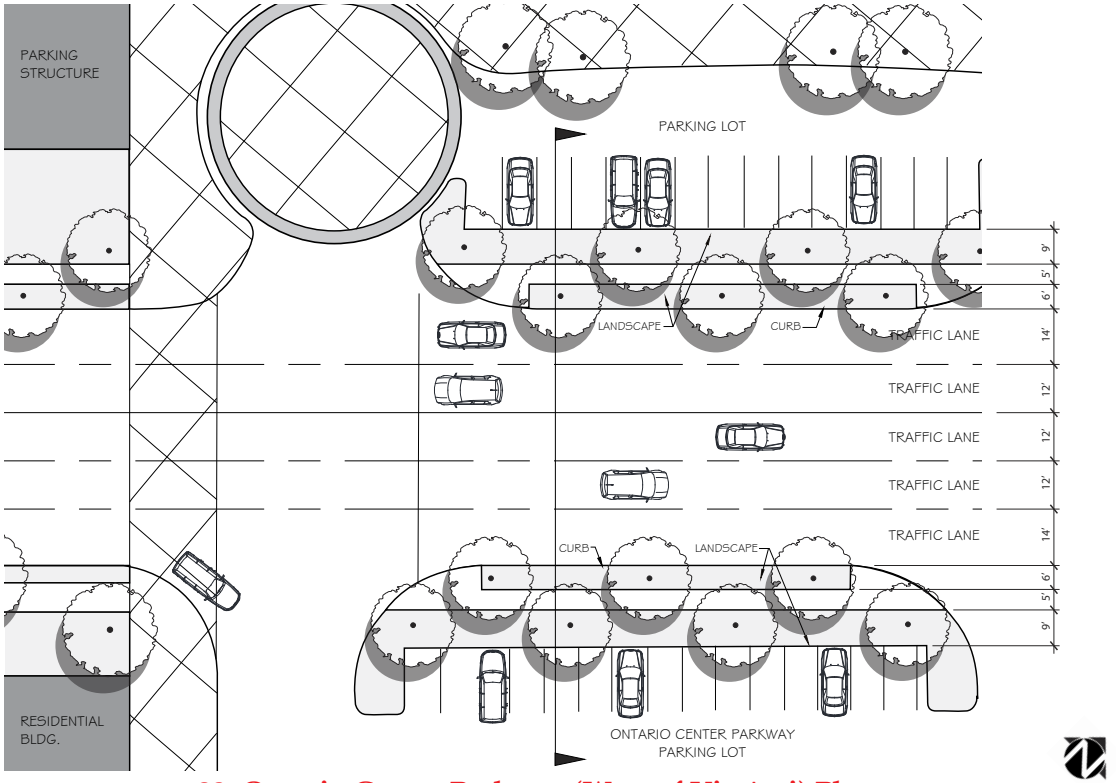


~~19~~ 22. Via Turin Plan

Figure 3.8~~np~~: Via Turin Private Streetscape Section and Plan

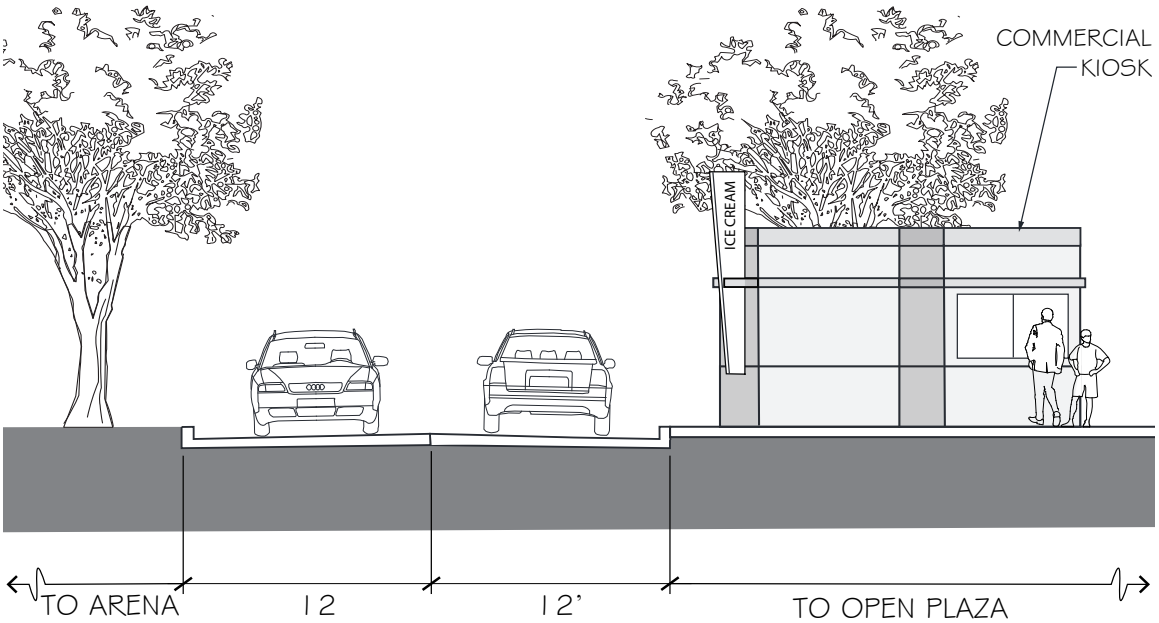


23. Ontario Center Parkway (West of Via Asti) Section

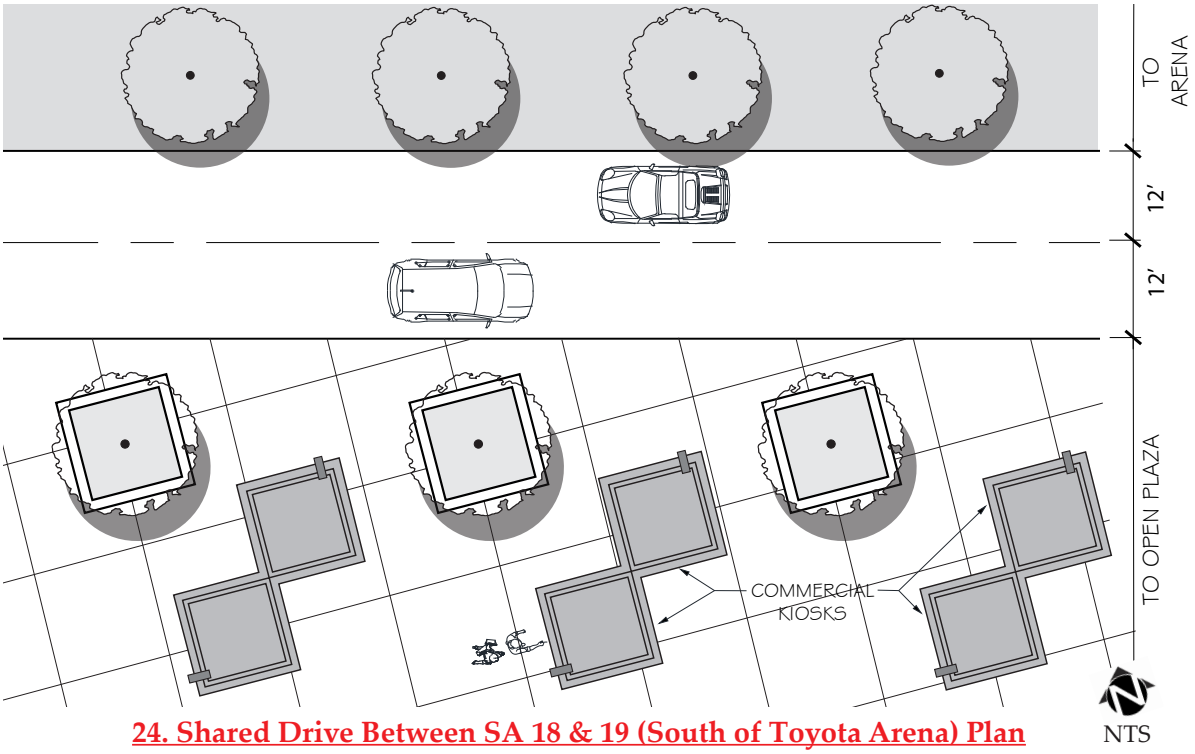


23. Ontario Center Parkway (West of Via Asti) Plan

Figure 3.8q: Ontario Center Parkway (West of Via Asti) Public Streetscape Section and Plan

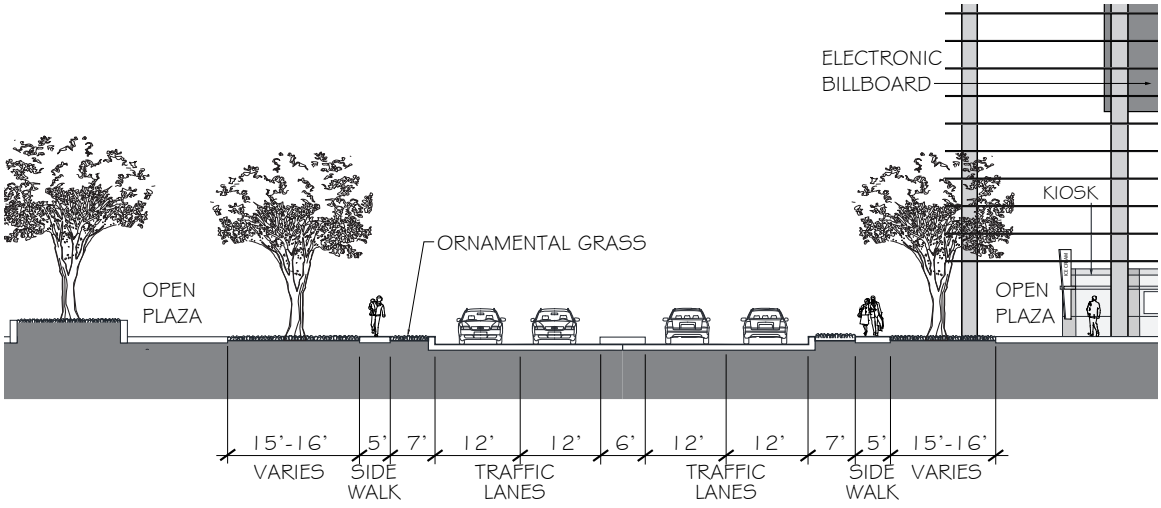


24. Shared Drive Between SA 18 & 19 (South of Toyota Arena) Section

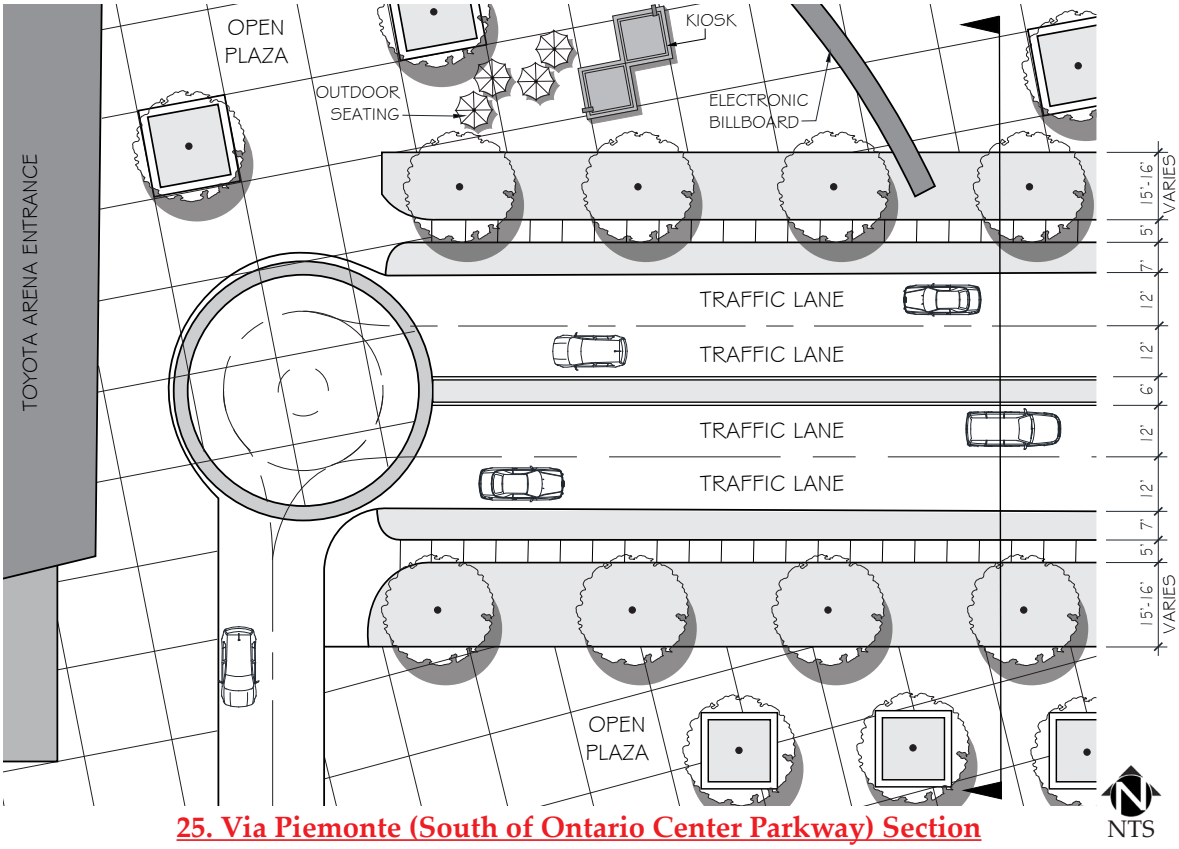


24. Shared Drive Between SA 18 & 19 (South of Toyota Arena) Plan

Figure 3.8r: Shared Drive Between SA 18 & 19 (South of Toyota Arena) Private Streetscape Section and Plan

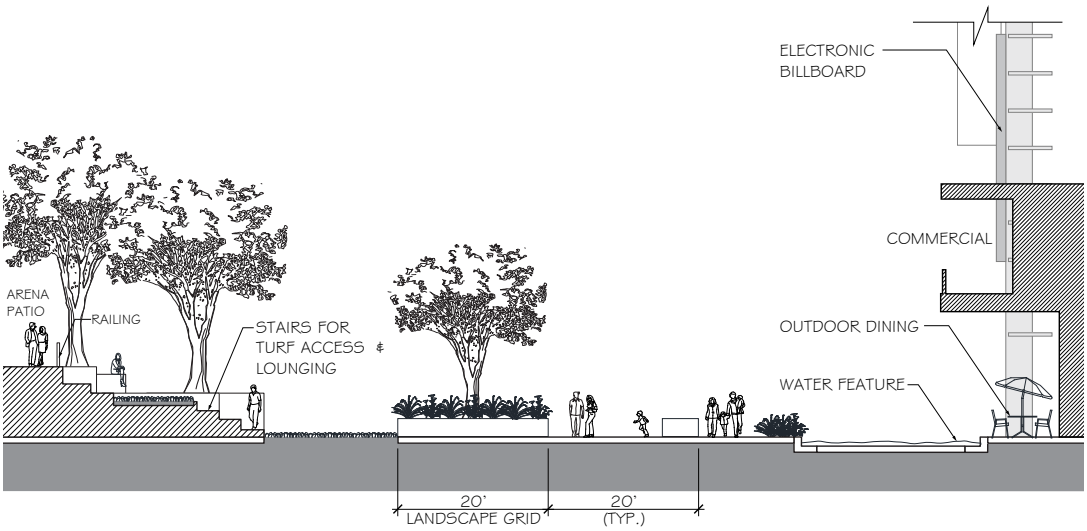


25. Via Piemonte (South of Ontario Center Parkway) Section

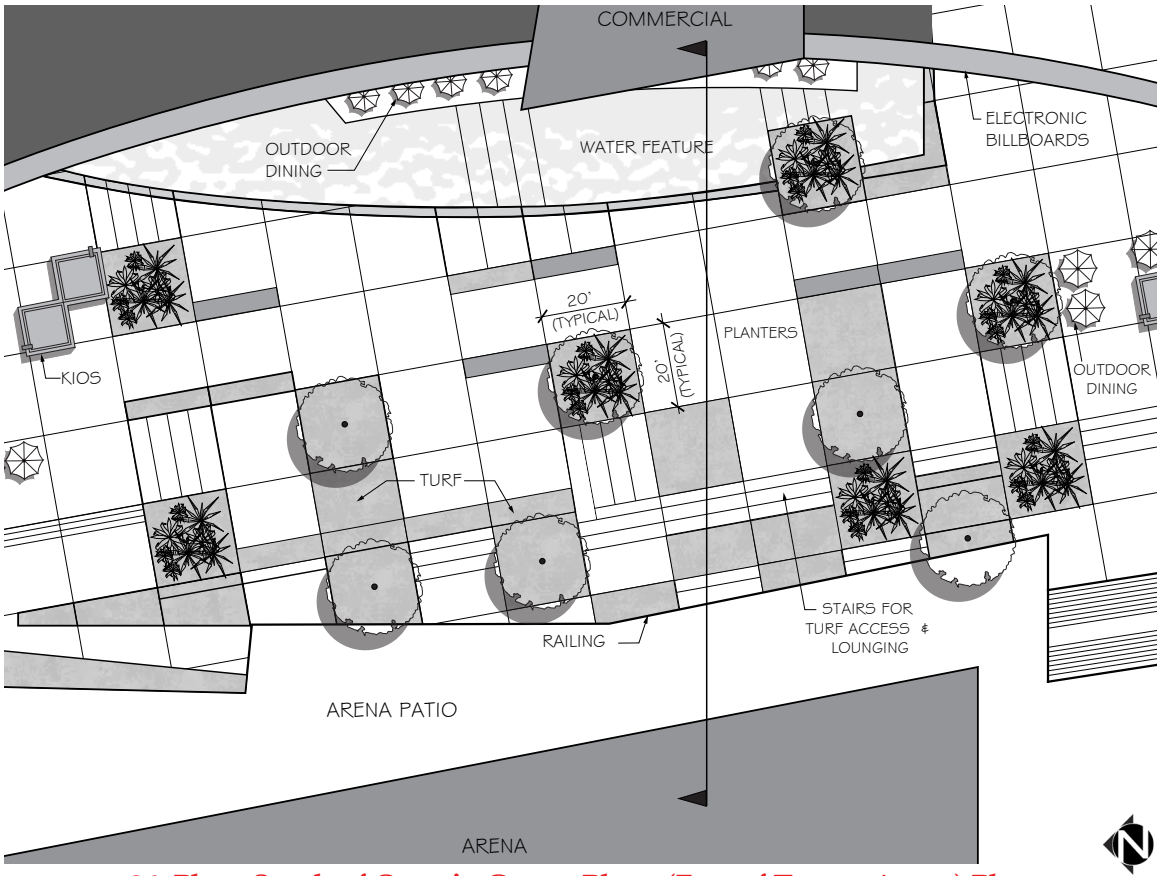


25. Via Piemonte (South of Ontario Center Parkway) Section

Figure 3.8s: Shared Drive Between SA 17 & 18 (South of Toyota Arena) Private Streetscape Section and Plan

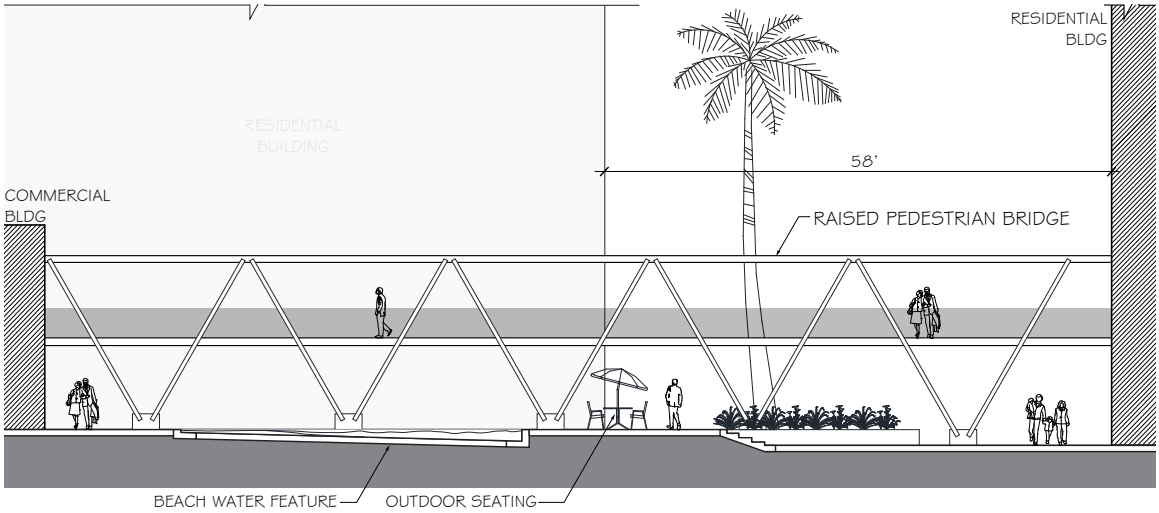


26. Plaza South of Ontario Canter Pkwy (East of Toyota Arena) Section

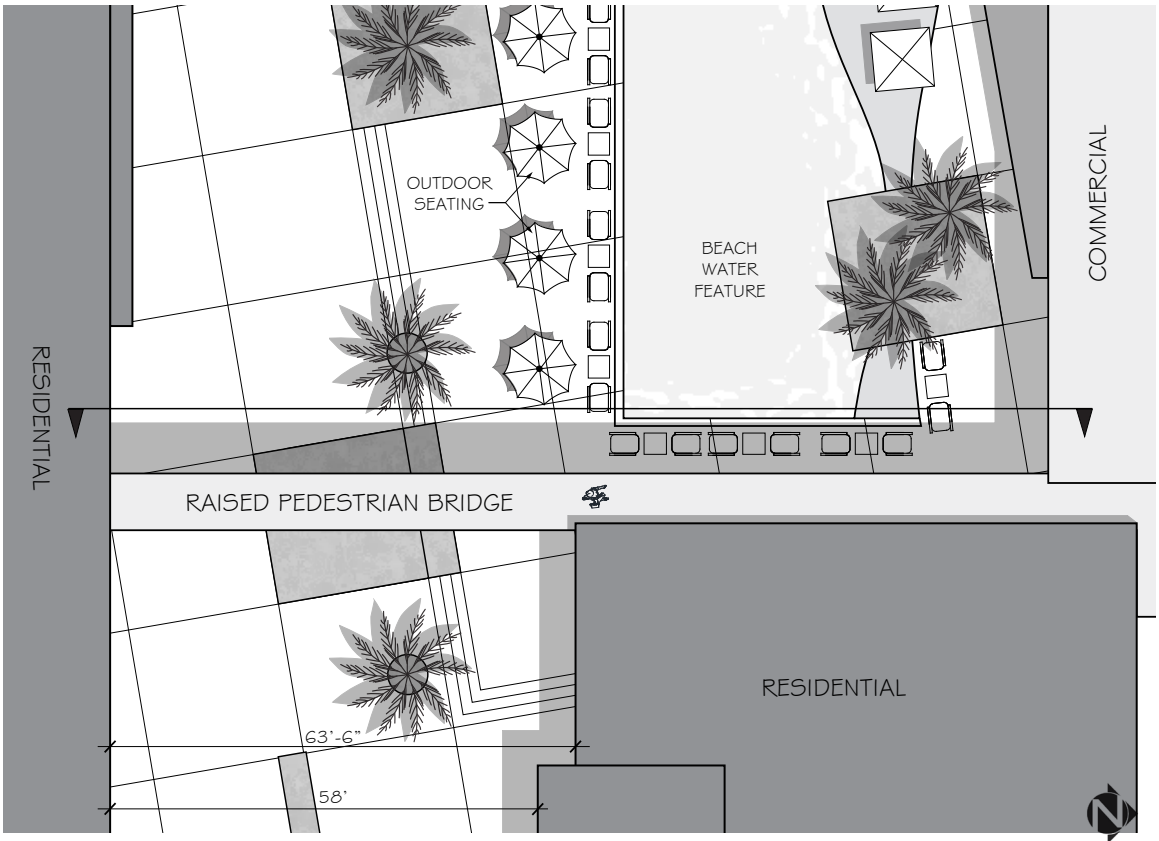


26. Plaza South of Ontario Canter Pkwy (East of Toyota Arena) Plan

Figure 3.8t: Plaza East of Toyota Arena Private Streetscape Section and Plan



27. Pedestrian Pathway Between SA 16 & 17 (East of Toyota Arena) Section



27. Pedestrian Pathway Between SA 16 & 17 (East of Toyota Arena) Plan NTS

Figure 3.8u: Pedestrian Pathway Between SA 16 & 17 (East of Toyota Arena) Private Streetscape Section and Plan

Entry Statements

Figure 3.9: Piemonte Overlay Entry Hierarchy identifies the locations and hierarchy of Overlay entries (Existing Primary, Secondary, and Tertiary and proposed project entries). Figures 3-11 through 3-13 illustrate the entry design concepts to be implemented at each type of entry. Sufficient area on both sides of entry roadways should be reserved to allow for construction of entry statement features and associated landscaping. To these ends, 400 square feet in a roughly square configuration shall be reserved at each Primary entry intersection corner (800 square feet total, 400 square feet allocated to each intersection corner); 300 square feet in a roughly square configuration shall be reserved at Secondary entry intersection corner (600 square feet total, 300 square feet allocated to each intersection corner); and 200 square feet in a roughly square configuration shall be reserved at each Tertiary entry intersection corner (400 square feet total, 200 square feet allocated to each intersection corner). The entry designs will be submitted at the time of the development application.

OCSP Entry Treatments

Figure 3.9: Piemonte Overlay Entry Hierarchy also identifies the location of primary and secondary entries to the OCSP, which entries are shared intersections with the Piemonte Overlay at Ontario Center. At these locations, the Piemonte Overlay will integrate and complete entry statements and intersection treatments consistent with current requirements of the OCSP. Schematic designs and dimensional criteria for these OCSP entry treatments are presented in Figure 3.13: Existing OCSP Entry Statement. Please refer also to related discussions presented in Section 3.8.4 Signs.

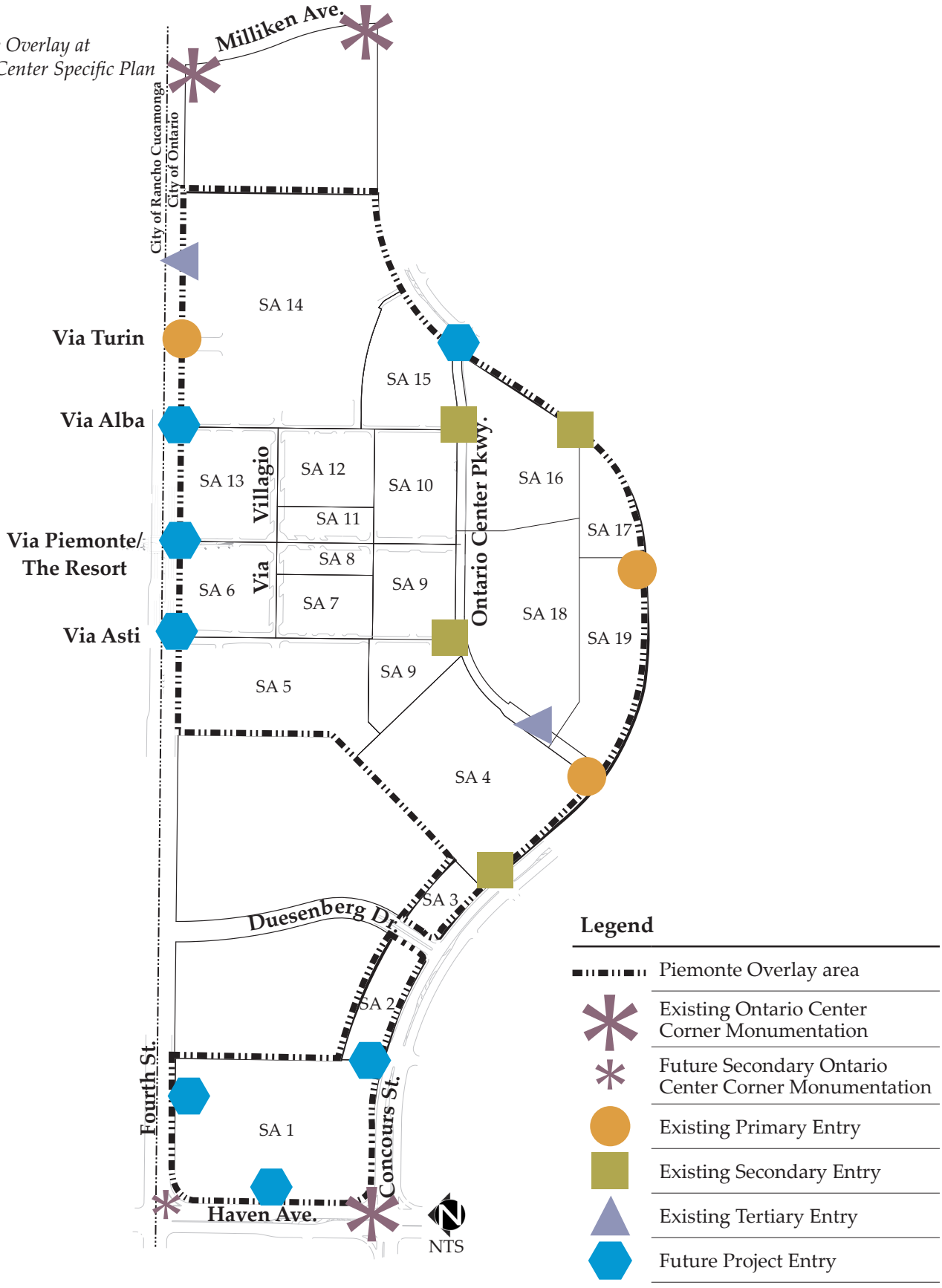
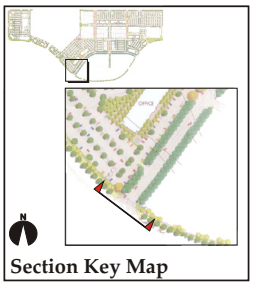


Figure 3.9: Piemonte Overlay Entry Hierarchy



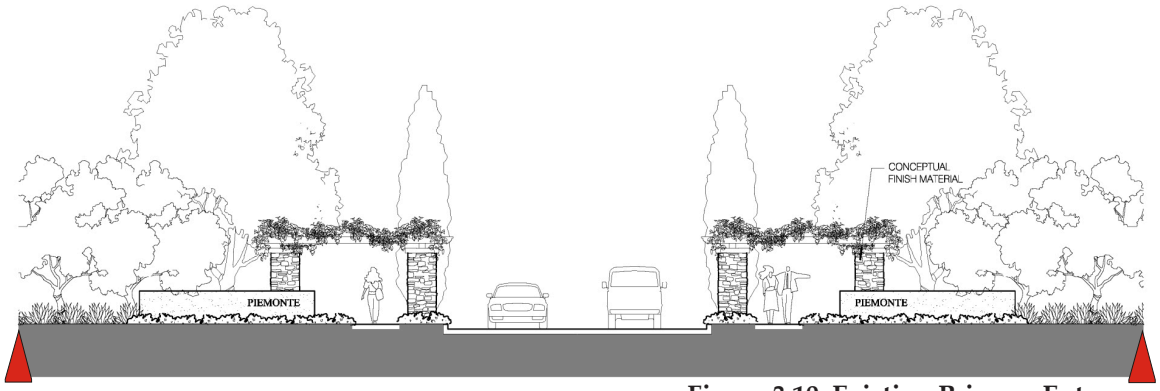
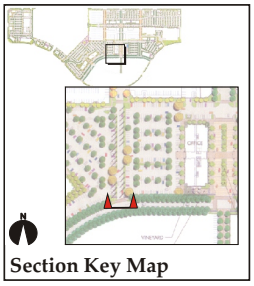


Figure 3.10: Existing Primary Entrance



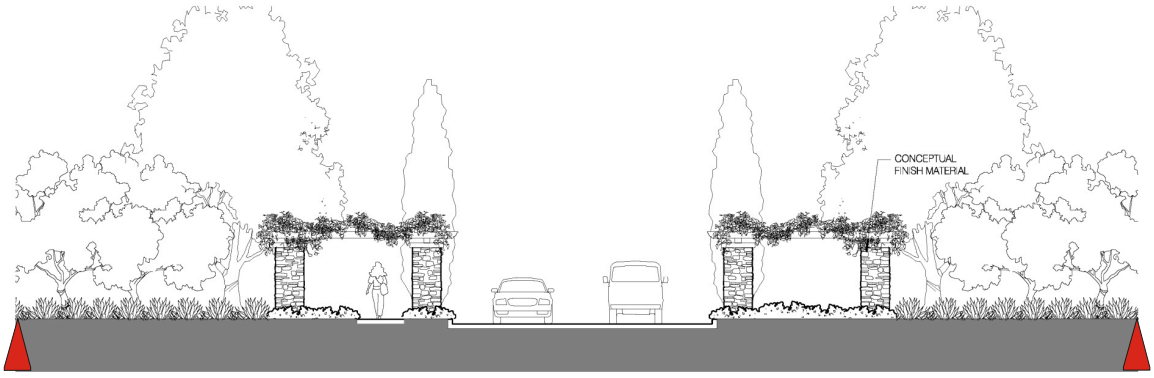
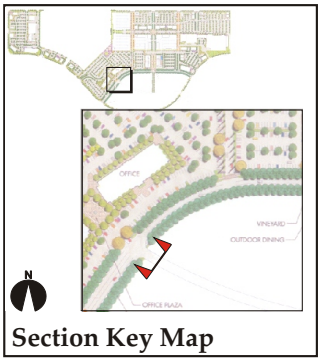


Figure 3.11: Existing Secondary Entrance



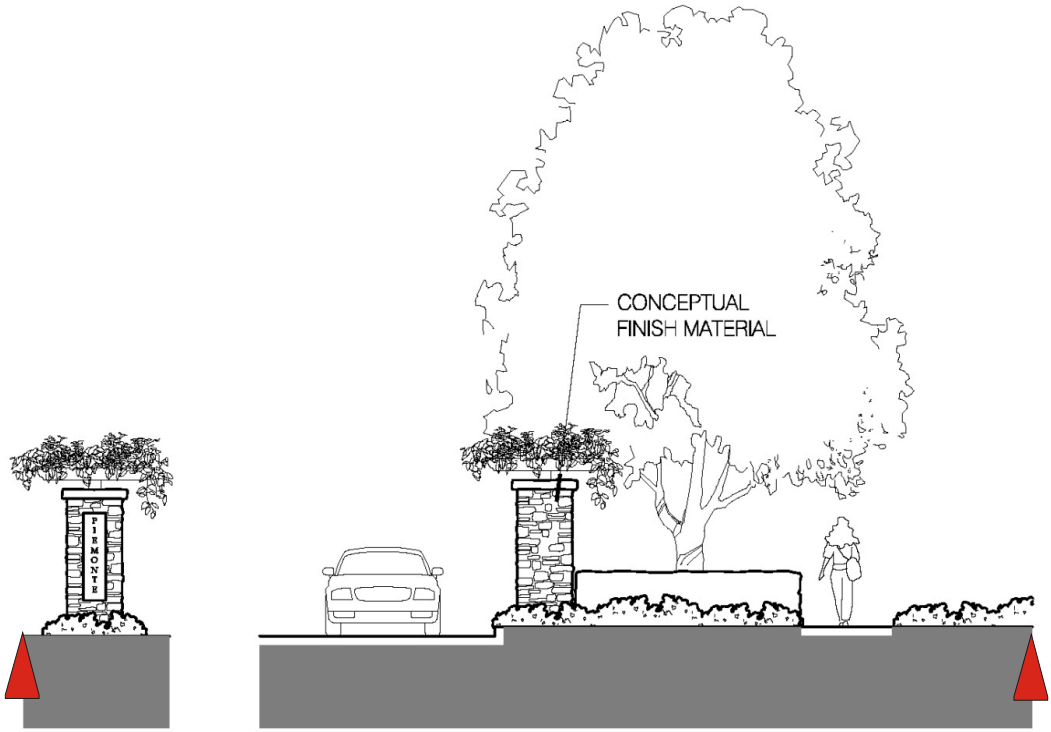


Figure 3.12: Existing Tertiary Entrance

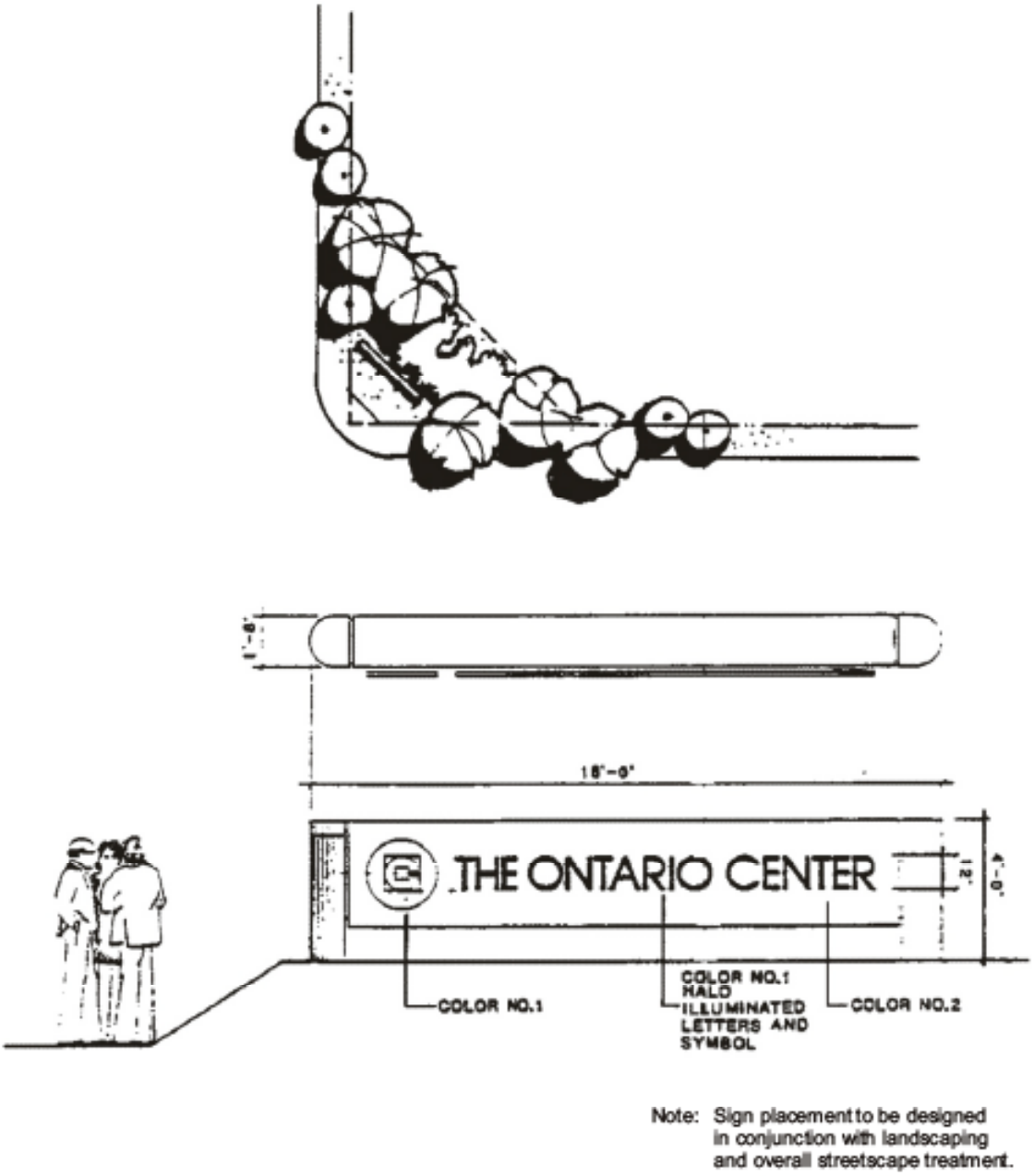


Figure 3.13: Existing OCSP Entry Statement

3.8.2 Landscape/Streetscape Development Regulations

3.8.2.1 General Landscape and Planting Requirements

General landscape/streetscape development regulations presented below are representative of area-wide requirements of the OCSP and shall guide the selection and installation of landscape improvements within the Overlay:

- Shrubs shall be 5 gallon minimum.
- All street trees shall be planted and staked per City of Ontario Standards. All trees receive separate tree bubbler irrigation.
- Trees shall be planted in minimum sizes and ratios presented in Table 3.7: Piemonte Overlay Tree Planting Schedule.

Table 3.7: Piemonte Overlay Tree Planting Schedule

Minimum Tree Size Mix	
Minimum Percent Mix of Required Trees	**Size**
10%	48-inch box or larger
15%	36-inch box
25%	24-inch box
50%	15-gallon
Minimum Tree Species Mix	
Number of Trees Proposed	**Number of Tree Species Required**
20 or fewer	2
21 to 30	3
31 to 40	4
More than 40	5

Tree planting ratios for major streets shall be:

- Primary tree species: 40 percent
- Secondary tree species: 60 percent
- Trees in parkways and medians shall be at an average ratio of 4 trees per 100 linear feet of frontage unless otherwise specified.

Planting for major street medians and parkway shall be~~,~~ ground cover, ornamental grasses and shrubs. In addition to the above requirements, 15 percent of the median area shall be devoted to cobble treatment. Exceptions to the above requirements may be granted by the City.

Staking and guying of all trees shall be in accord with City standards. Where appropriate, vines or suitable shrubs shall be used throughout the Piemonte Overlay for graffiti deterrence. Replacement of dead or broken plant material shall be the responsibility of the property owner. All landscaped areas within the Overlay shall be maintained to City standards. All landscape and irrigation plans shall be submitted to, and approved by, the City. Changes in the landscape, irrigation plans, or plant materials may be substituted as necessary by the City.

3.8.2.2 Public Streetscape

Each public street along the perimeter of the Overlay has a set of designated primary trees, complemented by a range of subordinate (or secondary) tree plantings. The previous Figures 3-9 and Figure 3.8n: Via Turin Private Streetscape Section and Plan and Figures 3-11 and Figure 3.8l: Via Alba - Middle Section (South of Via Villagio) Private Streetscape Section and Plan schematically present how the streetscape was implemented along these streets. Significant elements identified within these Figures include a meandering sidewalk, bordered on both sides by shrubs, groundcover, ornamental grass, and primary and secondary trees. Ornamental grass and trees will be located between the sidewalk and street pavement. Trees, shrubbery and groundcover will be located behind the sidewalk. Refer to Appendix E for the Applicable OCSP Planting Matrix for these streets.

3.8.2.3 Private Streetscape

Each private drive within the Piemonte Overlay also has designated primary and secondary tree plantings refer to Table 3.8: Private Street Planting Matrix and Table 3.9: Internal Trees for the species allowed for each drive.

Table 3.8: Private Street Planting Matrix

Species		Primary Entrance Statement	Secondary Entrance Statement	Via Asti	Via Piemonte	Via Alba	Via Villagio
Latin name	Common name						
Citrus species	NCN			X		X	
Cupressus sempervirens	Italian Cypress	X	X			X	
Olea europaea	Fruitless Olive			X	X		X
Quercus suber	Cork Oak			X	X		
Phoenix canariensis	Canary Island Date Palm				X		X
Phoenix dactylifera	Date Palm				X		
Pinus canariensis	Canary Island Pine					X	
Pittosporum undulatum	Victorian Box			X		X	
Platanus acerifolia	London Plane			X			X
Washingtonia filiferia	California Fan Palm	X	X	X		X	X

Table 3.9: Internal Trees

Latin name	Common name
Trees	
Arbutus 'Marina'	Strawberry Tree
Bambusa oldhamii	Clumping Giant Timber Bamboo
Bauhinia purpurea	Orchid Tree
Cercidium hybrid 'Desert Museum'	Hybrid Palo Verde
Citrus sinensis	Orange Tree
Eucalyptus citriodora	Lemon Scented Gum
Jacaranda mimosifolia	Jacaranda
Koelreuteria paniculata	Golden Rain Tree
Lagerstroemia indica	Crape Myrtle
Magnolia grandiflora 'D.D. Blanchard'	Southern Magnolia
Magnolia grandiflora 'Little Gem'	Southern Magnolia
Michelia champaca 'Alba'	White Fragrant Himalayan Champaca
Olea europaea	Olive
Pinus caneriensis	Canary Island Pine
Pyrus calleryana 'Chanticleer'	Chanticleer Pear
Rhus lancea	African Sumac
Strelitzia nicholai	Giant Bird-of-Paradise
Tristania conferta	Brisbane Box
Palms	
Archontophoenix cunninghamiana	King Palm
Brahea armata var. Clara	Droopy Mexican Blue Fan Palm
Chamaerops humilis	Mediterranean Fan Palm
Cycas revoluta	Sago Palm
Syagrus romanzoffianum	Queen Palm

3.8.2.4 Plant Palette/Planting Matrix

Table 3.10: Shrub Plant Palette for Parkways and Streetscapes and Table 3.11: Shrub Plant Palette for Internal Courtyards and Landscape Areas Not Adjacent to Streetscapes lists environmentally sustainable plant materials are also allowed within the Overlay to reinforce the architectural and land use planning themes. Plant varieties as indicated above will be employed in varying combinations throughout the Overlay.

Table 3.10: Shrub Plant Palette for Parkways and Streetscapes

Latin name	Common name
Acacia cognata 'Cousin Itt'	Little River Wattle
Agapanthus africanus	Lily-of-the-Nile
Agave 'Blue Flame'	Blue Flame Agave
Aloe arborescens	Tree Aloe
Aloe bainesii (barberae)	N.C.N.
Aloe vera	Medicinal Aloe
Buxus microphylla japonica	Japanese Boxwood
Callistemon viminalis 'LittleJohn'	Dwarf Bottlebrush
Carex species	Blue Sedge
Carissa grandiflora 'Green Carpet'	Natal Plum
Citrus Kumquat Hybrid 'Tavares'	Kumquat
Cordyline australis 'Red Star'	Red Grass Palm
Dianella tasmanica 'Silver Streak'	Silver Streak Flax Lily
Feijoa sellowiana	Pineapple Guava
Hemerocallis 'Dwarf Red'	Day Lily
Ilex crenata 'Sky Pencil'	Sky Pencil Ilex
Juncus patens	California Gray Rush
Juniperus scopulorum 'Skyrocket'	Skyrocket Juniper
Leucodendron 'Jester'	Sunshine Conebrush
Leucophyllum langmaniae 'Lynn's Legacy'	Lynn's Legacy Texas Ranger
Leymus condensatus 'Canyon Prince'	Canyon Prince Wild Rye
Ligustrum japonicum 'Texanum'	Wax Leaf Privet
Lomandra longifolia 'LM300'	Breeze Dwarf Mat Rush
Moraea bicolor	Fortnight Lily
Olea europaea 'Montra' P.P.#6266	Little Ollie Dwarf Olive
Pelargonium hortorum	Common Geranium
Pennisetum 'Fairy Tails'	Fairy Tails Fountain Grass
Penstemon 'Firebird'	Beard Tongue
Pittosporum Species	Tobira
Podocarpus elongatus 'Monmal'	Icee Blue Yellow-Wood
Rhaphiolepis species	Indian Hawthorne
Rosa f. 'Trumpeter'	Trumpeter Rose
Rosa x 'Noare'	Flower Carpet Red Groundcover Rose
Strelizia reginae	Bird-of-Paradise
Tecoma stans 'Sierra Apricot'	Sierra Apricot

Table 3.11: Shrub Plant Palette for Internal Courtyards and Landscape Areas Not Adjacent to Streetscapes

Latin name	Common name
Acacia cognata 'Cousin Itt'	Little River Wattle
Agapanthus africanus	Lily-of-the-Nile
Aloe arborescens	Tree Aloe
Aloe bainesii (barberae)	N.C.N.
Aloe vera	Medicinal Aloe
Buxus microphylla japonica	Japanese Boxwood
Callistemon viminalis 'LittleJohn'	Dwarf Bottlebrush
Carex species	Blue Sedge
Carissa grandiflora 'Green Carpet'	Natal Plum
Citrus Kumquat Hybrid 'Tavares'	Kumquat
Cordyline australis 'Red Star'	Red Grass Palm
Dianella tasmanica 'Silver Streak'	Silver Streak Flax Lily
Feijoa sellowiana	Pineapple Guava
Hemerocallis 'Dwarf Red'	Day Lily
Ilex crenata 'Sky Pencil'	Sky Pencil Ilex
Juncus patens	California Gray Rush
Juniperus scopulorum 'Skyrocket'	Skyrocket Juniper
Leucodendron 'Jester'	Sunshine Conebrush
Leucophyllum langmaniae 'Lynn's Legacy'	Lynn's Legacy Texas Ranger
Leymus condensatus 'Canyon Prince'	Canyon Prince Wild Rye
Ligustrum japonicum 'Texanum'	Wax Leaf Privet
Lomandra longifolia 'LM300'	Breeze Dwarf Mat Rush
Moraea bicolor	Fortnight Lily
Olea europaea 'Montra' P.P.#6266	Little Ollie Dwarf Olive
Pelargonium hortorum	Common Geranium
Pennisetum 'Fairy Tails'	Fairy Tails Fountain Grass
Penstemon 'Firebird'	Beard Tongue
Pittosporum Species	Tobira
Podocarpus elongatus 'Monmal'	Icee Blue Yellow-Wood
Rhaphiolepis species	Indian Hawthorne
Rosa f. 'Trumpeter'	Trumpeter Rose
Rosa x 'Noare'	Flower Carpet Red Groundcover Rose
Strelizia reginae	Bird-of-Paradise
Tecoma stans 'Sierra Apricot'	Sierra Apricot

3.8.2.5 Other Elements

Design and development standards applicable to other features represented within the Overlay area are discussed below.

Parking Lot/Streetscape Interface

As provided for under the OCSP to implement the informal landscape concept proposed along the major arterials within the Piemonte Overlay parking setbacks within the Overlay may be averaged.

Limited Use Areas

Standard limited use areas shall be maintained within the Piemonte Overlay as required by the City Engineering Department. Limited use areas restrict development and obstructions proximate to intersections, thereby establishing adequate site distances and promoting pedestrian and vehicular safety.

Retaining Walls

It is anticipated that certain areas of the Piemonte will require construction of expansive retaining walls which will be exposed to public view. Screenwalls may also be introduced where protection from intrusive views may be warranted. The following standards will be observed for expansive walls constructed within the Overlay:

- Visual impact of walls should be minimized by limiting wall heights to five (5) feet whenever possible.
- Walls will be stepped to allow for screen planting whenever possible.

Landscape Grading

Landscaped areas within the Overlay area will be graded as swales to the maximum extent practicable in order to maximize conservation of irrigation water and natural rainfall run-off.

3.8.3 Piemonte Open Space and Urban Recreational Opportunities

The Piemonte Overlay has a unique opportunity to provide an amazing active open space amenity, due to the connection and adjacency to the ~~Citizens Business Bank~~ Arena. Several of the private streets have been designed so they can easily be closed off to vehicular traffic, thereby creating a pedestrian open air mall.

Special events and festivals, along with farmer's markets, would benefit from this flexible urban activity. Most useful, however, would be pre- and post-game celebrations extending up from the ~~Citizens Business Bank~~ Arena. Physically expanding the connection to the restaurants and retail component, which will be directly located east and south of the Arena and ~~just~~ one block to the north, will not only create an economic benefit, but more importantly foster a social connection ~~of "like-minded" people~~among event attendess and other visitors; as well as create a hub of activity.

3.8.4 Signs

The following discussions identify visual attributes of, and define the standards for, signs within the Piemonte Overlay. The intent is to permit flexibility of design consistent with the proposed mix of land uses, and to provide a cohesive system of signs that are visually coordinated and aesthetically pleasing.

Various signs and monumentation within the Piemonte Overlay will provide identity and reinforce the land use plan and architectural design of the proposal. Sign design and details will relate to the architectural character, support the overall design concept, and reflect the proposed varied architectural styles.

The Sign Design Guidelines and Sign Regulations presented below constitute the basis of the Master Sign Program for the Piemonte Overlay, which Program is subject to review and approval by the City as provided in Chapter 4. The Master Sign Program will illustrate and demonstrate thematic integration of signs within the overall design, as well as internal compatibility of signs with each other, and with other elements. Further, as verified by the City through the review

processes, all signage will comply with applicable provisions of the Manual on Uniform Traffic Control Devices (MUCTD).

The Master Sign Program will be developed concurrent with design of each individual Project. As a minimum, a draft of the Master Sign Program will be provided to the City for review prior to issuance of the first building permit within the applicable project site, with final approval of the Master Sign Program to be accomplished prior to issuance of the first Certificate of Occupancy. Signs proposed for individual development projects within the Piemonte Overlay will be reviewed by the Planning Department/City for consistency with the Piemonte Sign Program.

3.8.4.1 Sign Design Guidelines

The following Sign Design Guidelines will establish and reinforce the identity of the Overlay, and provide a cohesive informational and directional graphic system. The detailing and style of signs shall relate to the architectural themes proposed, and shall support the Piemonte development concept while contributing to the overall ambience.

Thematic Character

Interesting and colorful signs will serve to attract patrons and facilitate desired circulation within the Piemonte. Signs will also establish and reinforce the development character within the Piemonte Overlay. The goals of the Piemonte sign guidelines are to:

- Foster variety in signs, including variety of size, design, placement, detail, shape and color.
- Encourage the use of design elements which interpret and incorporate thematic architectural elements.

To achieve these goals, the following guidelines will be followed in the design and implementation of signs within the Piemonte Overlay:

- Signs shall exhibit a varied mix of designs, colors, shapes, materials, and

fabrication technologies to reinforce the architectural themes. For example, modern office buildings within the Overlay will introduce signs evidencing modern designs, and which interpret architectural styles materials and styles of the buildings they (the signs) identify. The use of certain common sign colors, design elements, and/or language (e.g., "XYZ Business at Piemonte"), will lend to a cohesive sense of the Piemonte Overlay.

- Monument entry signs shall be integrated into cohesive landscape treatments.

Sign Categories

The following general categories of signs will be implemented in the Piemonte Overlay.

Perimeter Identity Signs

- **Perimeter Monumentation.** Entry and perimeter statements identifying the overall property and corporate identifications as applicable, consisting of vertical or horizontal monument signs which are integrated into landscape features.
- **Perimeter and Tenant Identification Signs.** Signs and identification statements denoting the Piemonte Overlay, as well as illuminated logos and tenant images which are integrated into building facades and roof edges.
- **Perimeter Directional Signs.** Directional signs located on the perimeter of Piemonte Overlay.

Internal Directional/Informational Signs

- **Site Circulation Signs.** Signs which facilitate pedestrian and vehicle circulation and assist drivers to identify areas within the Overlay while reinforcing the overall Overlay. The character of these signs will reflect the varied architectural themes employed within Overlay.
- **Interior Banners.** System of pole-mounted banners for identification purposes. It is anticipated that banners would be employed primarily in the more informal settings of the Commercial areas.

- **Regulatory Signs.** Regulatory signs will be provided consistent with City requirements. To the extent feasible, these signs will continue and interpret the Overlay architectural and landscape/streetscape themes.

Tenant Signs

Tenant signs will reflect individual occupancies, as determined by specific user requirements, including but not limited to: corporate logos, colors, and sign configurations. As a component of the City's development review process, tenant signs will be evaluated for consistency with these guidelines.

Digital Advertising Signs

Digitial Advertising Signs are allowed within the plaza area east of the Arena building, in the general area between Subareas 16 and 18, and Subareas 17 and 19. The signs will be a series of LED Billboard Screens and located in highly visible, high traffic, outdoor plaza and pedestrian corridor. The Digital Adversiting Signs may display products, brands, and businesses associated with the commercial uses in the development as well as offsite advertisements, City sponsored events, and public service announcements. An approved Master Sign Program shall be required in accordance with the Ontario Development Code to establish development standards for design, sign area, location, and use.

3.2.8.2 Sign Regulations

Sign regulations are organized to address the two (2) primary categories of signs within the Piemonte as described above: Perimeter Identity Signs and Internal Informational/Directional Signs. Individual tenant improvements signs will be addressed as a component of City's review processes for individual development proposals within the Piemonte Overlay. Of primary concern are the visual attributes of internal signs, and public perception of the signs as seen from off-site vantages.

Perimeter Identity Signs

The purpose of the Perimeter Identity Signs is to provide identification of the Piemonte Overlay at the edges and entrances and primary tenants. The character and details of these signs will interpret and reinforce general architectural themes of the Piemonte Overlay and will incorporate elements consistent with the design expressions common to prevailing architectural style(s). Perimeter Identity Signs shall be implemented consistent with the following guidelines:

Perimeter Entry Monumentation

Entry monumentation will be provided at each of the Overlay's perimeter entrances. (Please refer to the SPA topical discussion of Entry Statements). Monument signs provided at the development entrances will incorporate and reflect architectural themes exhibited by structures within the Piemonte Overlay. These signs may incorporate corporate identifiers, electronic graphics or similar visual displays. Detailed dimensions and locations of perimeter entry monument signs will be as provided for within the Piemonte Sign Program.

Perimeter Project and Tenant Identification

Perimeter and tenant identification statements will consist of horizontal or vertical monuments integrated into landscaping features along perimeter roadways. Content may include the development name and logo and names and logos of major tenants. Detailed dimensions and locations of perimeter and tenant identification monument signs will be as provided for within the Piemonte Sign Program.

Perimeter Directional Signs

Perimeter directional signs will typically be fabricated metal panels on posts, or panels mounted to lighting standards. Dimensions and general locations of perimeter directional signs will be as provided for within the Piemonte Sign Program.

Internal Informational/Directional Signs

Internal Informational/Directional Signs shall be limited to the following:

- **Vehicular Circulation**. Directional signs associated with on-site roadways and traffic circulation system.
- **Pedestrian Circulation**. Directional signs associated with on-site pedestrian walkways and corridors.
- **Interior Banners**. Banners or similar informal signs may be implemented throughout the Piemonte as a means of introducing color, variety, and as a unifying thematic element.
- **Parking Zone Markers**. Signs mounted on permanent poles to identify parking areas.

Other Regulatory Signs

Other regulatory signs, e.g., traffic controls signs, access control signs, will be provided throughout the Piemonte Overlay consistent with City or other applicable agency requirements.

Internal informational/directional signs will reflect the varied architectural themes and styles that are proposed throughout the Project. With the exception of signs mandated by City or other ordinances, dimensions and area of all Internal Informational/Directional Signs shall be as provided for within the Piemonte Sign Program.

3.8.5 Lighting

3.8.5.1 Lighting Design Guidelines

Lighting themes and fixtures will lend a varied ambience to the nighttime appearance of the Piemonte Overlay, while providing illumination that is consistent with customary municipal safety standards. A combination of light fixtures will be used to illuminate surfaces such as roadways, parking areas and walkways, as well as landscape areas and building facades. The overall effect to be achieved is a balanced composition of lighting elements consisting of warm color light for architecture and cool color light for landscaping. The utilization of varying shades of white light will bring out the most desirable color characteristics of each.

Illumination for roadways will be provided by decorative poles that are compatible with the architectural character of the Piemonte Overlay and its surroundings. Light sources will be energy-efficient fixtures selected for their durability and reliability. Finishes will be complementary to architectural and landscaping components.

Parking areas will receive "cut-off" luminaries that shield against light trespass. The fixtures will be pole-mounted and shall include optics which will allow all appropriate areas to receive an average light level of approximately 1.5 foot candles. Fixtures will be energy-efficient LED or other code compliant lights.

Facade lighting will consist of energy-efficient LED, metal halide, fluorescent, and incandescent sources. The goal will be to accent architectural building details, and to create a unified appearance for all structures. Layers of light from multiple sources will help to control contrasts and to enhance 3-dimensional perspectives.

Low level path lighting and illuminated bollards will be used to accent walkways, plazas, paseos and other pedestrian access areas. Fluorescent sources are most desirable for this type of lighting.

Metal halide and fluorescent fixtures are the primary light source that will be used to highlight planting and trees. The intent is to bring out the green of tree canopies as well as the vibrant colors of seasonal plants at grade level.

Project signs may be internally or externally illuminated, consistent with provisions of the Piemonte Sign Program.

3.8.5.2 Lighting Development Standards

All lighting along public roadways will comply with applicable City and OCSP requirements (as modified by this Overlay). Lighting and light fixtures within the Piemonte Overlay shall conform to the following standards:

- The use of lighting should be integrally designed as part of the built environment and should reflect a balance for the lighting needs with the contextual ambient light level and surrounding nighttime characteristics of the community.
- Lighting designs should be designed to minimize glare, light trespass, energy conservation, and to maintain dark skies.
- Full cut-off fixtures, mounting heights, and shielding should be utilized to effectively control glare and light trespass where possible.
- Lighting standards should support the overall intended theme of the Project.
- Lighting should be both aesthetically pleasing as well as functional.
- Lighting should meet all code requirements to properly achieve appropriate coverage.
- Lighting should provide a sense of safety and security for all site users.

All lighting within the Piemonte Overlay will be implemented and operated in conformance with Section 6.01.015.~~E~~N.13 of the Ontario Development Code.

4.0 ADMINISTRATION

4.1 INTRODUCTION

Approval of the Piemonte Overlay Specific Plan Amendment (~~2016~~2022) indicates acceptance by the City of Ontario City Council of the general framework for the development of the Piemonte Overlay property. Part of that framework establishes specific development standards that constitute the zoning regulations for the Piemonte Overlay. The provisions contained herein regulate development within the Specific Plan area, and provide the process for review and approval of development projects within the Overlay area.

4.2 SEVERABILITY

If any portion of this Specific Plan Overlay document is declared to be invalid or ineffective in whole or in part, such decision shall not affect the validity of the remaining portions thereof. The legislative body hereby declares that they would have enacted these regulations and each portion thereof irrespective of the fact that any one or more portions be declared invalid or ineffective.

4.3 MINOR MODIFICATIONS TO THE OVERLAY

The City recognizes that modifications to the text and exhibits of this document may be needed over time. The following minor modifications to this document may be process as Specific Plan Minor Amendments, pursuant to Ontario Development Code Section 4.02.080 ~~do not require formal Specific Plan Amendment and are subject to review and approval by the Planning Director~~; the reviewing authority ~~Director~~ however shall have the discretion to defer any such request for modification to the Planning Commission or City Council.

- Expansions or reductions of the net acreage covered within a Subarea.
- A decrease in development intensity/density (non-residential square footage, lodging rooms, and/or residential units).

- Modification of design criteria such as architectural details, landscape treatments, plant matrices, fencing, lighting, and entry treatments.
- Implementation of alternative landscape materials, wall materials, wall alignment, entry monument design, and streetscape design that are generally consistent with the conceptual design guidelines contained within this Overlay.
- Modifications to Architectural Design Guidelines, such as variation of materials within a particular architectural style and variations in materials and colors.
- Modifications to Signage requirements.
- Final infrastructure facility sizing and precise location of dry utilities, water, sewer, and storm drainage improvements when directed by the City Engineer.
- Roadway alignment when the changes are warranted. Revisions to exhibits which do not substantially change the intent of the Specific Plan.
- Modification and deletions to the list of allowed uses.
- Specific modifications of a similar nature to those listed above which are deemed minor by the Planning Director, which are in keeping with the intent of this Specific Plan and which are in conformance with the City of Ontario General Plan.

4.4 AMENDMENTS TO THE OVERLAY

Amendments to the Overlay may be requested by the applicant or the City pursuant to Section 65453(a) of the Government Code. Amendments shall be processed pursuant to the provisions of the Government Code for Specific Plan Amendments and Section 4.01.035 Specific Plans and Amendments of the Ontario Development Code.

In the event the proposed amendment requires supplemental environmental analysis pursuant to the California Environmental Quality Act (CEQA), the applicant(s) are responsible for preparing the necessary CEQA documentation.

4.5 SUBDIVISION MAPS

Approval of subdivision ~~(parcel)~~ maps may occur concurrently or subsequent to the adoption of the Overlay. All tentative and final subdivision maps shall be reviewed and approved pursuant to Division 2.02, Application Filing and Processing, and Division 6.08, Subdivisions, of the Ontario Development Code and consistent with the applicable provisions of the Land Use, Infrastructure, Development Regulations, and Design Guidelines adopted as part of the Overlay.

4.6 DEVELOPMENT REVIEW PROCESS

Development proposals within the Piemonte Overlay area are subject to review and approval by the City of Ontario through the City's review processes discussed below.

4.6.1 Development Plans

Development proposals shall be submitted to the City for consideration, pursuant to the provisions of the Development Code Division 2.02 and Division 4.02. Development Plans shall be substantially consistent with the Overlay and associated exhibits. Applications and appeals related to Development Plan Review shall conform to requirements of the Ontario Development Code.

Through the Development Plan review process, development of individual proposals will be evaluated for consistency with the land uses, facilities configurations, and Design Guidelines and Development Regulations established under the Overlay. Development Plan review will consider and evaluate such details as building architecture, design, location and orientation, development intensity, and circulation/site access.

4.6.2 Development Capacity Conversion

Any conversion of remaining development capacity shall be processed at the same time as the applicable development plan.

4.7 CONDITIONAL USE PERMIT

Conditional Use Permits shall be required in accordance with Table 5.02-1: Land Use Matrix of the Ontario Development Code ~~for any use in Subareas 6, 8, 11, and 13~~. Conditional uses shall be processed pursuant to the requirements of Section 4.02.015 Conditional Use Permits of the Ontario Development Code. Conditional Use Permits adjacent to residential uses shall consider and address the following residential/commercial interface issues during the review process:

1. Parking
   - Guest
   - Personal spaces being used
2. Traffic
   - Blocked streets
   - Arena/restaurant events
3. Noise
   - People
   - Traffic/Motorcycles
   - Horns
   - Music
   - Arguments
4. Late Night Activities
   - Every night until 2 am
5. Security
   - Unwanted element
   - Sheer number of people in area
   - Strangers
6. Lack of Privacy
   - Walking
   - Jogging
   - Dog Walking

7. Trash Pickup
    - Early morning noise
8. Deliveries
    - Large trucks
    - Times of day
9. Lighting
    - Overall light – amount of light
    - Lights shining in windows
10. Odors/Smell/Health
    - Kitchens/food
    - Flies and bugs
    - Rats and rodents
11. View/Appearance
    - Back of house
    - Loading areas
    - Wash out areas
12. Physical Damage
    - Walls
    - Buildings
    - Gates
    - Landscape

4.8 APPEALS

An appeal from any determination, decision, or requirement of staff, City, or Planning Commission shall conform to the appeal procedures established by Division 2.04 Appeals of the Ontario Development Code.

~~SECTION~~ 5.0 GENERAL PLAN CONSISTENCY

California Government Code (Title 7, Division 1, Chapter 3, Article 8, Section 65450-65457) permits the adoption and administration of Specific Plans as an implementation tool for elements contained in the local General Plan. Specific Plans must demonstrate consistency ~~I~~in regulations, guidelines, and programs with the goals and policies set forth in the General Plan.

The Piemonte Overlay has been prepared in conformance with the goals and policies of The Ontario Plan (TOP) Policy Plan (General Plan). The policy analysis in this Chapter describes the manner in which the Overlay complies with TOP Goals and Polices applicable to the development.

Policy Plan Goals and Policies	Overlay Consistency
LAND USE ELEMENT	
GOAL LU 1: A community that has a spectrum of housing types and price ranges that match the jobs in the City and that make it possible for people to live and work in Ontario and maintain a quality of life.	
LU 1-1 Strategic Growth. We concentrate growth in strategic locations that help create place and identify, maximizes available and planned infrastructure, and foster the development of transit.	The Overlay area is located within the Ontario Center Specific Plan (OCSP) identified in The Ontario Plan and will rely on available infrastructure. The Overlay will adhere to current approved City of Ontario Infrastructure Master Plans.
LU 1-2 Sustainable Community Strategy. We integrate state, regional and local Sustainable Community/Smart Growth principles into the development and entitlement process.	Sustainable Community/Smart Growth principles are incorporated into Land Use Plan. Pedestrian sidewalks connect the mix of land uses within the OCSP. The project will contain many energy efficient features.
LU 1-3 Adequate Capacity. We require adequate infrastructure and services for all development.	The Overlay is located in an area where planned infrastructure and public facilities have been constructed to ensure that adequate roadways and public utilities including sewer, water and drainage facilities along with parks and other public facilities are provided to serve the Overlay area.
LU 1-4 Mobility. We require development and urban design, where appropriate, that reduces reliance on the automobile and capitalizes on multi-modal transportation opportunities. (Link to Mobility Element Policy M 3-3)	The mix of residential and commercial land uses within the Overlay are within walkable distance reducing the reliance on the automobile..
LU 1-5 Jobs-Housing Balance. We coordinate land use, infrastructure, and transportation planning and analysis with regional, county and other local agencies to further regional and subregional goals for jobs-housing balance. (Link to Community Economics Element Policy CE1-1)	N/A
LU 1-6 Complete Community. We incorporate a variety of land uses and building types in our land use planning efforts that result in a complete community where residents at all stages of life, employers, workers and visitors have a wide spectrum of choices of where they can live, work, shop and recreate within Ontario. (Link to Complete Community Section of Community Economics Element)	The Overlay plans for a complete infill community with a mix of residential, commercial, and offices where residents can live, work, shop and recreate at adjacent areas.

Policy Plan Goals and Policies	Overlay Consistency
LU 1-7 Revenues and Costs. We require future amendments to our Land Use Plan to be accompanied by analyses of fiscal impacts. (Link to Community Economics Policy CE3-2)	N/A
GOAL LU 2: Compatibility between a wide range of uses.	
LU 2-1 Land Use Decisions. We minimize adverse impacts on adjacent properties when considering land use and zoning requests.	All development will be reviewed through the City's Development Plan process. Parking demand is carefully reviewed to minimize impacts on adjacent properties.
LU 2-2 Buffers. We require new uses to provide mitigation or buffers between existing uses where potential adverse impacts could occur. (Link to Community Design)	N/A
LU 2-3 Hazardous Uses. We regulate the development of industrial and similar uses that use, store, produce or transport toxic substances, air emissions, other pollutants or hazardous materials. (Link to Hazardous Materials & Waste including Policies S6-4 and S6-5)	N/A
LU 2-4 Regulation of Nuisances. We regulate the location, concentration and operations of potential nuisances.	N/A
LU 2-5 Regulation of Uses. We regulate the location, concentration and operations of uses that have impacts on surrounding land uses.	All development will be reviewed through the City's Development Plan and/or applicable CUP process.
LU 2-6 Infrastructure Compatibility. We require infrastructure to be aesthetically pleasing and in context with the community character.	The Overlay provides for an aesthetically pleasing streetscape concept.
LU 2-7 Inter-jurisdictional Coordination. We maintain an ongoing liaison with IEUA, LAWA, Caltrans, Public Utilities Commission, the railroads and other agencies to help minimize impacts and improve the operations and aesthetics of their facilities.	N/A
LU 2-8 Transitional Areas. We require development in transitional areas to protect the quality of life of current residents.	N/A
LU 2-9 Methane Gas Sites. We require sensitive land uses and new uses on former dairy farms or other methane-producing sites be designed to minimize health risks.	N/A

Policy Plan Goals and Policies	Overlay Consistency
GOAL LU3: Staff, regulations and processes that support and allow flexible response to conditions and circumstances in order to achieve the Vision.	
LU 3-1 Development Standards. We maintain clear development standards which allow flexibility to achieve our Vision.	The Overlay will set forth clear development standards compatible with the City's vision.
LU 3-2 Design Incentives. We offer design incentives to help projects achieve the Vision. (Link to Community Design)	N/A
LU 3-3 Land Use Flexibility. We consider uses not typically permitted within a land use category if doing so improves livability, reduces vehicular trips, creates community gathering places and activity nodes, and helps create identity.	~~N/A~~ The Overlay will be classified as mixed use to allow for flexible land use that will improve livability around the area by creating a pedestrian driven community, through open spaces, plazas, and entertainment.
Goal LU 4: Development that provides short-term value only when the opportunity to achieve our Vision can be preserved.	
LU 4-1 Commitment to Vision. We are committed to achieving our Vision but realize that it may take time and several interim steps to get there.	~~N/A~~ The Overlay master plan is designed to be developed in a series of phases to achieve the Vission around the Piemonte Overlay.
LU 4-2 Interim Development. We allow development in growth areas that is not immediately reflective of our ultimate Vision provided it can be modified or replaced when circumstances are right. We will not allow development that impedes, precludes or compromises our ability to achieve our Vision. (Link to Community Economics Policy CE2-3)	~~N/A~~ The Overlay development allows for areas to be utilized as temporary uses if it will facility and assist towards achieving the ultimate vision. Some areas can be used as immediate parking areas that can later be developed to achieve and accomodate the required parking.
LU 4-3 Infrastructure Timing. We require that the necessary infrastructure and services be in place prior to or concurrently with development.	Necessary infrastructure and services will be in place at occupancy.
GOAL LU5: Integrated airport facilities that minimize negative impacts to the community and maximize economic benefits.	
LU 5-1 Coordination with Airport Authorities. We collaborate with FAA, Caltrans Division of Aeronautics, airport owners, neighboring jurisdictions, and other shareholders in the preparation, update and maintenance of airport-related plans.	N/A
LU 5-2 Airport Planning Consistency. We coordinate with airport authorities to ensure The Ontario Plan is consistent with state law, federal regulations and/or adopted master plans and land use compatibility plans for the ONT and Chino Airport.	N/A

Policy Plan Goals and Policies	Overlay Consistency
LU 5-3 Airport Impacts. We work with agencies to maximize resources to mitigate the impacts and hazards related to airport operations.	N/A
LU 5-4 ONT Growth Forecast. We support and promote an ONT that accommodates 30 million annual passengers and 1.6 million tons of cargo per year, as long as the impacts associated with that level of operations are planned for and mitigated	N/A
LU 5-5 Airport Compatibility Planning for ONT. We create and maintain the Airport Land Use Compatibility Plan for ONT.	N/A
LU 5-6 Alternative Process. We fulfill our responsibilities and comply with state law with regard to the Alternative Process for proper airport land use compatibility planning.	N/A
LU 5-7 ALUCP Consistency and Land Use Regulations. We comply with state law that requires general plans, specific plans and all new development to be consistent with the policies and criteria set forth within an Airport Land Use Compatibility Plan for any public use airport.	The Overlay is located within the Airport Influence Areas of Ontario International Airport. Section 2.1.2 notifies the reader to refer to the ONT ALUCP.
LU 5-8 Chino Airport. We will support the creation and implementation of the Airport Land Use Compatibility Plan for Chino Airport.	N/A

HOUSING ELEMENT

Goal H1: Stable neighborhoods of quality housing, ample community services and public facilities, well-maintained infrastructure, and public safety that foster a positive sense of identity

H 1-1 Housing Rehabilitation. We support the rehabilitation, maintenance, and improvement of single-family, multiple-family, and mobile homes through code compliance, removal of blight where necessary, and provision of rehabilitation assistance where feasible.	N/A
H 1-2 Neighborhood Conditions. We direct efforts to improve the long-term sustainability of neighborhoods through comprehensive planning, provision of neighborhood amenities, rehabilitation and maintenance of housing, and community building efforts.	Our mixed-use project combines residential and commercial uses which will help vitalize an underutilized area.

Policy Plan Goals and Policies	Overlay Consistency
H 1-3 Community Amenities. We shall provide adequate public services, infrastructure, open space, parking and traffic management, pedestrian, bicycle and equestrian routes and public safety for neighborhoods consistent with City master plans and neighborhood plans.	~~N/A~~ The Overlay allows for plaza areas to be publicly accessible community amenities and encourages engagement with the adjacent commercial ues.
H 1-4 Historical Preservation. We support the preservation and enhancement of residential structures, properties, street designs, lot configurations, and other reminders of Ontario's past that are considered to be local historical or cultural resources.	N/A
H 1-5 Neighborhood Identity. We strengthen neighborhood identity through creating parks and recreational outlets, sponsoring neighborhood events and encouraging resident participation in the planning and improvement of their neighborhoods.	N/A
GOAL H_2: Diversity of types of quality housing that are affordable to a range of household income levels, accommodate changing demographics, and support and reinforce the economic sustainability of Ontario.	
H 2-1 Corridor Housing. We revitalize transportation corridors by encouraging the production of higher density residential and mixed-uses that are architecturally, functionally and aesthetically suited to corridors.	The design guidelines and development standards provide for development suited for adjacency to corridors. The proposed high density housing is also suitable for the adjacent Haven and Fourth Streets high traffic corridors.
2-2 Historic Downtown. We foster a vibrant historic downtown through facilitating a wide range of housing types and affordability levels for households of all ages, housing preferences, and income levels.	N/A
H 2-3 Ontario Airport Metro Center. We foster a vibrant, urban, intense and highly amenitized community in the Ontario Airport Metro Center Area through a mix of residential, entertainment, retail and office-oriented uses.	~~N/A~~ The Overlay allows for a mix of residential, entertainment, retail and potentially office-oriented uses centered around the Arena.
H 2-4 New Model Colony. We support a premier lifestyle community in the New Model Colony distinguished by diverse housing, highest design quality, and cohesive and highly amenitized neighborhoods.	N/A
H 2-5 Housing Design. We require architectural excellence through adherence to City design guidelines, thoughtful site planning, environmentally sustainable practices and other best practices.	The Overlay has its own design guidelines to achieve architectural excellence.

Policy Plan Goals and Policies	Overlay Consistency
H 2-6 Infill Development. We support the revitalization of neighborhoods through the construction of higher-density residential developments on underutilized residential and commercial sites.	The Overlay allows for development on underutilized residential and commercial sites, including high density residential developments.
Goal H3: A City regulatory environment that balances the need for creativity and excellence in residential design, flexibility and predictability in the project approval process, and the provision of an adequate supply and prices of housing.	
H 3-1 Incentives. We maintain incentive programs that can be offered to projects that provide benefits to the community such as exceptional design quality, economic advantages, environmental sustainability, or other benefits that would otherwise be unrealized.	N/A
H 3-2 Flexible Standards. We allow flexibility in the application of residential and mixed-use development standards in order to gain benefits such as exceptional design quality, economic advantages, sustainability, or other benefits that would otherwise be unrealized.	This Overlay provides flexibility in design to allow the most exceptional design quality.
H 3-3 Development Review. We maintain a residential development review process that provides certainty and transparency for project stakeholders and the public, yet allows for the appropriate review to facilitate quality housing development.	N/A
H 3-4 Financial Incentives. We consider financial incentives to facilitate and encourage the production, rehabilitation or improvement of housing, or provision of services where such activity furthers housing and community-wide goals.	N/A
GOAL H4: Increased opportunities for low and moderate income households and families to afford and maintain quality ownership and rental housing opportunities, including move-up opportunities.	
H 4-1 Preservation of Affordable Apartments. We strive to facilitate the preservation of the affordability of publicly assisted apartments for lower income households through financial assistance, technical assistance, rehabilitation, and collaborative partnerships.	N/A
H 4-2 Homeownership Opportunities. We increase and expand homeownership rates for lower and moderate income households by offering financial assistance, low-interest loans and educational resources, and by working in collaboration with partnerships.	N/A

Policy Plan Goals and Policies	Overlay Consistency
H 4-3 Rental Assistance. We support the provision of rental assistance for individuals and families earning extremely low, very low, and low income with funding from the state and federal government.	N/A
H 4-4: Mixed-income Housing. We encourage the integration of affordable housing in the New Model Colony, Ontario Airport Metro Center Area, and existing neighborhoods.	The Overlay provides for apartment living. The proposed rent range will include rents affordable to more moderate income residents.
H 4-5 Collaborative Partnerships. We support collaborative partnerships of nonprofit organizations, affordable housing developers, major employers, and for-profit developers to produce affordable housing.	N/A
H 4-6 Fair Housing. We further fair housing by prohibiting discrimination in the housing market and providing education, support, and enforcement services to address discriminatory practices	N/A
Goal H5: A full range of housing types and community services that meet the special housing needs for all individuals and families in Ontario, regardless of income level, age or other status.	
H 5-1 Senior Housing. We support the development of accessible and affordable senior housing and provide financial assistance for seniors to maintain and improve their homes.	N/A
H 5-2 Family Housing. We support the development of larger rental apartments that are appropriate for families with children, including, as feasible, the provision of services, recreation and other amenities.	~~N/A~~ The Overlay allows residential two- and three-bedroom apartments that will have access to children friendly amenities.
H 5-3 Disabled People. We increase the supply of permanent, affordable and accessible housing for people with disabilities, and provide assistance to allow them to maintain and improve their homes	~~N/A~~ Residential development in the Overlay project area will comply with ADA standards.
H 5-4 Homeless People. We partner with non-profit partners to provide emergency shelters, transitional housing, permanent supportive housing, and supportive services for people who are homeless.	N/A
H 5-5 Supportive Services. We financially support organizations, as feasible, that provide support services that meet the needs of those with special needs and further the greatest level of independence.	N/A

Policy Plan Goals and Policies	Overlay Consistency
H 5-6 Partnerships. We collaborate with non-profit organizations, private developers, employers, government agencies and other interested parties to develop affordable housing and provide support services.	N/A
PARKS AND RECREATION ELEMENT	
Goal PR1: A system of safe and accessible parks that meets the needs of the community.	
PR 1-1 Access to Parks. We strive to provide a park and/or recreational facility within walking distances (1/4 mile) of every residence.	All residents will have access to a range of on-site amenities including plazas, gathering areas, playgrounds, pools and gyms.
PR 1-2 Adjacency to Schools. We examine locating parks adjacent to school sites to promote joint-use opportunities.	N/A
PR 1-3 Funding. We shall seek outside, one-time sources of funding for capital improvements and reserve ongoing City funds primarily for operations and maintenance.	N/A
PR 1-4 Joint-use Opportunities. In areas where there is a need but no City recreational facility, we explore joint-use opportunities. (e.g., school sites).	N/A
PR 1-5 Acreage Standard. We strive to provide 5 acres of parkland (public and private) per 1,000 residents.	Park fees will be paid at the time of building permits to assist the City in its park efforts.
PR 1-6 Private Parks. We expect development to provide a minimum of 2 acres of developed private park space per 1,000 residents.	Park fees will be paid at the time of building permits.
PR 1-7 Special Needs/Universal Design. We attempt to provide recreational opportunities at parks for people of all ages and abilities.	N/A
PR 1-8 Renovation. We examine renovating existing facilities prior to building replacement facilities.	N/A
PR 1-9 Phased Development. We require parks be built in new communities before a significant proportion of residents move in.	Park fees will be paid at the time of building permits.
PR 1-10 Master Plans for Individual Park Facilities. We require an individual park master plan for parks in excess of 10 acres.	N/A

Policy Plan Goals and Policies	Overlay Consistency
PR 1-11 Environmental Function of Parks. We require new parks to meet environmental management objectives.	N/A
PR 1-12 Trails. We promote connections between parks and local trails including those managed by other public agencies.	N/A
PR 1-13 Equestrian Trails. We require the design, construction and maintenance of equestrian trails in Rural Residential designated areas.	N/A
PR 1-14 Multi-family Residential Developments. We require that new multi-family residential developments of five or more units provide recreational facilities or open space, in addition to paying adopted impact fees.	The Overlay requires that all multi-family developments within the Overlay provide private recreational areas for residents of the development in addition to the payment of park fees at the time of building permits.
PR 1-15 Trail Connectivity. We strengthen and improve equestrian, bike and multipurpose trail connections within the City and work to improve trail connections into adjacent jurisdictions.	N/A
PR 1-16 Equestrian Master Plan. We use Homer Briggs Park as the primary focal point for the development of a Master Plan of Equestrian Trails in the Rural Residential area.	N/A

ENVIRONMENTAL RESOURCES ELEMENT

GOAL ER1: A reliable and cost effective system that permits the City to manage its diverse water resources and needs.

ER 1-1 Local Water Supply. We increase local water supplies to reduce our dependence on imported water.	N/A
ER 1-2 Matching Supply to Use. We match water supply and quality to the appropriate use.	N/A
ER 1-3 Conservation. We require conservation strategies that reduce water usage.	All Overlay development will meet CALGreen low flow fixture requirements. All irrigation systems will be designed per State and/ or the City of Ontario's Water Conservation Ordinance and utilize the existing reclaimed water infrastructure system. Landscaped areas within the Overlay area will be graded as swales to the maximum extent practicable in order to maximize conservation of irrigation water and natural rainfall run-off.

Policy Plan Goals and Policies	Overlay Consistency
ER 1-4 Supply-Demand Balance. We require that available water supply and demands be balanced.	N/A
ER 1-5 Groundwater Management. We protect groundwater quality by incorporating strategies that prevent pollution, require remediation where necessary, capture and treat urban run-off, and recharge the aquifer.	The Overlay development will comply with all applicable regulations in regards to protecting groundwater quality.
ER 1-6 Urban Run-off Quantity. We encourage the use of low impact development strategies to intercept run-off, slow the discharge rate, increase infiltration and ultimately reduce discharge volumes to traditional storm drain systems.	Overlay development shall be designed to retain and in-filter, harvest and use or biotreat the Design Capture Volume of surface run-off, on-site, to comply with the current requirements of the San Bernardino County NPDES Stormwater Program's Water Quality Management (WQMP) for new development projects.
ER 1-7 Urban Run-off Quality. We require the control and management of urban run-off, consistent with Regional Water Quality Control Board regulations.	Overlay Development is obligated to minimize the impacts of urban run-off, through the implementation of on-site and off-site Low Impact Development (LID) Site Design Best Management Practices (BMPs) which retain/ in-filter, harvest and use, or biotreat the average 2-year, 24-hour storm run-off volume (85th percentile storm event) from the project, consistent with Regional Water Quality Control Board regulations as part of the County-wide NPDES Permit.
ER 1-8 Wastewater Management. We require the management of wastewater discharge and collection consistent with waste discharge requirements adopted by the Regional Water Quality Control Board.	The project is obligated to comply with wastewater discharge and collection requirements adopted by the Regional Water Quality Control Board.
Goal ER2: A cost effective, integrated waste management system that meets or exceeds state and federal recycling and waste diversion mandates.	
ER 2-1 Waste Diversion. We shall meet or exceed AB 939 requirements.	All development will comply with City construction waste diversion requirements.
ER 2-2 Hazardous and Electronic Wastes. We prohibit the disposal of hazardous and electronic waste into the municipal waste stream pursuant to state law.	N/A
ER 2-3 Purchase Products Made from Recycled Materials. We purchase recycled-content products where it is cost effective	N/A

Policy Plan Goals and Policies	Overlay Consistency
GOAL ER3: Cost-effective and reliable energy system sustained through a combination of low impact building, site and neighborhood energy conservation and diverse sources of energy generation that collectively helps to minimize the region's carbon footprint.	
ER 3-1 Conservation Strategy. We require conservation as the first strategy to be employed to meet applicable energy-saving standards.	All development within the Overlay will meet California's stringent CALGreen and Energy Codes.
ER 3-2 Green Development- Communities. We require the use of best practices identified in green community rating systems to guide the planning and development of all new communities.	The Overlay contains a broad mix of land uses, and density as identified in the best practices of several rating systems.
ER 3-3 Building and Site Design. We require new construction to incorporate energy efficient building and site design strategies, which could include appropriate solar orientation, maximum use of natural daylight, passive solar and natural ventilation.	All development within the Overlay will meet California's stringent CALGreen and Energy Codes.
ER 3-4 Green Development– Public Buildings. We require all new and substantially renovated City buildings in excess of 10,000 square feet achieve a LEED Silver Certification standard, as determined by the U.S. Green Building Council.	N/A
ER 3-5 Fuel Efficient and Alternative Energy Vehicles and Equipment. We purchase and use vehicles and equipment that are fuel efficient and meet or surpass state emissions requirements and/or use renewable sources of energy	N/A
ER 3-6 Generation. Renewable Sources. We promote the use of renewable energy sources to serve public and private sector development.	N/A
GOAL ER4: Improved indoor and outdoor air quality and reduced locally generated pollutant emissions.	
ER 4-1 Land Use. We reduce GHG and other local pollutant emissions through compact, mixed use, and transit-oriented development and development that improves the regional jobs-housing balance.	The Overlay provides for compact mix of uses that improves the regional jobs-housing balance.
ER 4-2 Sensitive Land Uses. We prohibit the future siting of sensitive land uses, within the distances defined by the California Air Resources Board for specific source categories, without sufficient mitigation.	N/A

Policy Plan Goals and Policies	Overlay Consistency
ER 4-3 Greenhouse Gases (GHG) Emissions Reductions. We will reduce GHG emissions in accordance with regional, state and federal regulations.	The Overlay complies with regional, state and federal regulations.
ER 4-4 Indoor Air Quality. We will comply with State Green Building Codes relative to indoor air quality.	Overlay development will be required to comply with all State laws in regards to indoor air quality.
ER 4-5 Transportation. We promote mass transit and non-motorized mobility options (e.g. walking, biking) to reduce air pollutant emissions.	~~N/A~~ Overlay development includes a variety of pedestrian and bicycle paths that is consistent with a walkable master plan.
ER4-6 Particulate Matter. We support efforts to reduce particulate matter to meet State and Federal Clean Air Standards.	N/A
ER4-7 Other Agency Collaboration. We collaborate with other agencies within the South Coast Air Basin to improve regional air quality at the emission source.	N/A
ER 4-8 Tree Planting. We protect healthy trees within the City and plant new trees to increase carbon sequestration and help the regional/local air quality.	Where possible, healthy existing street trees will be protected. Additional trees will be planted within the Overlay per the landscape standards and requirements.
Goal ER5 Protected high value habitat and farming and mineral resource extraction activities that are compatible with adjacent development.	
ER 5-1 Habitat Conservation Areas. We support the protection of biological resources through the establishment, restoration and conservation of high quality habitat areas.	N/A
ER 5-2 Entitlement and Permitting Process. We comply with state and federal regulations regarding protected species.	N/A
ER 5-3 Right to Farm. We support the right of existing farms to continue their operations within the New Model Colony.	N/A
ER 5-4 Transition of Farms. We protect both existing farms and sensitive uses around them as agricultural areas transition to urban uses.	N/A
ER 5-5 Mining Operations. We prohibit future mining operations where the resource extraction activities are incompatible with existing or proposed adjacent land uses.	N/A

Policy Plan Goals and Policies	Overlay Consistency
COMMUNITY ECONOMICS ELEMENT	
GOAL CE1: A complete community that provides for all incomes and stages of life.	
CE 1-1 Jobs-Housing Balance. We pursue improvement to the Inland Empire's balance between jobs and housing by promoting job growth that reduces the regional economy's reliance on out-commuting.	~~N/A~~ The Overlay allows for mixed land uses of commercial, office, and residential to promote job growth in the area.
CE 1-2 Jobs and Workforce Skills. We use our economic development resources to: 1) attract jobs suited for the skills and education of current and future City residents; 2) work with regional partners to provide opportunities for the labor force to improve its skills and education; and 3) attract businesses that increase Ontario's stake and participation in growing sectors of the regional and global economy. (Link to Social Resource Policy SR2-2)	N/A
CE 1-3 Regional Approach to Workforce Development. We work with our partners to provide workforce training and development services throughout the region recognizing that Ontario employers rely on workers living outside of the City.	N/A
CE 1-4 Business Retention and Expansion. We continuously improve two-way communication with the Ontario business community and emphasize customer service to existing businesses as part of our competitive advantage.	N/A
CE 1-5 Business Attraction. We proactively attract new and expanding businesses to Ontario in order to increase the City's share of growing sectors of the regional and global economy.	N/A
CE 1-6 Diversity of Housing. We collaborate with residents, housing providers and the development community to provide housing opportunities for every stage of life; we plan for a variety of housing types and price points to support our workforce, attract business and foster a balanced community.	The Overlay provides smaller ~~1- and 2~~ studio to 3-bedroom apartments that will serve a diversity of households and incomes.
CE 1-7 Retail Goods and Services. We seek to ensure a mix of retail businesses that provide the full continuum of goods and services for the community.	The Overlay allows for ~~and~~ an exciting mix of retail businesses.

Policy Plan Goals and Policies	Overlay Consistency
CE 1-8 Regional Attraction. We encourage the development and programming of regional, cultural, and entertainment destinations in Ontario. (Link to Social Resources Entertainment and Culture Policy SR5-4)	~~N/A~~ The Overlay vision encourages a regional entertainment destination around the Arena.
CE 1-9 Regional Leadership. We provide leadership for public, quasi-public, and private-sector partners that help Ontario and its residents and businesses realize our goals and achieve our Vision.	N/A
CE 1-10 Life-Long Education. We work with our partners who provide life-long learning to ensure that our residents and workforce have access to education at all stages of life. (Link to Social Resources-Education SR2-1)	N/A
CE 1-11 Socioeconomic Trends. We continuously monitor, plan for, and respond to changing socioeconomic trends.	N/A
CE 1-12 Circulation. We continuously plan and improve public transit and non-vehicular circulation for the mobility of all, including those with limited or no access to private automobiles. (Link to Mobility Public Transit)	Existing bus routes are located on adjacent streets to the Overlay, allowing residents and patrons of commercial development easy access to alternative means of transportation.
CE 1-13 Safety and Security. We invest in public safety and communicate our successes because the perception and reality of safety and security are necessary prerequisites for private investment and economic growth. (Link to Safety Element)	N/A
GOAL CE2: A City of distinctive neighborhoods, districts, and corridors, where people choose to be.	
CE 2-1 Development Projects. We require new development and redevelopment to create unique, high-quality places that add value to the community. (Link to Community Design Element)	The Overlay sets forth criteria for creating high-quality places and development. In particular, residential development expressed in a contemporary architectural vernacular will be unique to Ontario.
CE 2-2 Development Review. We require those proposing new development and redevelopment to demonstrate how their projects will create appropriately unique, functional and sustainable places that will compete well with their competition within the region.	The Overlay provides standards and guidelines to create unique, functional and sustainable places.

Policy Plan Goals and Policies	Overlay Consistency
CE 2-3 Interim Development. We require interim development that does not reflect the long-term Vision, be limited in scale of development so that the investment can be sufficiently amortized to make Vision-compatible redevelopment financially feasible.	N/A
CE 2-4 Protection of Investment. We require that new development and redevelopment protect existing investment by providing architecture and urban design of equal or greater quality.	The Overlay provides a framework for high quality architecture and urban design.
CE 2-5 Private Maintenance. We require adequate maintenance, upkeep, and investment in private property because proper maintenance on private property protects property values. (Link to Community Design Policy CD5-1)	There is an existing Piemonte at Ontario Center Property Owners Association that maintains the private drives.
CE 2-6 Public Maintenance. We require the establishment and operation of maintenance districts or other vehicles to fund the long-term operation and maintenance of the public realm whether on private land, in rights-of-way, or on publicly-owned property. (Link to Community Design Policy CD 5-1)	N/A
Goal CE3 Decision-making deliberations that incorporate the full short-term and long-term economic and fiscal implications of proposed City Council actions.	
CE 3-1 Fiscal Impact Disclosure. We require requests for City Council action to disclose the full fiscal impacts, including direct and indirect costs.	N/A
CE 3-2 General Plan Amendments. We require those proposing General Plan amendments to disclose reasonably foreseeable impacts through a fiscal analysis.	N/A
CE 3-3 Long-Term Funding Disclosure. We require those requesting City support or funding for projects or programs to disclose if and how they can be continued without further City support.	N/A
CE 3-4 Improving Fiscal Decision-Making. We periodically assess the accuracy of projections for staff time and City resources and use the assessment results to improve our fiscal decision-making process.	N/A
CE 3-5 Sustainable Development. We recognize impacts to municipal finances as an element of sustainability, and we require claims of sustainability to assess fiscal impacts.	N/A

Policy Plan Goals and Policies	Overlay Consistency
CE 3-6 Fully Funded Liability. We require long-term liabilities, such as retiree medical benefits, employee accrued leave balances and self insured liability claims, to be fully funded to ensure sound, long-term fiscal health.	N/A
CE 3-7 Programmatically Balanced Budget. We require that the annual budget include appropriations allocated in a manner to meet the goal of the programmatically balanced budget.	N/A
CE 3-8 Budget Margins. We require that the adopted budget for revenue and expenditures reflect sufficient budget margins to minimize negative impacts to City services due to economic uncertainties.	N/A
CE 3-9 Complete Comparative Context. We require that our annual budget process provide the complete comparative context for proposed new and increased funding so decision makers can fully understand the trade-offs among budget choices.	N/A
SAFETY ELEMENT	
Goal S1: Minimized risk of injury, loss of life, property damage and economic and social disruption caused by earthquake-induced and other geologic hazards.	
S 1-1: Implementation of Regulations and Standards. We require that all new habitable structures be designed in accordance with the most recent California Building Code adopted by the City, including provisions regarding lateral forces and grading.	All habitable buildings within the Overlay will be required to meet the California Building Code.
S 1-2 Entitlement and Permitting Process. We follow state guidelines and the California Building Code to determine when development proposals must conduct geotechnical and geological investigations.	All habitable buildings within the Overlay will be required to meet the California Building Code.
S 1-3 Continual Update of Technical Information. We maintain up-to-date California Geological Survey seismic hazard maps.	N/A
S 1-4 Seismically Vulnerable Structures. We conform to state law regarding unreinforced masonry structures.	N/A

Policy Plan Goals and Policies	Overlay Consistency
GOAL S2 Minimized risk of injury, loss of life, property damage and economic and social disruption caused by flooding and inundation hazards.	
S 2-1 Entitlement and Permitting Process. We follow State guidelines and building code to determine when development proposals require hydrological studies prepared by a State-certified engineer to assess the impact that the new development will have on the flooding potential of existing development down-gradient.	N/A
S 2-2 Flood Insurance. We will limit development in flood plains and participate in the National Flood Insurance Program.	N/A
S 2-3 Facilities that Use Hazardous Materials. We comply with state and federal law and do not permit facilities using, storing, or otherwise involved with substantial quantities of on-site hazardous materials to be located in the 100 year flood zone unless all standards of elevation, flood proofing and storage have been implemented to the satisfaction of the Building Department.	N/A
S 2-4 Prohibited Land Uses. We prohibit the development of new essential and critical facilities in the 100-year floodplain.	N/A
S 2-5 Storm Drain System. We maintain and improve the storm drain system to minimize flooding. (Link to Environmental Resources)	N/A
S 2-6 Use of Flood Control Facilities. We encourage joint use of flood control facilities as open space or other types of recreational facilities.	N/A
Goal S3: Reduced risk of death, injury, property damage and economic loss due to fires, accidents and normal everyday occurrences through prompt and capable emergency response.	
S 3-1 Prevention Services. We proactively mitigate or reduce the negative effects of fire, hazardous materials release, and structural collapse by implementing the adopted Fire Code.	All buildings and site design will comply with the California Fire Code.
S 3-2 Community Outreach. We provide education to local schools and community groups to promote personal and public safety.	N/A

Policy Plan Goals and Policies	Overlay Consistency
S 3-3 Fire and Emergency Medical Services. We maintain sufficient fire stations, equipment and staffing to respond effectively to emergencies.	N/A
S 3-4 Special Team Services. We maintain effective special rescue services.	N/A
S 3-5 Emergency Communication Services. We maintain a 9-1-1 emergency communication and dispatch center.	N/A
S 3-6 Interagency Cooperation. In order to back up and supplement our capabilities to respond to emergencies, we participate in the California Fire Rescue and Mutual Aid Plan.	N/A
S 3-7 Water Supply and System Redundancy. We monitor our water system to manage firefighting water supplies.	N/A
S 3-8: Fire Prevention through Environmental Design. We require new development to incorporate fire prevention consideration in the design of streetscapes, sites, open space and buildings. (Link to Community Design Element)	All development within the Overlay incorporates fire prevention considerations in the design of streetscapes, sites, open spaces and buildings and will be verified for compliance during the review process.
S 3-9 Resource Allocation. We analyze fire data to evaluate the effectiveness of our fire prevention and reduction strategies and allocate resources accordingly.	N/A
Goal S4 An environment where noise does not adversely affect the public's health, safety, and welfare.	
S 4-1 Noise Mitigation. We utilize the City's Noise Ordinance, building codes and subdivision and development codes to mitigate noise impacts.	~~N/A~~ All habitable buildins withing the Overlay will be required to meet the City's Noise Ordinance, California Building Code and subdivision and develoment codes to mitigate noise impact.
S 4-2 Coordination with Transportation Authorities. We collaborate with airport owners, FAA, Caltrans, SANBAG, SCAG, neighboring jurisdictions, and other transportation providers in the preparation and maintenance of, and updates to transportation-related plans to minimize noise impacts and provide appropriate mitigation measures.	N/A

Policy Plan Goals and Policies	Overlay Consistency
S 4-3 Airport Noise Mitigation. We aggressively pursue funding and utilize programs to reduce effects of aircraft noise in impacted areas of our community. (Link to Land Use Element and Quiet Home Program)	N/A
S 4-4 Truck Traffic. We manage truck traffic to minimize noise impacts on sensitive land uses. (Link to Mobility Element)	N/A
S 4-5 Roadway Design. We design streets and highways to minimize noise impacts.	N/A
S 4-6 Airport Noise Compatibility. We utilize information from Airport Land Use Compatibility Plans to prevent the construction of new noise sensitive land uses within airport noise impact zones.	The Overlay complies with the ALUCP for Ontario International Airport.
Goal S5: Reduced risk of injury, property damage and economic loss resulting from windstorms and wind- related hazards.	
S 5-1 Backup Power in Critical Facilities. We require backup power be maintained in critical facilities.	N/A
S 5-2 Dust Control Measures. We require the implementation of Best Management Practices for dust control at all excavation and grading project.	Construction within the Overlay will comply with all mitigation measures identified in the project EIR with regard to dust control.
S 5-3 Grading in High Winds. We prohibit excavation and grading during strong wind conditions, as defined by the Building Code.	The Overlay complies with the Building Code.
Goal S6 Reduced potential for hazardous materials exposure and contamination.	
S 6-1 Disclosure and Notification. We enforce disclosure laws that require all users, producers, and transporters of hazardous materials and wastes to clearly identify the materials that they store, use or transport.	N/A
S 6-2 Response to Hazardous Materials Releases. We respond to hazardous materials incidents and coordinate these services with other jurisdictions.	N/A
S 6-3 Safer Alternatives. We minimize our use of hazardous materials by choosing non-toxic alternatives that do not pose a threat to the environment.	N/A

Policy Plan Goals and Policies	Overlay Consistency
S 6-4 Safe Storage and Maintenance Practices. We require that the users of hazardous materials be adequately prepared to prevent and mitigate hazardous materials releases.	N/A
S 6-5 Location of Hazardous Material Facilities. We regulate facilities that will be involved in the production, use, storage or disposal of hazardous materials, pursuant to federal, state, county, and local regulations, so that impacts to the environment and sensitive land uses are mitigated.	N/A
S 6-6 Location of Sensitive Land Uses. We prohibit new sensitive land uses from locating within airport Safety Zones and near existing sites that use, store, or generate large quantities of hazardous materials. (Link to Land Use Element)	N/A
S 6-7 Household Hazardous Waste. We support the proper disposal of household hazardous substances.	N/A
S 6-8 Mitigation and Remediation of Groundwater Contamination. We actively participate in local and regional efforts directed at both mitigating environmental exposure to contaminated groundwater and taking action to clean up contaminated groundwater once exposure occurs.	N/A
S 6-9 Remediation of Methane. We require development to assess and mitigate the presence of methane, per regulatory standards and guidelines.	N/A
Goal S7: Neighborhoods and commercial and industrial districts that are kept safe through a multi-faceted approach of prevention, suppression, community involvement and a system of continuous monitoring.	
S 7-1 Police Unit Response. We respond to calls for service in a timely manner.	N/A
S 7-2 Community Oriented Problem Solving (C.O.P.S.). We support and maintain the mission of COPS to identify and resolve community problems.	N/A
S 7-3 Prevention Services. We provide crime prevention programs targeted to youth, parents, seniors, businesses, and neighborhoods.	N/A

Policy Plan Goals and Policies	Overlay Consistency
S 7-4: Crime Prevention through Environmental Design (CPTED). We require new development to incorporate CPTED in the design of streetscapes, sites, open spaces and buildings.	All new development will be reviewed and approved pursuant to the provisions of the City's Subdivision Ordinance and Development Plan Review process which provides for review by the City's Police Department and that may require the development to incorporate CPTED in the design of streetscapes, sites, and buildings.
S 7-5 Interdepartmental Coordination. We utilize all City departments to help reduce crime and promote public safety.	N/A
S 7-6 Partnerships. We partner with other local, state and federal law enforcement agencies and private security providers to enhance law enforcement service to Ontario.	N/A
S 7-7 Resource Allocation. We analyze crime data to evaluate the effectiveness of crime prevention and reduction strategies and allocate resources accordingly.	N/A
MOBILITY ELEMENT	
GOAL M1: A system of roadways that meets the mobility needs of a dynamic and prosperous Ontario.	
M 1-1: Roadway Design and Maintenance. We require our roadways to: • Comply with federal, state and local design and safety standards. • Meet the needs of multiple transportation modes and users. • Handle the capacity envisioned in the Functional Roadway Classification Plan. • Maintain a peak hour Level of Service (LOS) E or better at all intersections. • Be compatible with the streetscape and surrounding land uses. • Be maintained in accordance with best practices and our Right-of-Way Management Plan.	The Overlay complies with federal, state and local design and safety standards. It is consistent with the requirements of the City's Functional Roadway Classification Plan.
M 1-2: Mitigation of Impacts. We require development to mitigate its traffic impacts.	All development will implement all traffic mitigation measures, standard conditions and project design features identified in the project EIR.

Policy Plan Goals and Policies	Overlay Consistency
M 1-3 Roadway Improvements. We work with Caltrans, SANBAG and others to identify, fund and implement needed improvements to roadways identified in the Functional Roadway Classification Plan.	N/A
M 1-4 Adjacent Jurisdictions. We work with neighboring jurisdictions to meet our level of service standards at the City limits.	Street improvements along 4th Street will have been approved by the City of Rancho Cucamonga.
GOAL M_2: A system of trails and corridors that facilitate and encourage bicycling and walking.	
M 2-1 Bikeway Plan. We maintain our Multipurpose Trails & Bikeway Corridor Plan to create a comprehensive system of on- and off-street bikeways that connect residential areas, businesses, schools, parks, and other key destination points.	Existing bike lanes on public streets will remain.
M 2-1 Bikeway Plan. We maintain our Multipurpose Trails & Bikeway Corridor Plan to create a comprehensive system of on- and off-street bikeways that connect residential areas, businesses, schools, parks, and other key destination points.	N/A
M 2-3: Pedestrian Walkways. We require walkways that promote safe and convenient travel between residential areas, businesses, schools, parks, recreation areas, and other key destination points. (Link to Community Design CD 3-1)	Pedestrian walkways~~, as shown in the roadway plans and sections, exist~~ are planned throughout the Overlay area, promoting safe and convenient travel between destination points.
M 2-4 Network Opportunities. We explore opportunities to expand the pedestrian and bicycle networks. This includes consideration of utility easements, levees, drainage corridors, road right-of-ways, medians and other potential options.	N/A
GOAL M_3: A public transit system that is a viable alternative to automobile travel and meets the basic transportation needs of the transit dependent.	
M 3-1 Transit Partners. We maintain a proactive working partnership with transit providers to ensure that adequate public transit service is available.	N/A
M 3-2 Transit Facilities at New Development. We require new development to provide transit facilities, such as bus shelters, transit bays and turnouts, as necessary.	Transit facilities are located on adjacent or nearby streets.

Policy Plan Goals and Policies	Overlay Consistency
M 3-3 Transit-Oriented Development. We may provide additional development-related incentives to those inherent in the Land Use Plan for projects that promote transit use.	N/A
M 3-4 Bus Rapid Transit (BRT) Corridors. We work with regional transit agencies to implement BRT service to target destinations and along corridors, as shown in the Transit Plan.	N/A
M 3-5 Light Rail. We support extension of the Metro Rail Gold Line to Ontario, and will work to secure station locations adjacent to the Meredith site and at the proposed multimodal transit center.	N/A
M 3-6 Metrolink Expansion. We advocate expansion of Metrolink service to include the Downtown and the multimodal transit center.	N/A
M 3-7 High Speed Rail. We encourage the development of high-speed rail systems that would enhance regional mobility in Southern California and serve the City of Ontario.	N/A
M 3-8 Feeder Systems. We work with regional transit agencies to secure convenient feeder service from the Metrolink station and the proposed multimodal transit center to employment centers in Ontario.	N/A
M 3-9 Ontario Airport Metro Center Circulator. We will explore development of a convenient mobility system, including but not limited to shuttle service, people mover, and shared car system, for the Ontario Airport Metro Center.	N/A
M 3-10 Multimodal Transit Center. We intend to ensure the development of a multimodal transit center near LAONT airport to serve as a transit hub for local buses, BRT, the Gold Line, high-speed rail, the proposed Ontario Airport Metro Center circulator and other future transit modes.	N/A
M 3-11 Transit and Community Facilities. We require the future development of community-wide serving facilities to be sited in transit-ready areas that can be served and made accessible by public transit. Conversely, we plan (and coordinate with other transit agencies to plan) future transit routes to serve existing community facilities.	N/A

Policy Plan Goals and Policies	Overlay Consistency
Goal M4 An efficient flow of goods through the City that maximizes economic benefits and minimizes negative impacts	
M 4-1 Truck Routes. We designate and maintain a network of City truck routes that provide for the effective transport of goods while minimizing negative impacts on local circulation and noise-sensitive land uses, as shown in the Truck Routes Plan.	N/A
M 4-2 Regional Participation. We work with regional and subregional transportation agencies to plan and implement goods movement strategies, including those that improve mobility, deliver goods efficiently and minimize negative environmental impacts (Link to Environmental Resources Policy ER4-3)	N/A
M 4-3 Railroad Grade Separations. We eliminate at-grade rail crossings identified on the Functional Roadway Classification Plan.	N/A
M 4-4 Environmental Considerations. We support efforts to reduce/eliminate the negative environmental impacts of goods movement.	N/A
M 4-5 Air Cargo. We support and promote a LAONT airport that accommodates 1.6 million tons of cargo per year, as long as the impacts associated with that level of operations are planned for and mitigated.	N/A
Goal M5 A proactive leadership role to help identify and facilitate implementation of strategies that address regional transportation challenges.	
M 5-1 Regional Leadership. We maintain a leadership role to help identify and implement potential solutions to long-term regional transportation problems.	N/A
M 5-2 Land Use Compatibility with Regional Transportation Facilities. We work with LAWA, railroads, Caltrans, SANBAG, and other transportation agencies to minimize impacts.	N/A
Goal LU5: Integrated airport systems and facilities that minimize negative impacts to the community and maximize economic benefits.	
LU 5-1 Coordination with Airport Authorities. We collaborate with FAA, Caltrans Division of Aeronautics, airport owners, neighboring jurisdictions, and other shareholders in the preparation, update and maintenance of airport-related plans.	N/A

Policy Plan Goals and Policies	Overlay Consistency
LU 5-2 Airport Planning Consistency. We coordinate with airport authorities to ensure The Ontario Plan is consistent with state law, federal regulations and/or adopted master plans and land use compatibility plans for the ONT and Chino Airport.	N/A
LU 5-3 Airport Impacts. We work with agencies to maximize resources to mitigate the impacts and hazards related to airport operations.	N/A
LU 5-4 ONT Growth Forecast. We support and promote an ONT that accommodates 30 million annual passengers and 1.6 million tons of cargo per year, as long as the impacts associated with that level of operations are planned for and mitigated.	N/A
LU 5-5 Airport Compatibility Planning for ONT. We create and maintain the Airport Land Use Compatibility Plan for ONT.	N/A
LU 5-6 Alternative Process. We fulfill our responsibilities and comply with state law with regard to the Alternative Process for proper airport land use compatibility planning.	N/A
LU 5-7 ALUCP Consistency with Land Use Regulations. We comply with state law that requires general plans, specific plans and all new development be consistent with the policies and criteria set forth within an Airport Land Use Compatibility Plan for any public use airport.	N/A The Overlay is located within the Airport Influence Areas of Ontario International Airport. Section 2.1.2. notifies the reader to refer to ONT ALUCP.
LU 5-8 Chino Airport. We will support the creation and implementation of the Airport Land Use Compatibility Plan for Chino Airport.	N/A
COMMUNITY DESIGN ELEMENT	
GOAL CD1: A dynamic, progressive city containing distinct neighborhoods and commercial districts that foster a positive sense of identity and belonging among residents, visitors, and businesses.	
CD1-1 City Identity. We take actions that are consistent with the City being a leading urban center in Southern California while recognizing the diverse character of our existing viable neighborhoods.	N/A
CD 1-2 Growth Areas. We require development in growth areas to be distinctive and unique places within which there are cohesive design themes.	The Design Guidelines set forth a clear and cohesive design theme by providing a set of unique design criteria for site planning, architectural styles, landscaping, and walls and fences.

Policy Plan Goals and Policies	Overlay Consistency
CD 1-3 Neighborhood Improvement. We require viable existing residential and non-residential neighborhoods to be preserved, protected, and enhanced in accordance with our land use policies.	N/A
CD 1-4 Transportation Corridors. We will enhance our major transportation corridors within the City through landscape, hardscape, signage and lighting.	N/A
CD 1-5 View Corridors. We require all major north-south streets be designed and redeveloped to feature views of the San Gabriel Mountains, which are part of the City's visual identity and a key to geographic orientation. Such views should be free of visual clutter, including billboards and may be enhanced by framing with trees.	Haven Avenue provides view of the San Gabriel Mountains.
GOAL CD_2: A high level of design quality resulting in public spaces, streetscapes, and developments that are attractive, safe, functional and district.	
CD 2-1: Quality Architecture. We encourage all development projects to convey visual interest and character through: • building volume, massing, and height to provide appropriate scale and proportion; • a true architectural style which is carried out in plan, section and elevation through all aspects of the building and site design and appropriate for its setting; and • exterior building materials that are visually interesting, high quality, durable, and appropriate for the architectural style.	The Design Guidelines set forth a clear and cohesive design theme by providing a set of unique design criteria for architecture, landscaping, and walls and fences.

Policy Plan Goals and Policies	Overlay Consistency
CD 2-2 Neighborhood Design. We create distinct residential neighborhoods that are functional, have a sense of community, emphasize livability and social interaction, and are uniquely identifiable places through such elements as: • a pattern of smaller, walkable blocks that promote access, activity and safety; • variable setbacks and parcel sizes to accommodate a diversity of housing types; • traffic calming measures to slow traffic and promote walkability while maintaining acceptable fire protection and traffic flows; • floor plans that encourage views onto the street and de-emphasize the visual and physical dominance of garages (introducing the front porch as the "outdoor living room"}, as appropriate; and • landscaped parkways, with sidewalks separated from the curb.	The Design Guidelines provide for distinct residential neighborhoods that are functional, have a sense of community, emphasize livability and social interaction, and are uniquely identifiable places.
CD 2-3 Commercial Centers. We desire commercial centers to be distinctive, pedestrian friendly, functional and vibrant with a range of businesses, places to gather, and connectivity to the neighborhoods they serve.	The Design Guidelines set forth a clear and cohesive design theme for pedestrian-friendly, vibrant retail areas.
CD 2-4 Mixed Use, Urban Office and Transit Serving Areas. We require mixed use, urban office and transit serving areas to be designed and developed as pedestrian oriented "villages" that promote a vibrant, comfortable and functional environment.	The Design Guidelines set forth a clear and cohesive design theme for pedestrian-friendly, vibrant retail areas.
CD 2-5: Streetscapes. We design new and, when necessary, retrofit existing streets to improve walkability, bicycling and transit integration, strengthen connectivity, and enhance community identity through improvements to the public right of way such as sidewalks, street trees, parkways, curbs, street lighting and street furniture.	The Circulation Plan is designed to accommodate pedestrians, bicycles and autos.

Policy Plan Goals and Policies	Overlay Consistency
CD 2-6: Connectivity. We promote development of local street patterns and pedestrian networks that create and unify neighborhoods, rather than divide them, and create cohesive and continuous corridors, rather than independent "islands" through the following means: local street patterns that provide access between subdivisions and within neighborhoods and discourage through traffic; a local street system that is logical and understandable for the user. A grid system is preferred to avoid circuitous and confusing travel paths between internal neighborhood areas and adjacent arterials; and neighborhoods, centers, public schools, and parks that are linked by pedestrian greenways open space networks. These may also be used to establish clear boundaries between distinct neighborhoods and/or centers.	The Circulation Plan is designed for connectivity that unifies neighborhoods and promotes walkability.
CD 2-7: Sustainability. We collaborate with the development community to design and build neighborhoods, streetscapes, sites, outdoor spaces, landscaping and buildings to reduce energy demand through solar orientation, maximum use of natural daylight, passive solar and natural ventilation, building form, mechanical and structural systems, building materials and construction techniques.	All buildings will meet or exceed California's stringent CALGreen and California Energy Codes reducing energy demand.
CD 2-8: Safe Design. We incorporate defensible space design into new and existing developments to ensure the maximum safe travel and visibility on pathways, corridors, and open space and at building entrances and parking areas by avoiding physically and visually isolated spaces, maintenance of visibility and accessibility, and use of lighting.	The Overlay encourages "eyes on the street" for neighborhood safety and security.
CD 2-9: Landscape Design. We encourage durable landscaping materials and designs that enhance the aesthetics of structures, create and define public and private spaces, and provide shade and environmental benefits.	The Overlay landscape enhances the aesthetics of structures, creates and defines public and private spaces, and provides shade.
CD 2-10 Surface Parking Areas. We require parking areas visible to or used by the public to be landscaped in an aesthetically pleasing, safe and environmentally sensitive manner. Examples include shade trees, pervious surfaces, urban run-off capture and infiltration, and pedestrian paths to guide users through the parking field.	The Overlay contains guidelines for surface parking areas.

Policy Plan Goals and Policies	Overlay Consistency
CD 2-11: Entry Statements. We encourage the inclusion of amenities, signage and landscaping at the entry to neighborhoods, commercial centers, mixed use areas, industrial developments, and public places that reinforce them as uniquely identifiable places.	The Overlay contains guidelines for neighborhood entries and monumentation.
CD 2-12: Site and Building Signage. We encourage the use of sign programs that utilize complementary materials, colors, and themes. Project signage should be designed to effectively communicate and direct users to various aspects of the development and complement the character of the structures.	The Overlay contains guidelines for neighborhood entries and monumentation.
CD 2-13 Entitlement Process. We work collaboratively with all stakeholders to ensure a high degree of certainty in the efficient review and timely processing of all development plans and permits.	N/A
CD 2-14 Availability of Information. We provide easy access to information for developers, builders and the public about design quality, construction quality, and sustainable building practices.	N/A
CD 2-15 Leverage Professional and Trade Organizations. We support excellence in design and construction quality through collaboration with trade and professional organizations that provide expertise, resources and programs for developers, builders and the public.	N/A
GOAL CD3: Vibrant urban environments that are organized around intense buildings, pedestrian and transit areas, public plazas, and linkages between and within developments that are conveniently located, visually appealing, and safe during all hours.	
CD 3-1 Design. We require that pedestrian, vehicular, bicycle and equestrian circulation on both public and private property be coordinated and designed to maximize safety, comfort and aesthetics. (Link to Bicycle and Pedestrians Section of the Mobility Element and Policies M2-3 and M2-4)	The Overlay is designed for pedestrian accessibility throughout the community through a network of on-street sidewalks, plazas, and other open space designs. Bicycle corridors are located on Haven Avenue, and Fourth Street and on Inland Empire Boulevard to the south of the Overlay.

Policy Plan Goals and Policies	Overlay Consistency
CD 3-2 Connectivity Between Streets, Sidewalks, Walkways and Plazas. We require landscaping and paving be used to optimize visual connectivity between streets, sidewalks, walkways and plazas for pedestrians.	Landscaping and paving are used to maintain a visual connectivity between streets, sidewalks, and walkways for pedestrians.
CD 3-3 Building Entrances. We require all building entrances to be accessible and visible from adjacent streets, sidewalks or public open spaces. (Link to Safety Element Policy S 7-4)	The Overlay guidelines for doors and entries promote the interface between public and private spaces.
CD 3-4 Ground Floor Usage of Commercial Buildings. We create lively pedestrian streetscapes by requiring the location of uses, such as shopping, galleries, restaurants, etc., on ground floors adjacent to sidewalks.	The Overlay allows for lively pedestrian streetscapes.
CD 3-5 Paving. We require sidewalks and road surfaces to be of a type and quality that contributes to the appearance and utility of streets and public spaces.	Sidewalks and landscaping contribute to the appearance of streets and public spaces.
CD 3-6 Landscaping. We utilize landscaping to enhance the aesthetics, functionality and sustainability of streetscapes, outdoor spaces and buildings.	The landscape guidelines enhance the streetscapes and outdoor spaces.
CD 3-7 Transit Stops. We require transit stops be well lit, safe, appealing to and accessible by pedestrians.	N/A
Goal CD4: Historic buildings, streets, landscapes and neighborhoods, as well as the story of Ontario's people, businesses, and social and community organizations, that have been preserved and serve as a focal point for civic pride and identity.	
CD 4-1 Cultural Resource Management. We update and maintain an inventory of historic sites and buildings, professional collections, artifacts, manuscripts, photographs, documents, maps and other archives.	N/A
CD 4-2 Collaboration with Property Owners and Developers. We educate and collaborate with property owners and developers to implement strategies and best practices that preserve the character of our historic buildings, streetscapes and unique neighborhoods.	N/A
CD 4-3 Collaboration with Outside Agencies. We pursue opportunities to team with other agencies, local organizations and non-profits in order to preserve and promote Ontario's heritage.	N/A

Policy Plan Goals and Policies	Overlay Consistency
CD 4-4 Incentives. We use the Mills Act and other federal, state, regional and local programs to assist property owners with the preservation of select properties and structures.	N/A
CD 4-5 Adaptive Reuse. We actively promote and support the adaptive reuse of historic sites and buildings to preserve and maintain their viability.	N/A
CD 4-6 Promotion of Public Involvement in Preservation. We engage in programs to publicize and promote the City's and the public's involvement in preservation efforts.	N/A
CD 4-7 Public Outreach. We provide opportunities for our residents to research and learn about the history of Ontario through the Planning Department, Museum of History and Art, Ontario and the Robert E. Ellingwood Model Colony History Room.	N/A
GOAL CD5: A sustained level of maintenance and improvement of properties, buildings and infrastructure that protects the property values and encourages public and private investments.	
CD 5-1 Maintenance of Buildings and Property. We require all public and privately owned buildings and property (including trails and easements) to be properly and consistently maintained.	There is an existing Piemonte at Ontario Center Property Owners Association that maintains the private drives.
CD 5-2 Maintenance of Infrastructure. We require the continual maintenance of infrastructure.	There is an existing Piemonte at Ontario Center Property Owners Association that maintains the private drives.
CD 5-3 Improvements to Property & Infrastructure. We provide programs to improve property and infrastructure.	N/A
CD 5-4 Neighborhood Involvement. We encourage active community involvement to implement programs aimed at the beautification and improvement of neighborhoods.	N/A
SOCIAL SERVICES ELEMENT	
Goal SR1: A community where residents have access to information, services and goods that improve their health and well being.	
SR 1-1 Partnering for Healthcare. We work with healthcare providers, and local, regional, state and federal agencies to attract and retain a diversity of affordable, quality healthcare and facilities for the entire community.	N/A

Policy Plan Goals and Policies	Overlay Consistency
SR 1-2 Nutrition Choices. We support the promotion of healthy nutritional food choices in the community.	N/A
SR 1-3 Health Education. We promote health education, including disease prevention, mental health, nutrition and physical fitness.	N/A
SR 1-4 Physical Activity. We encourage activities and community design that improve the physical fitness of our community members.	N/A
Goal SR2: A range of educational and training opportunities for residents and workers of all ages and abilities that improves their life choices and provides a skilled workforce for our businesses.	
SR 2-1 Educational Partners. We partner with educational institutions throughout the region in order to expand the range and quality of educational offerings available to the community.	N/A
SR 2-2 Workforce Training. We will work with industrial organizations, businesses and educational institutions to create opportunities for workforce training.	N/A
SR 2-3 Joint Use of Facilities. We partner with public and private educational institutions to jointly use facilities for both City and educational purposes.	N/A
SR 2-4 Access to Schools. We work with local and regional partners to improve the safety in and around schools and to improve access for citizens of all ages and abilities to schools and community services, such as after school and other programs.	N/A
SR 2-5 School Facilities. We plan and coordinate with school districts for designing and locating school facilities to meet the City's goals, such as for health, walkability, and safety and to minimize impacts to existing neighborhoods.	N/A
Goal SR3: A range of community and leisure programs and activities provided by public, private and non-profit organizations that meet the needs of the community's varied interests, age groups and abilities.	
SR 3-1 Partnerships. We partner with local and regional agencies, non-profit organizations and the private sector to provide a comprehensive range of community activities and events to citizens.	N/A

Policy Plan Goals and Policies	Overlay Consistency
SR 3-2 Needs Assessment. We track the needs and priorities for community services and look for ways to meet demands and avoid duplication of offerings.	N/A
SR 3-3 Program Outreach. We promote information about leisure activities, classes, special events and other services and activities to our community.	N/A
SR 3-4 Community Events. We plan and actively participate in regularly scheduled community events and seasonal or yearly citywide events.	N/A
SR 3-5 Community Activities as Crime Deterrents. We promote and participate in community activities as part of our crime prevention efforts. (Link to Safety Element Policy S7-3)	N/A
Goal SR4: City libraries that connect community members of all ages and abilities to a broad range of programs, communication and informational resources.	
SR 4-1 Community Needs. We identify and monitor community needs for library services, technologies and facilities, and tailor them to effectively meet those needs.	N/A
SR 4-2 Interagency Coordination. We leverage relationships with outside agencies, educational institutions and neighboring jurisdictions to share library resources to the benefit of Ontario residents.	N/A
SR 4-3 Library Outreach. We outreach to the community to increase the patronage of the library.	N/A
SR 4-4 Coordination with Other Community Services. We coordinate library programs with other recreational and community programs and facilities.	N/A
SR 4-5 Focal Points of the Community. We design and program Ontario's libraries as focal points for community engagement, including public outreach and community events.	N/A

Policy Plan Goals and Policies	Overlay Consistency
SR 4-6 Robert E. Ellingwood Model Colony History Room. We work with the Museum of History and Art, Ontario in order to collect, preserve and display artifacts and images from Ontario's heritage and connect the City's past to the present through the History Room.	N/A
Goal SR5: Local heritage, entertainment and cultural experiences that enrich the lives of Ontario's residents, workers, and visitors and serve to attract residents and businesses to the City.	
SR 5-1 Provision of Entertainment and Culture. We support a range of entertainment and cultural experiences such as public art, exhibitions and performances.	N/A The Overlay allows for an entertainment district surrouding the Arena and would include a series of open plazas to encourage the possibility for public art, exhibitions and performances.
SR 5-2 Local Heritage Education. We partner with educational providers to promote culture and heritage. (Link to Historic Preservation Section of Community Design Element)	N/A
SR 5-3 Public Art. We encourage public art in buildings, parks, open spaces and other public and private spaces.	N/A
SR 5-4 Private-Public Sector Events. We partner with private and nonprofit sectors to provide and promote participation in cultural activities including fairs, festivals and other events geared to neighborhoods, the City as a whole and the region.	N/A
SR 5-5 Promotion of Ontario Artists and Musicians. We promote awareness of entertainment and culture produced in Ontario.	N/A

APPENDIX A - LEGAL DESCRIPTION

NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

PARCEL MAP NO. 17550

IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006

OWNER'S STATEMENT

WE HEREBY STATE THAT WE ARE ALL AND THE ONLY PARTIES HAVING ANY RECORD TITLE INTEREST IN THE LAND SUBDIVIDED AS SHOWN ON THE ANNEXED MAP, AND WE HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF THIS PARCEL MAP.

WE HEREBY RESERVE FOR OURSELVES, OUR SUCCESSORS AND ASSIGNS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES IN, OVER, UNDER, AND ACROSS PRIVATE STREETS VIA ASTI, VIA PIEMONTE, VIA ALBA, VIA VILLAGIO, AND VIA TURIN AS SHOWN ON THE ANNEXED MAP.

WE HEREBY DEDICATE TO THE CITY OF ONTARIO FOR PUBLIC STREET AND UTILITY PURPOSES, ONTARIO CENTER PARKWAY AS SHOWN ON THE ANNEXED MAP.

WE HEREBY DEDICATE TO THE CITY OF ONTARIO A 10 FOOT EASEMENT FOR PEDESTRIAN ACCESS PURPOSES, TO BE MAINTAINED BY THE PROPERTY OWNERS, AS SHOWN ON THE ANNEXED MAP.

WE HEREBY DEDICATE TO THE CITY OF ONTARIO A 10.5 FOOT EASEMENT FOR PEDESTRIAN ACCESS AND PUBLIC UTILITY PURPOSES, TO BE MAINTAINED BY THE PROPERTY OWNERS, AS SHOWN ON THE ANNEXED MAP.

WE HEREBY DEDICATE TO THE CITY OF ONTARIO A PUBLIC EASEMENT FOR EMERGENCY ACCESS, AND PUBLIC UTILITY PURPOSES IN, OVER, UNDER, AND ACROSS PRIVATE STREETS VIA ASTI, VIA PIEMONTE, VIA ALBA, VIA VILLAGIO, AND VIA TURIN AS SHOWN ON THE ANNEXED MAP.

THE CITY OF ONTARIO, A CALIFORNIA MUNICIPAL CORPORATION

BY: _____
ROBERT HEITZMAN

THE ONTARIO REDEVELOPEMENT AGENCY, A PUBLIC BODY, CORPORATE AND POLITIC

BY: _____
ROBERT HEITZMAN

NOTARY ACKNOWLEDGMENT

STATE OF CALIFORNIA)
ss
COUNTY OF SAN BERNARDINO)

ON SEPTEMBER 11, 2006, BEFORE ME, Traci R McGinley, Notary, PERSONALLY APPEARED ROBERT HEITZMAN, PERSONALLY KNOWN TO ME (OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS(ARE) SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/~~SHE/THEY~~ EXECUTED THE SAME IN HIS/~~HER/THEIR~~ AUTHORIZED CAPACITY(~~IES~~), AND THAT BY HIS/~~HER/THEIR~~ SIGNATURE(~~S~~) ON THE INSTRUMENT THE PERSON(~~S~~) OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(~~S~~) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL
SIGNATURE _____
TRACI R. MCGINLEY

COMMISSION # 1483449
APRIL 13, 2008

NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE
MY PRINCIPAL PLACE OF BUSINESS IS SAN BERNARDINO COUNTY.
MY COMMISSION EXPIRES

NOTARY ACKNOWLEDGMENT

STATE OF CALIFORNIA)
ss
COUNTY OF SAN BERNARDINO)

ON SEPTEMBER 11, 2006, BEFORE ME, TRACI R. MCGINLEY, NOTARY, PERSONALLY APPEARED ROBERT HEITZMAN, PERSONALLY KNOWN TO ME (OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(~~S~~) WHOSE NAME(~~S~~) IS(~~ARE~~) SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/~~SHE/THEY~~ EXECUTED THE SAME IN HIS/~~HER/THEIR~~ AUTHORIZED CAPACITY(~~IES~~), AND THAT BY HIS/~~HER/THEIR~~ SIGNATURE(~~S~~) ON THE INSTRUMENT THE PERSON(~~S~~) OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(~~S~~) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL
SIGNATURE _____
TRACI R. MCGINLEY

COMMISSION # 1483449
APRIL 13, 2008

NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE
MY PRINCIPAL PLACE OF BUSINESS IS SAN BERNARDINO COUNTY.
MY COMMISSION EXPIRES

ABANDONMENT NOTE

PURSUANT TO SECTION 66499.20-1/2 OF THE SUBDIVISION MAP ACT, THE FILING OF THIS MAP CONSTITUTES ABANDONMENT OF THAT CERTAIN EASEMENT FOR STREET AND HIGHWAY PURPOSES IN FAVOR OF THE CITY OF ONTARIO AS SHOWN ON TRACT MAP NO. 16666 IN BOOK 302, PAGES 55 AND 56 OF MAPS.

SIGNATURE OMISSION

THE SIGNATURE OF THE CITY OF ONTARIO, THE OWNER OF AN EASEMENT STORM DRAIN PURPOSES, DISCLOSED BY INSTRUMENT NO. 1989-210122, RECORDS OF SAN BERNARDINO COUNTY HAVE BEEN OMITTED UNDER THE PROVISIONS OF SECTION 66436 OF THE SUBDIVISION MAP ACT OF THE STATE OF CALIFORNIA. ITS INTEREST CANNOT RIPEN INTO A FEE.

SURVEYOR'S STATEMENT

I, LENNY GUYETT, HEREBY STATE THAT I AM A LICENSED LAND SURVEYOR OF THE STATE OF CALIFORNIA AND THAT THIS MAP, CONSISTING OF FOURTEEN SHEETS, IS A TRUE AND COMPLETE REPRESENTATION OF A SURVEY MADE BY ME OR UNDER MY DIRECTION IN MARCH 2005 AT THE REQUEST OF PANATTONI DEVELOPMENT, AND THAT ALL THE MONUMENTS SHOWN HEREON ARE OF THE CHARACTER AND OCCUPY THE POSITIONS INDICATED, OR WILL BE SET IN SUCH POSITIONS WITHIN ONE YEAR OF THE RECORDATION OF THIS MAP, IN COMPLIANCE WITH SECTION 66495 AND 66496 OF THE SUBDIVISION MAP ACT, AND ARE OR WILL BE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED. I HEREBY STATE THAT THIS PARCEL MAP SUBSTANTIALLY CONFORMS TO THE APPROVED OR CONDITIONALLY APPROVED TENTATIVE MAP, IF ANY.

LICENSED LAND SURVEYOR
LENNY GUYETT
No. 7993
Exp. 12/31/06
STATE OF CALIFORNIA

8/24/06
LENNY GUYETT, PLS 7993
REGISTRATION EXPIRES: 12-31-06

CITY ENGINEER'S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS MAP, AND THAT THE SUBDIVISION SHOWN HEREON IS SUBSTANTIALLY THE SAME AS IT APPEARED ON THE TENTATIVE MAP AND ANY APPROVED ALTERATIONS THEREOF, AND THAT ALL THE PROVISIONS OF THE SUBDIVISION MAP ACT AND THE CITY OF ONTARIO MUNICIPAL CODE HAVE BEEN COMPLIED WITH AND I AM SATISFIED THAT THIS MAP IS TECHNICALLY CORRECT.

REGISTERED PROFESSIONAL ENGINEER
JOHN P. SULLIVAN
No. 24079
Exp. 12-31-07
CIVIL
STATE OF CALIFORNIA

8.30.06
JOHN P. SULLIVAN
CITY ENGINEER, R.C.E. 24079
CITY OF ONTARIO, CALIFORNIA
REGISTRATION EXPIRES: 12/31/07

PLANNING COMMISSION'S STATEMENT

I DO HEREBY STATE THAT THE SUBDIVISION SHOWN ON THE ANNEXED MAP IS IN ACCORDANCE WITH THE TENTATIVE MAP APPROVED AT A MEETING OF THE PLANNING COMMISSION OF THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, HELD ON THE TWENTY-EIGHTH DAY OF FEBRUARY, 2006.

DATED: 8.29.06 BY: _____
JERRY L. BLUM
SECRETARY OF THE ONTARIO PLANNING COMMISSION

CITY COUNCIL'S STATEMENT

I HEREBY STATE THAT THE CITY COUNCIL OF THE CITY OF ONTARIO BY A MOTION, BY RESOLUTION, DULY SECONDED, PASSED AND APPROVED THE ANNEXED MAP ON THE 6TH DAY OF JUNE, 2006, AND ACCEPTED, SUBJECT TO THEIR IMPROVEMENT IN ACCORDANCE WITH CITY STANDARDS, THE FOLLOWING DEDICATIONS:
THE DEDICATION OF ONTARIO CENTER PARKWAY FOR STREET AND PUBLIC UTILITY PURPOSES AS SHOWN ON THE ANNEXED MAP;
EASEMENTS FOR EMERGENCY ACCESS, AND PUBLIC UTILITY PURPOSES IN, OVER, UNDER, AND ACROSS PRIVATE STREETS VIA ASTI, VIA PIEMONTE, VIA ALBA, VIA VILLAGIO, AND VIA TURIN AS SHOWN ON THE ANNEXED MAP;
A 10 FOOT EASEMENT FOR PEDESTRIAN ACCESS AS SHOWN ON THE ANNEXED MAP;
A 10.5 FOOT EASEMENT FOR PEDESTRIAN ACCESS AND PUBLIC UTILITY PURPOSES AS SHOWN ON THE ANNEXED MAP;
AND ALSO ACCEPTED THE ABANDONMENT OF THAT CERTAIN EASEMENT FOR STREET AND HIGHWAY PURPOSES IN FAVOR OF THE CITY OF ONTARIO AS SHOWN ON TRACT MAP NO. 16666 IN BOOK 302, PAGES 55 AND 56 OF MAPS, AND AS ALSO SHOWN ON ~~THE ANNEXED~~ THE ANNEXED MAP.

DATED: 08-31-06 BY: _____
TRACI R. MCGINLEY
CITY CLERK ASSISTANT
CITY OF ONTARIO, CALIFORNIA

CITY OF ONTARIO
INCORPORATED
DECEMBER
1891
CALIFORNIA

AUDITOR'S STATEMENT

I HEREBY ~~CERTIFY~~ STATE THAT ACCORDING TO THE RECORDS OF THIS OFFICE, AS OF THIS DATE, THERE ARE NO LIENS AGAINST THE REAL PROPERTY SHOWN UPON THE ANNEXED MAP FOR UNPAID STATE, COUNTY, MUNICIPAL OR LOCAL TAXES, OR SPECIAL ASSESSMENTS COLLECTED AS TAXES, EXCEPT TAXES OR SPECIAL ASSESSMENTS NOT YET PAYABLE, ESTIMATED TO BE $ 0 (EXEMPT).

LARRY WALKER, COUNTY AUDITOR/CONTROLLER
COUNTY OF SAN BERNARDINO

09/15/06 BY: _____
DATED: DEPUTY

BOARD OF SUPERVISOR'S STATEMENT

I HEREBY ~~CERTIFY~~ STATE THAT A BOND IN THE SUM OF $ 0 HAS BEEN EXECUTED AND FILED WITH THE BOARD OF SUPERVISORS ~~(OR AGENCY)~~ OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA; CONDITIONED UPON THE PAYMENT OF ALL TAXES, STATE, COUNTY, MUNICIPAL, OR LOCAL, AND ALL SPECIAL ASSESSMENTS, COLLECTED AS TAXES, WHICH AT THE TIME OF FILING OF THE ANNEXED MAP WITH THE COUNTY RECORDER IS A LIEN AGAINST SAID PROPERTY, BUT NOT YET PAYABLE AND THAT THE SUBDIVIDER HAS FILED WITH ME A CERTIFICATE BY THE PROPER OFFICER GIVING HIS ESTIMATE OF THE AMOUNT OF SAID TAXES AND ASSESSMENTS, AND SAID BOND I HEREBY ACCEPTED.

SPECIAL
DENA M. SMITH
CLERK OF THE BOARD OF SUPERVISOR'S OF
THE COUNTY OF SAN BERNARDINO

09/15/06 BY: _____
DATED: DEPUTY

COUNTY RECORDER'S CERTIFICATE

THIS MAP HAS BEEN FILED UNDER DOCUMENT NUMBER 2006-0632192
THIS 15TH DAY OF SEPTEMBER, 2006, AT 9:52 A.M. IN BOOK 316 OF PAGE 7-20
AT THE REQUEST OF FIRST AMERICAN TITLE,
IN THE AMOUNT OF $ 0.00
9:52AM
OF PARCEL MAPS

LARRY WALKER, COUNTY AUDITOR
THE COUNTY OF SAN BERNARDINO

9/15/06 BY: _____
DATED: DEPUTY

316/7

L/0112

Order: Non-Order Search Doc: SB:P 116-7

Created By: Scott Shelby Printed: 5/16/2013 10:12:02 AM PST

8/91E

March 2022June 2017

SHEET 2 OF 14 SHEETS

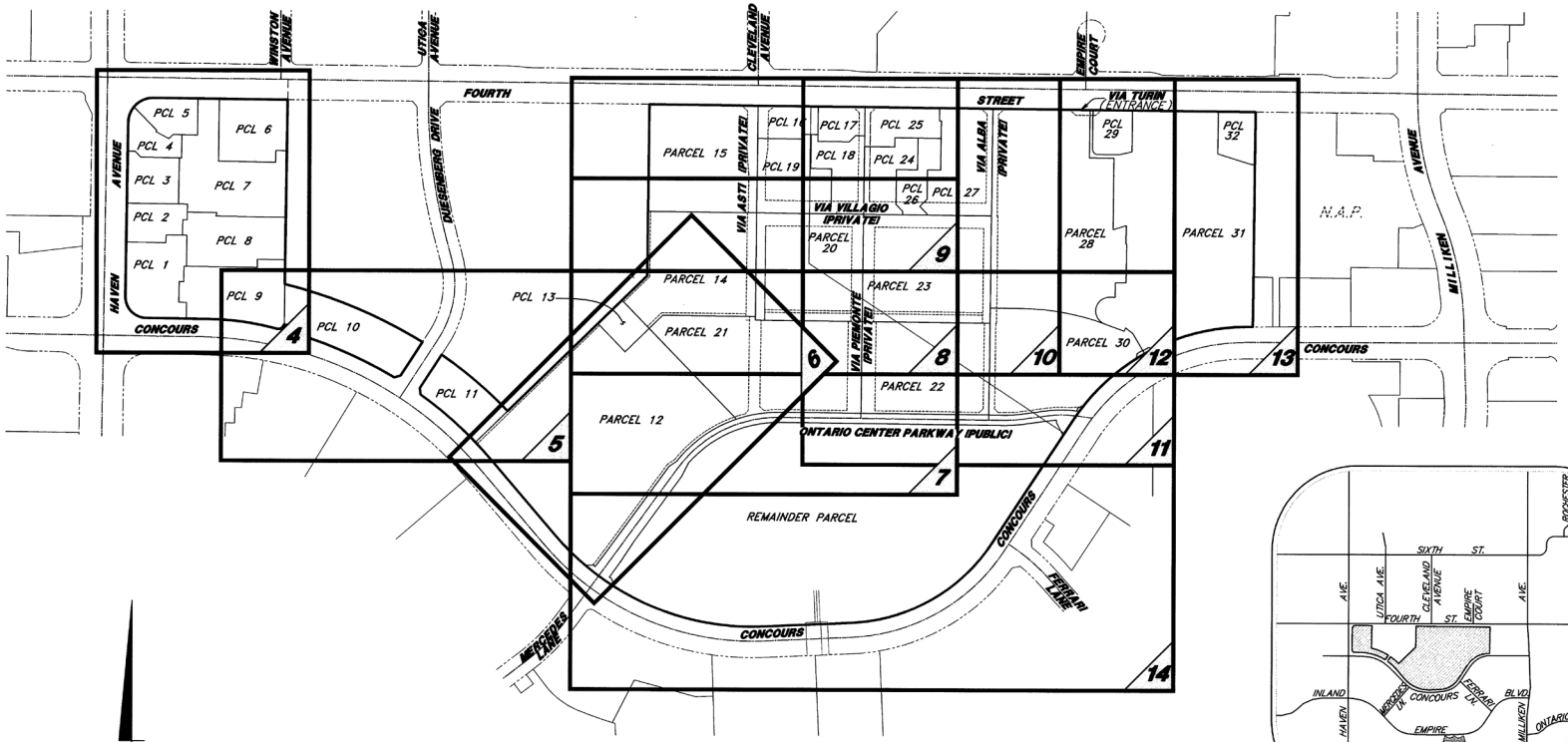
NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

PARCEL MAP NO. 17550

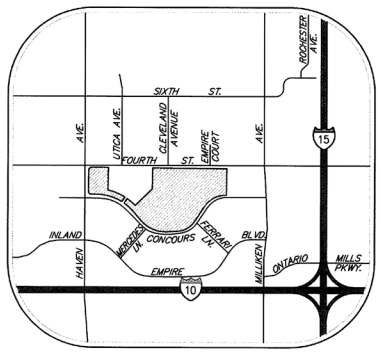
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006



INDEX MAP



VICINITY MAP:
NOT TO SCALE

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

216/8

Page A-3

6/918

March 2022June 2017

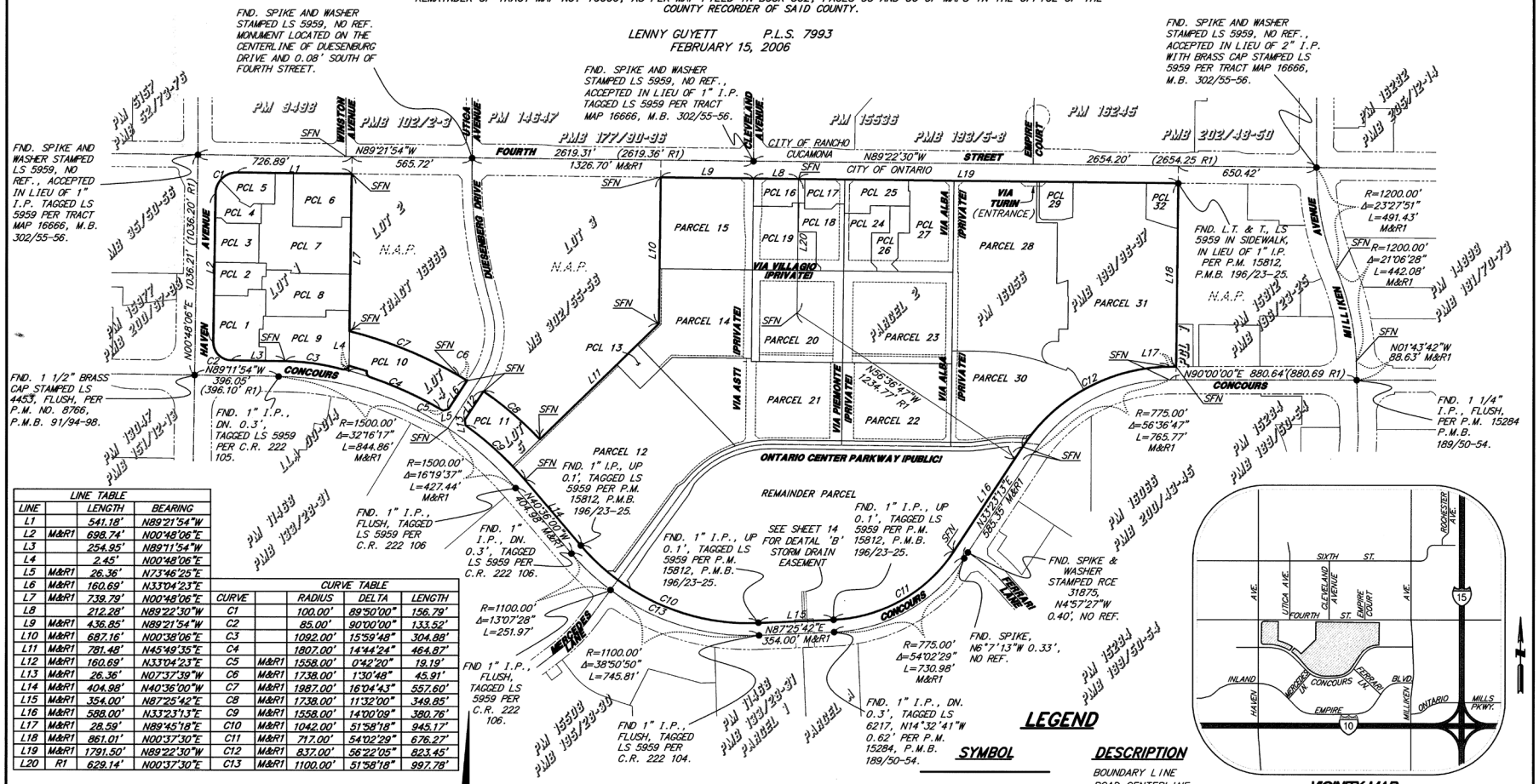
PARCEL MAP NO. 17550

IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006



LINE TABLE			
LINE		LENGTH	BEARING
L1		541.18'	N89°21'54"W
L2	M&R1	698.74'	N00°48'06"E
L3		254.95'	N89°11'54"W
L4		2.45'	N00°48'06"E
L5	M&R1	26.36'	N73°46'25"E
L6	M&R1	160.69'	N33°04'23"E
L7	M&R1	739.79'	N00°48'06"E
L8		212.28'	N89°22'30"W
L9	M&R1	436.85'	N89°21'54"W
L10	M&R1	687.16'	N00°38'06"E
L11	M&R1	781.48'	N45°49'35"E
L12	M&R1	160.69'	N33°04'23"E
L13	M&R1	26.36'	N07°37'39"W
L14	M&R1	404.98'	N40°36'00"W
L15	M&R1	354.00'	N87°25'42"E
L16	M&R1	588.00'	N33°23'13"E
L17	M&R1	28.59'	N89°45'18"E
L18	M&R1	861.01'	N00°37'30"E
L19	M&R1	1791.50'	N89°22'30"W
L20	R1	629.14'	N00°37'30"E

CURVE TABLE				
CURVE		RADIUS	DELTA	LENGTH
C1		100.00'	89°50'00"	156.79'
C2		85.00'	90°00'00"	133.52'
C3		1092.00'	15°59'48"	304.88'
C4		1807.00'	14°44'24"	464.87'
C5	M&R1	1558.00'	0°42'20"	19.19'
C6	M&R1	1738.00'	1°30'48"	45.91'
C7	M&R1	1987.00'	16°04'43"	557.60'
C8	M&R1	1738.00'	11°32'00"	349.85'
C9	M&R1	1558.00'	14°00'09"	380.76'
C10	M&R1	1042.00'	51°58'18"	945.17'
C11	M&R1	717.00'	54°02'29"	676.27'
C12	M&R1	837.00'	56°22'05"	823.45'
C13	M&R1	1100.00'	51°58'18"	997.78'

GRAPHIC SCALE

300 0 150 300 600 1200
(IN FEET)
1 inch = 300 ft.

BASIS OF BEARINGS

BEARINGS ARE BASED UPON THE CENTERLINE OF HAVEN AVENUE AS BEING N00°48'06"E PER TRACT MAP 16666, RECORDED IN MB 302, PAGES 55 AND 56, SAN BERNARDIO COUNTY RECORDS.

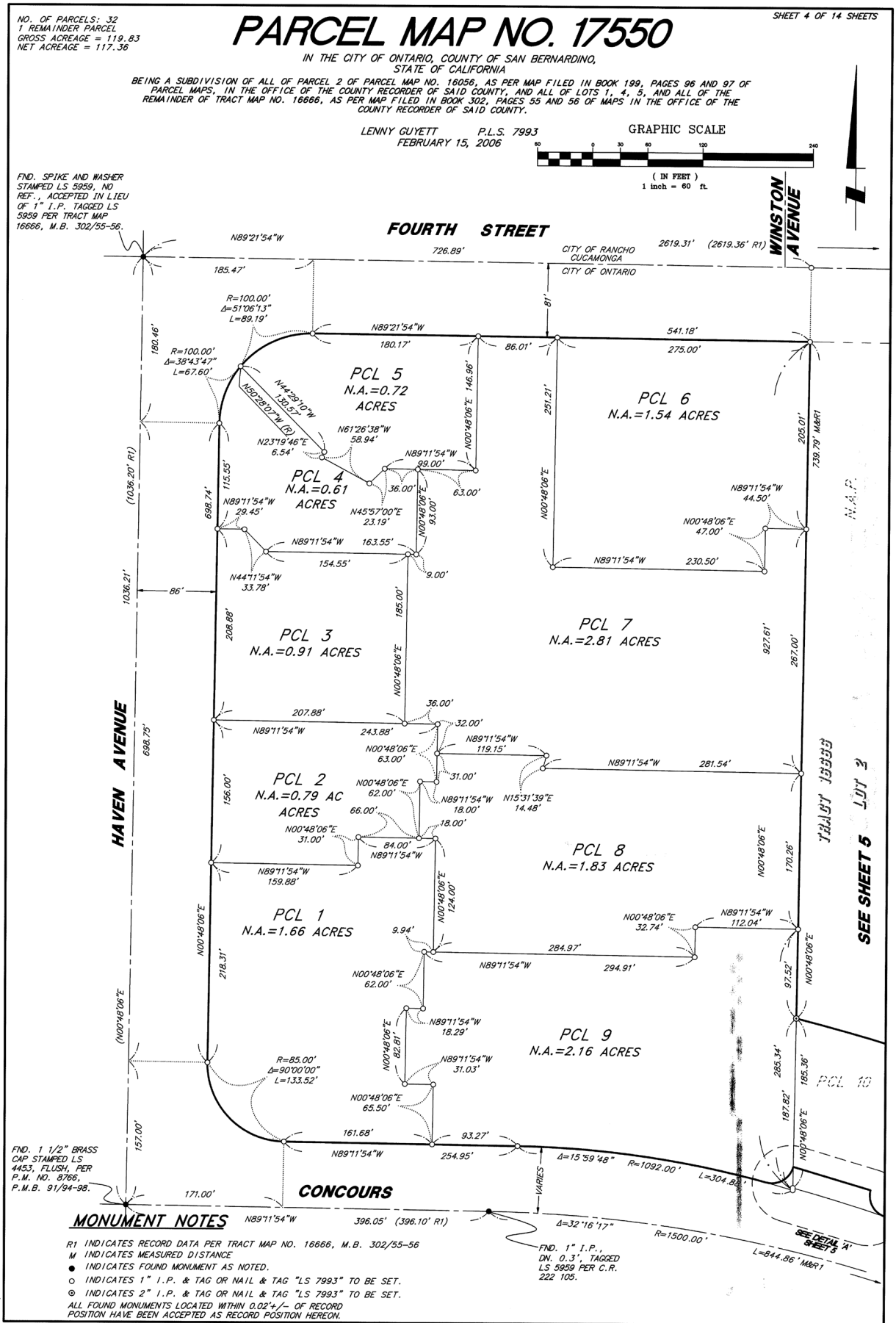
LEGEND

SYMBOL	DESCRIPTION
	BOUNDARY LINE
	ROAD CENTERLINE
	RIGHT-OF-WAY
	PROPOSED EASEMENT
R1	INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M	INDICATES MEASURED DISTANCE
SFN	INDICATES SEARCH FOUND NOTHING.
●	INDICATES FOUND MONUMENT AS NOTED. ALL FOUND MONUMENTS LOCATED WITHIN 0.02'+/- OF RECORD POSITION HAVE BEEN ACCEPTED AS RECORD POSITION HEREON.
○	INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
⊙	INDICATES 2" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.

VICINITY MAP:
NOT TO SCALE

216/9

Page A-4


NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36
PARCEL MAP NO. 17550
SHEET 4 OF 14 SHEETS
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
FND. SPIKE AND WASHER STAMPED LS 5959, NO REF., ACCEPTED IN LIEU OF 1" I.P. TAGGED LS 5959 PER TRACT MAP 16666, M.B. 302/55-56.
FOURTH STREET
WINSTON AVENUE
CITY OF RANCHO CUCAMONGA
CITY OF ONTARIO
HAVEN AVENUE
CONCOURS
PCL 1 N.A.=1.66 ACRES
PCL 2 N.A.=0.79 AC ACRES
PCL 3 N.A.=0.91 ACRES
PCL 4 N.A.=0.61 ACRES
PCL 5 N.A.=0.72 ACRES
PCL 6 N.A.=1.54 ACRES
PCL 7 N.A.=2.81 ACRES
PCL 8 N.A.=1.83 ACRES
PCL 9 N.A.=2.16 ACRES
PCL 10
SEE SHEET 5
SEE DETAIL 'A' SHEET 5
FND. 1 1/2" BRASS CAP STAMPED LS 4453, FLUSH, PER P.M. NO. 8766, P.M.B. 91/94-98.
FND. 1" I.P., DN. 0.3', TAGGED LS 5959 PER C.R. 222 105.
MONUMENT NOTES
R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M INDICATES MEASURED DISTANCE
● INDICATES FOUND MONUMENT AS NOTED.
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
⊙ INDICATES 2" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
ALL FOUND MONUMENTS LOCATED WITHIN 0.02'+/- OF RECORD POSITION HAVE BEEN ACCEPTED AS RECORD POSITION HEREON.

11/916

NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

SHEET 5 OF 14 SHEETS

PARCEL MAP NO. 17550

IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

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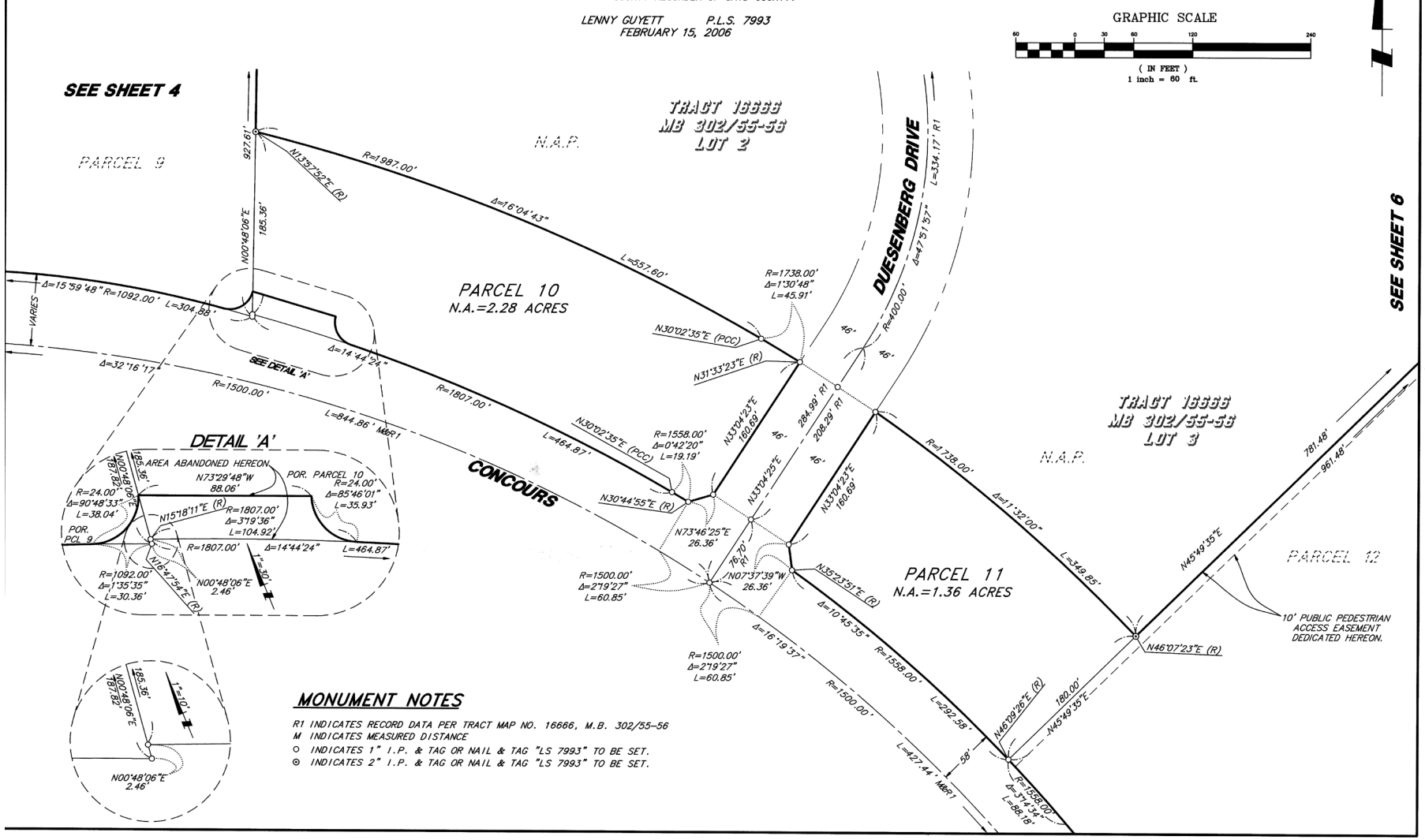
LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006

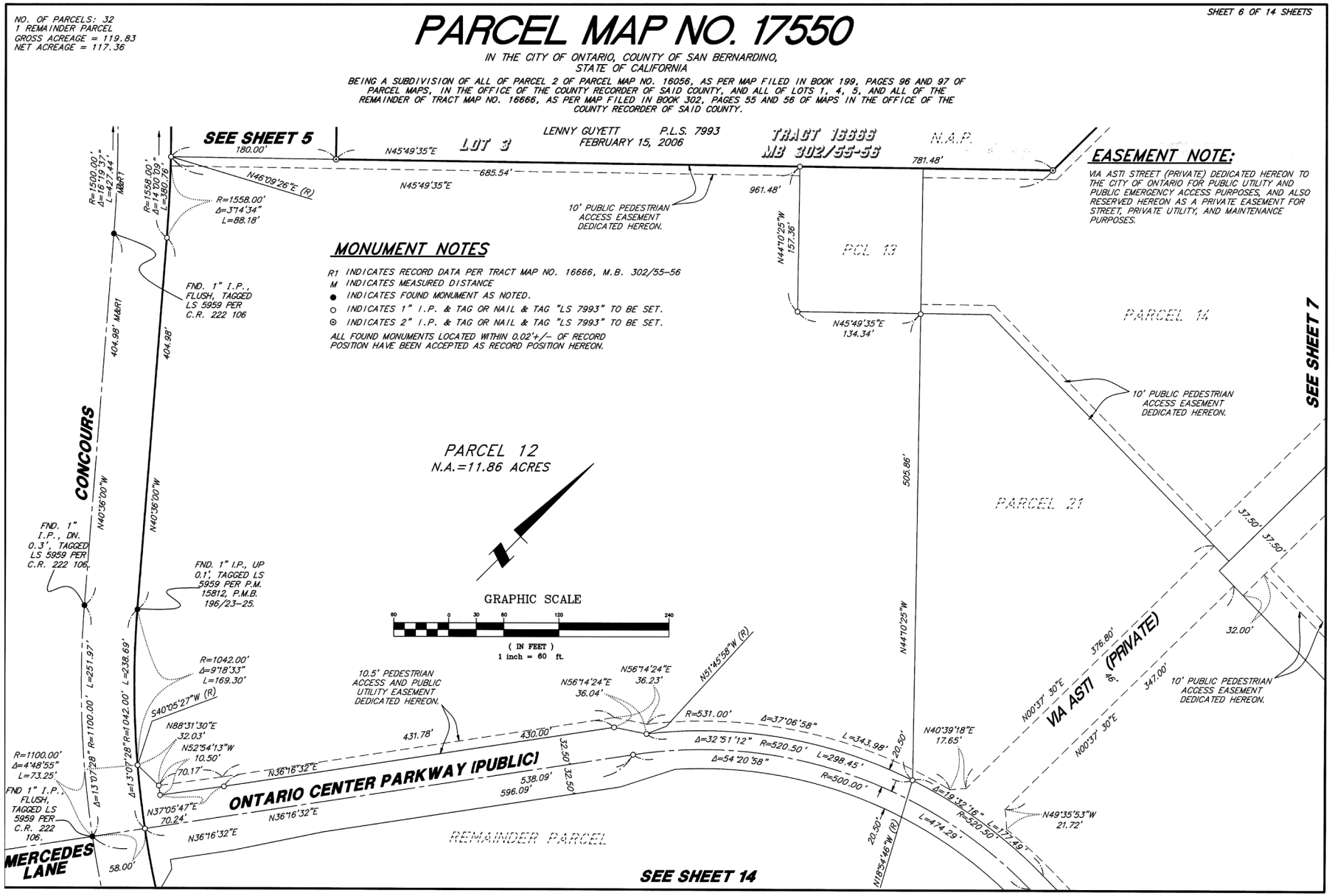


MONUMENT NOTES

R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M INDICATES MEASURED DISTANCE
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
⊙ INDICATES 2" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.

216/11

216/12



NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36
SHEET 6 OF 14 SHEETS
PARCEL MAP NO. 17550
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
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LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006
SEE SHEET 5
LOT 3
TRACT 16666
MB 302/55-56
N.A.P.
EASEMENT NOTE:
VIA ASTI STREET (PRIVATE) DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.
MONUMENT NOTES
R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M INDICATES MEASURED DISTANCE
● INDICATES FOUND MONUMENT AS NOTED.
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
⊙ INDICATES 2" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
ALL FOUND MONUMENTS LOCATED WITHIN 0.02'+/- OF RECORD POSITION HAVE BEEN ACCEPTED AS RECORD POSITION HEREON.
PCL 13
PARCEL 14
PARCEL 21
PARCEL 12
N.A.=11.86 ACRES
CONCOURS
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
VIA ASTI (PRIVATE)
ONTARIO CENTER PARKWAY (PUBLIC)
REMAINDER PARCEL
MERCEDES LANE
SEE SHEET 7
SEE SHEET 14
10' PUBLIC PEDESTRIAN ACCESS EASEMENT DEDICATED HEREON.
10.5' PEDESTRIAN ACCESS AND PUBLIC UTILITY EASEMENT DEDICATED HEREON.
FND. 1" I.P., FLUSH, TAGGED LS 5959 PER C.R. 222 106
FND. 1" I.P., DN. 0.3', TAGGED LS 5959 PER C.R. 222 106.
FND. 1" I.P., UP 0.1', TAGGED LS 5959 PER P.M. 15812, P.M.B. 196/23-25.
FND 1" I.P., FLUSH, TAGGED LS 5959 PER C.R. 222 106.

216/12

216/13

NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

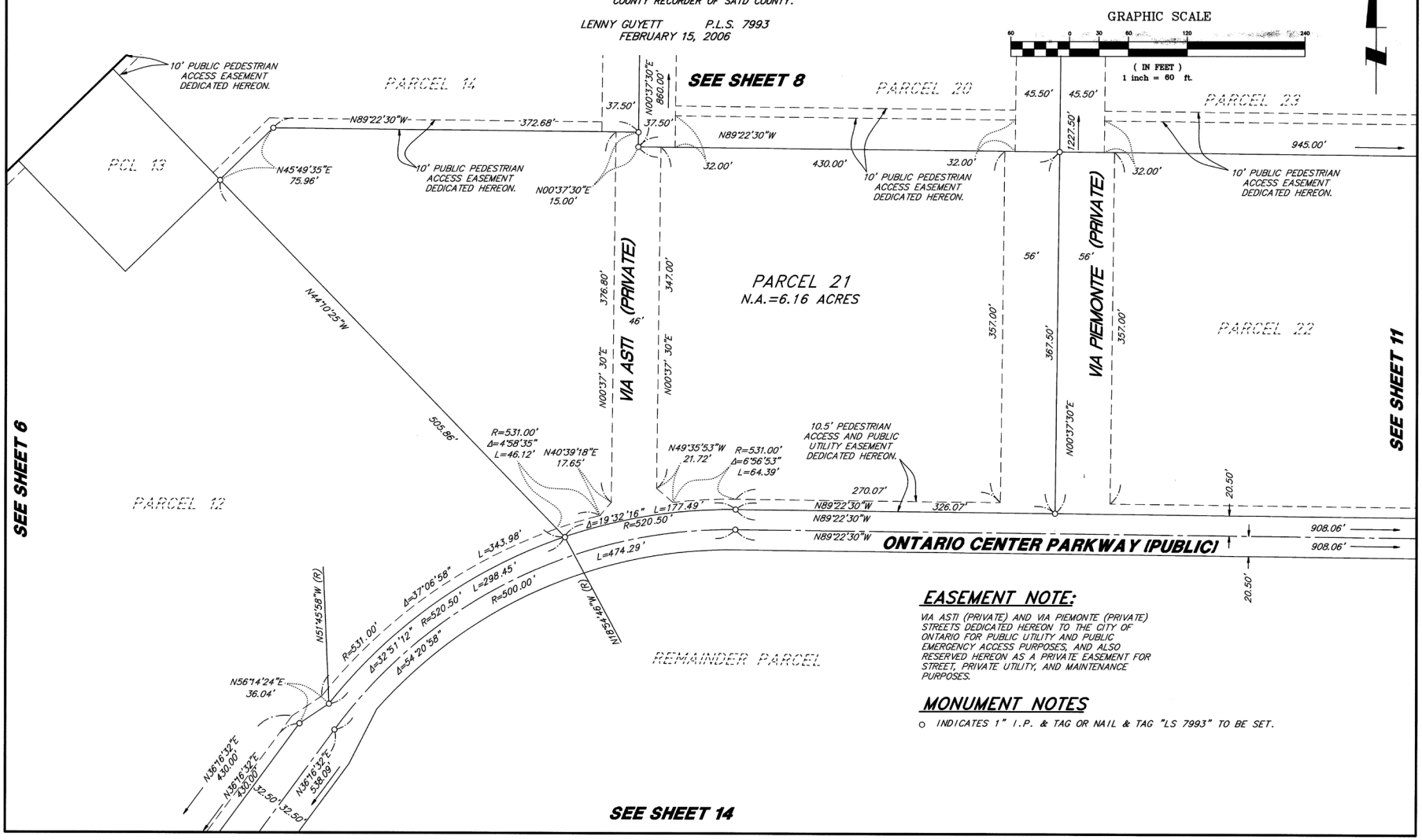
SHEET 7 OF 14 SHEETS

PARCEL MAP NO. 17550

IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006



EASEMENT NOTE:

VIA ASTI (PRIVATE) AND VIA PIEMONTE (PRIVATE) STREETS DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.

MONUMENT NOTES

o INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.

216/13

216/14

NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

PARCEL MAP NO. 17550

IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

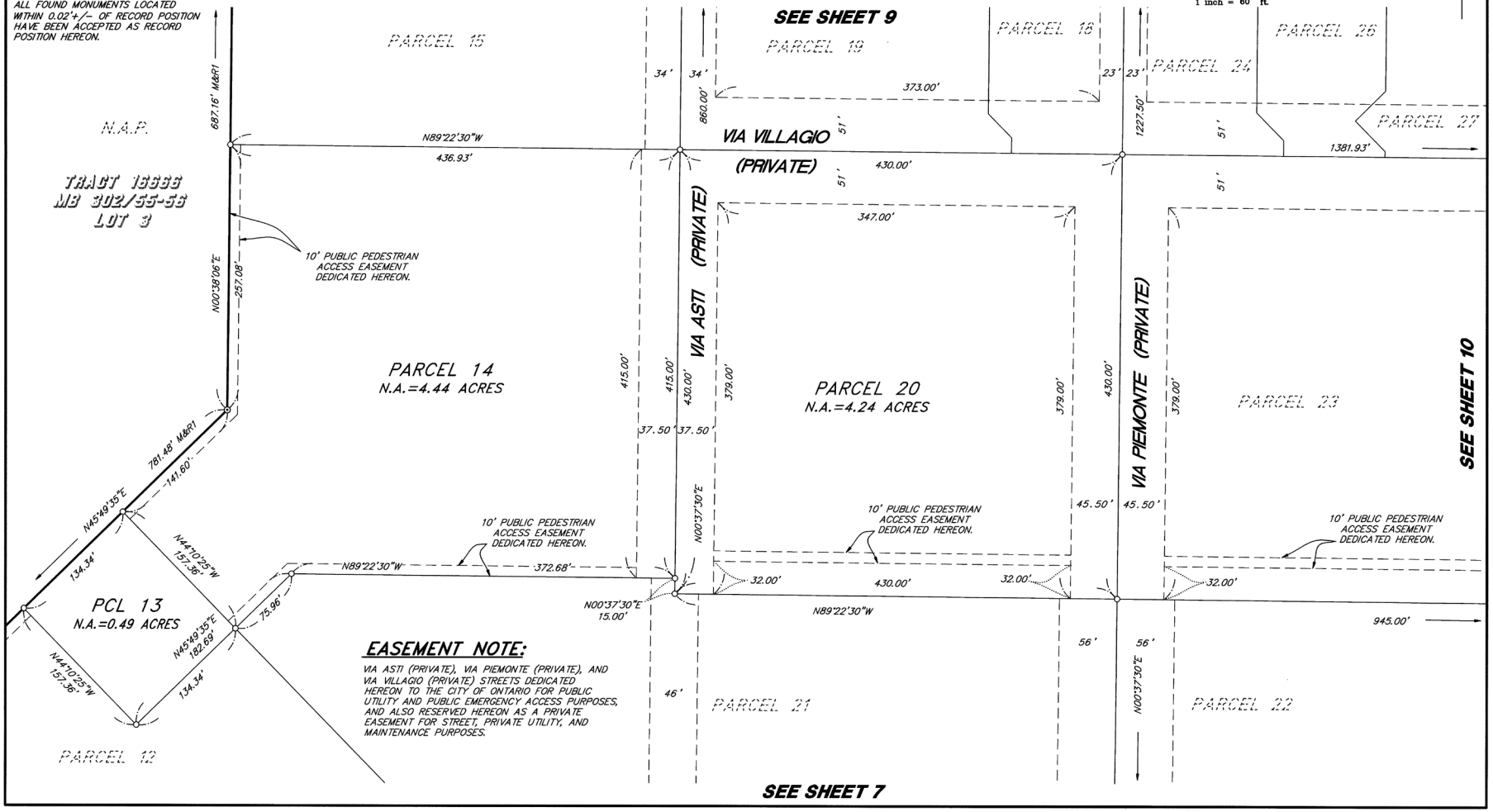
LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006

SHEET 8 OF 14 SHEETS

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft.

MONUMENT NOTES

R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M INDICATES MEASURED DISTANCE
● INDICATES FOUND MONUMENT AS NOTED.
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
⊙ INDICATES 2" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
ALL FOUND MONUMENTS LOCATED WITHIN 0.02'+/- OF RECORD POSITION HAVE BEEN ACCEPTED AS RECORD POSITION HEREON.

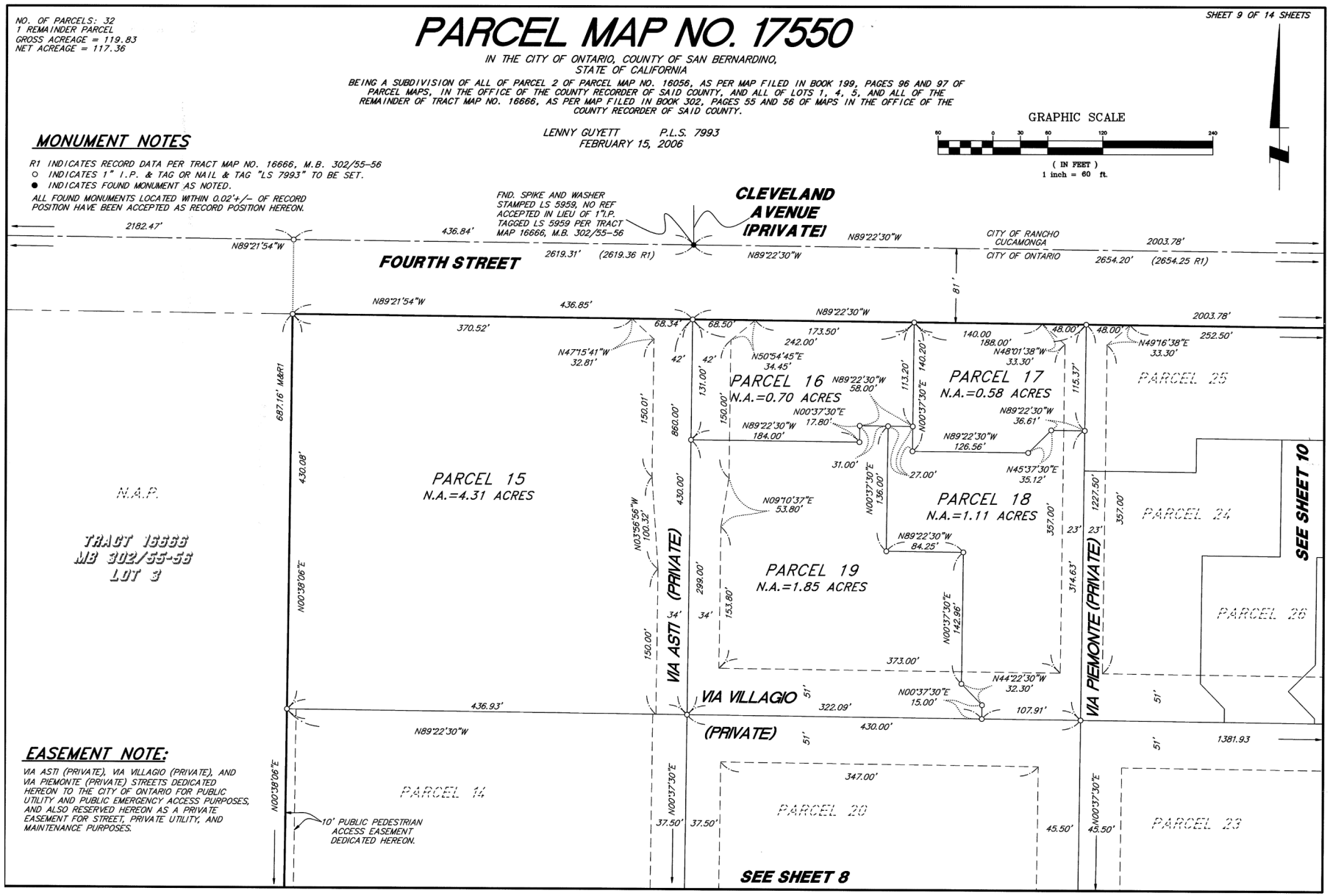


EASEMENT NOTE:

VIA ASTI (PRIVATE), VIA PIEMONTE (PRIVATE), AND VIA VILLAGIO (PRIVATE) STREETS DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.

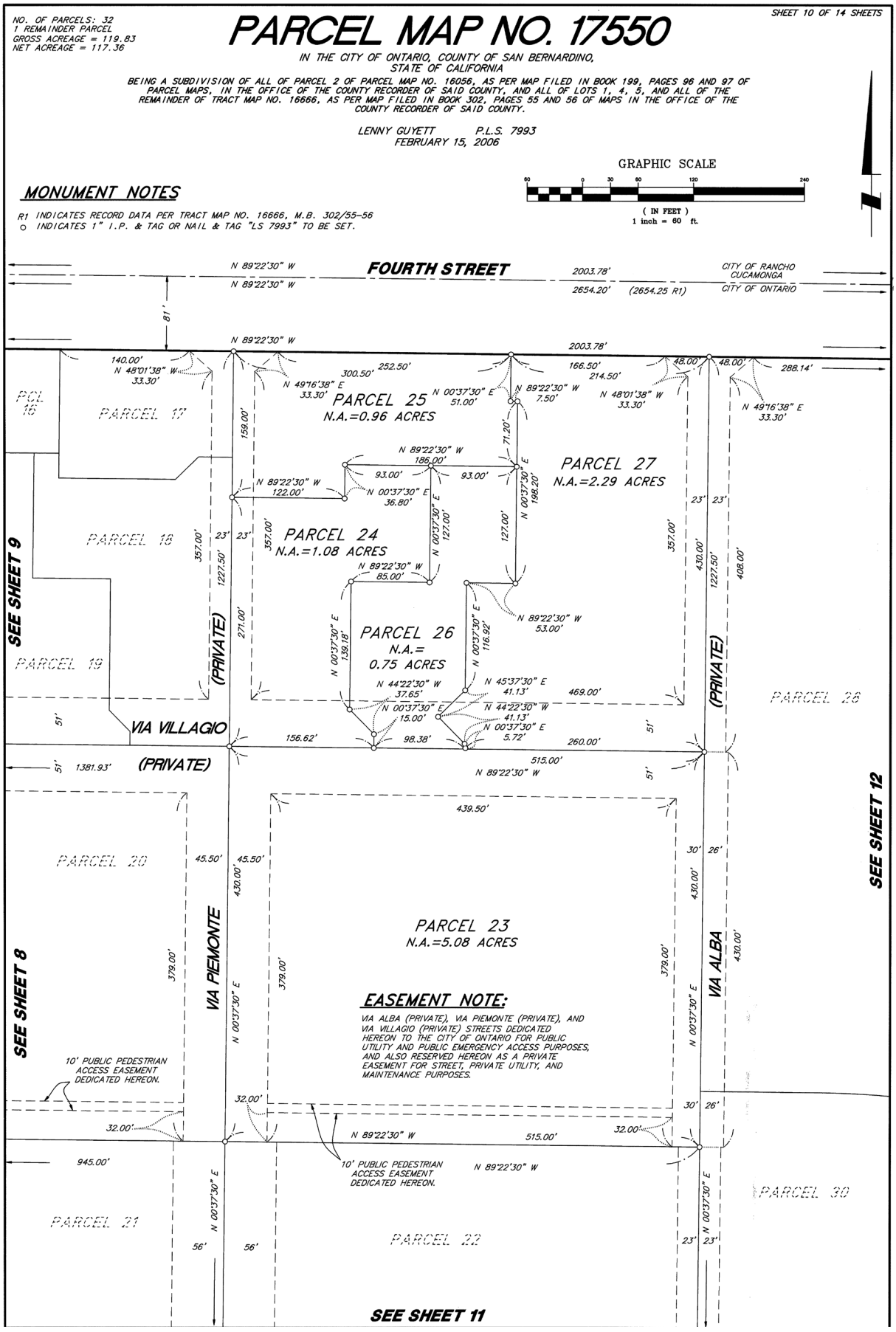
216/14

216/15



NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36
PARCEL MAP NO. 17550
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006
SHEET 9 OF 14 SHEETS
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
MONUMENT NOTES
R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
● INDICATES FOUND MONUMENT AS NOTED.
ALL FOUND MONUMENTS LOCATED WITHIN 0.02'+/- OF RECORD POSITION HAVE BEEN ACCEPTED AS RECORD POSITION HEREON.
FND. SPIKE AND WASHER STAMPED LS 5959, NO REF ACCEPTED IN LIEU OF 1"I.P. TAGGED LS 5959 PER TRACT MAP 16666, M.B. 302/55-56
CLEVELAND AVENUE (PRIVATE)
FOURTH STREET
CITY OF RANCHO CUCAMONGA
CITY OF ONTARIO
PARCEL 15
N.A.=4.31 ACRES
PARCEL 16
N.A.=0.70 ACRES
PARCEL 17
N.A.=0.58 ACRES
PARCEL 18
N.A.=1.11 ACRES
PARCEL 19
N.A.=1.85 ACRES
PARCEL 14
PARCEL 20
PARCEL 23
PARCEL 24
PARCEL 25
PARCEL 26
N.A.P.
TRACT 16666
MB 302/55-56
LOT 3
VIA ASTI (PRIVATE)
VIA VILLAGIO (PRIVATE)
VIA PIEMONTE (PRIVATE)
SEE SHEET 10
SEE SHEET 8
10' PUBLIC PEDESTRIAN ACCESS EASEMENT DEDICATED HEREON.
EASEMENT NOTE:
VIA ASTI (PRIVATE), VIA VILLAGIO (PRIVATE), AND VIA PIEMONTE (PRIVATE) STREETS DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.

216/15


NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36
SHEET 10 OF 14 SHEETS
PARCEL MAP NO. 17550
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
MONUMENT NOTES
R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
FOURTH STREET
CITY OF RANCHO CUCAMONGA
CITY OF ONTARIO
PARCEL 25
N.A.=0.96 ACRES
PARCEL 27
N.A.=2.29 ACRES
PARCEL 24
N.A.=1.08 ACRES
PARCEL 26
N.A.=
0.75 ACRES
PARCEL 17
PARCEL 18
PARCEL 19
PARCEL 20
PARCEL 21
PARCEL 22
PARCEL 23
N.A.=5.08 ACRES
PARCEL 28
PARCEL 30
PCL 16
VIA VILLAGIO (PRIVATE)
VIA PIEMONTE (PRIVATE)
VIA ALBA (PRIVATE)
SEE SHEET 8
SEE SHEET 9
SEE SHEET 11
SEE SHEET 12
EASEMENT NOTE:
VIA ALBA (PRIVATE), VIA PIEMONTE (PRIVATE), AND VIA VILLAGIO (PRIVATE) STREETS DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.
10' PUBLIC PEDESTRIAN ACCESS EASEMENT DEDICATED HEREON.
10' PUBLIC PEDESTRIAN ACCESS EASEMENT DEDICATED HEREON.

2/6/18

9/1/2012

LI/DNE

March 2022June 2017

NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

PARCEL MAP NO. 17550

IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA

BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

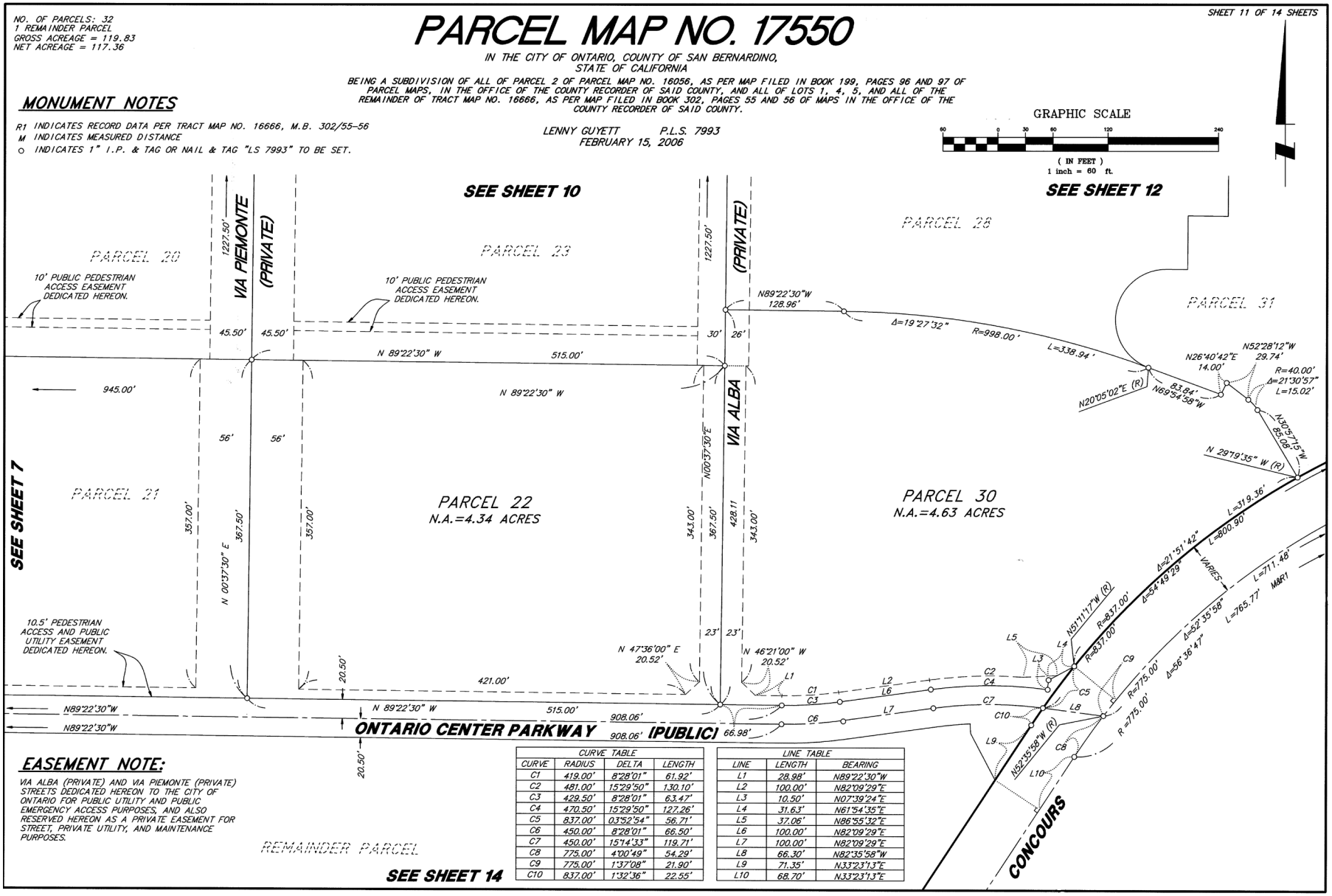
SHEET 11 OF 14 SHEETS

MONUMENT NOTES

R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M INDICATES MEASURED DISTANCE
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.

LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft.



EASEMENT NOTE:

VIA ALBA (PRIVATE) AND VIA PIEMONTE (PRIVATE) STREETS DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.

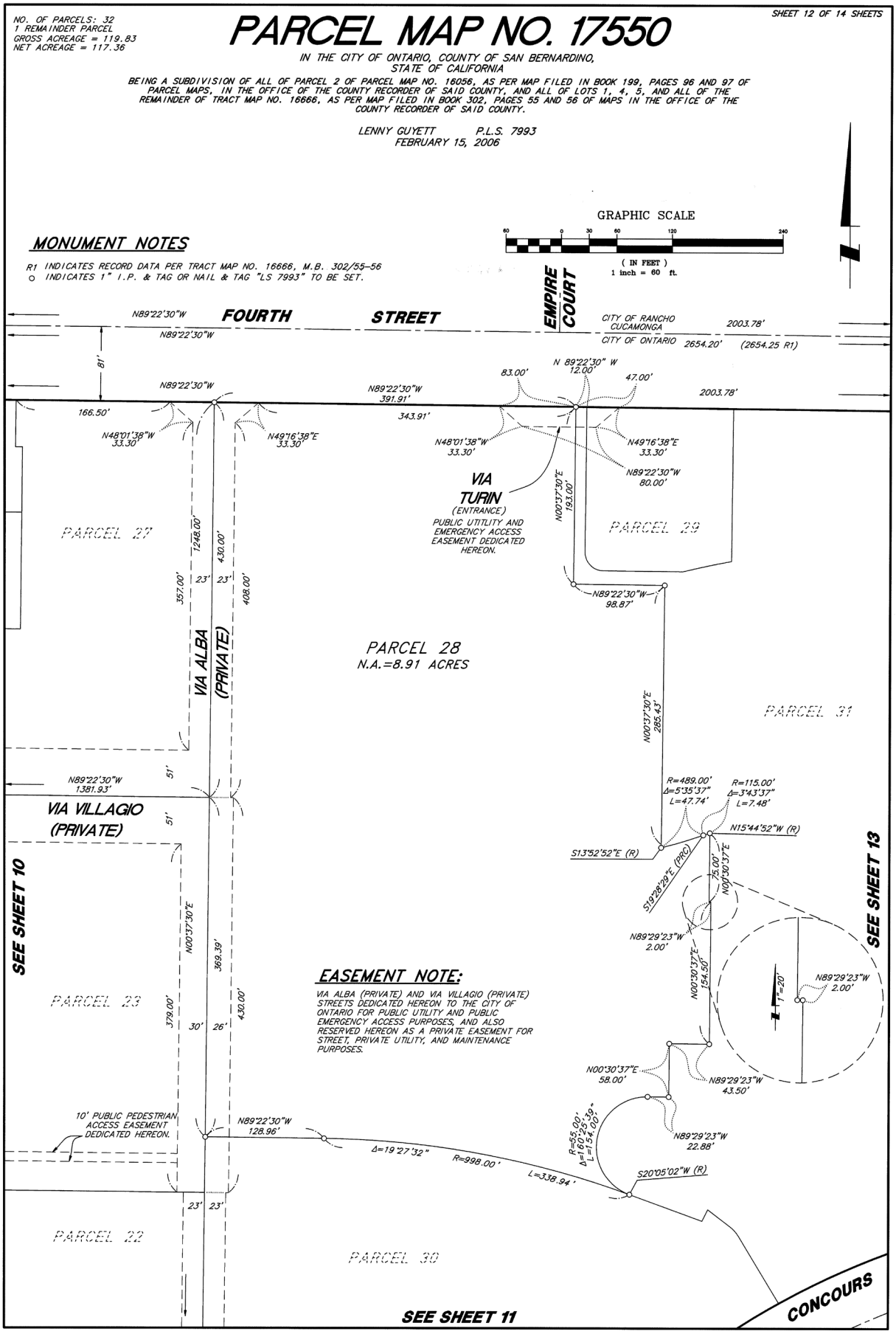
CURVE TABLE

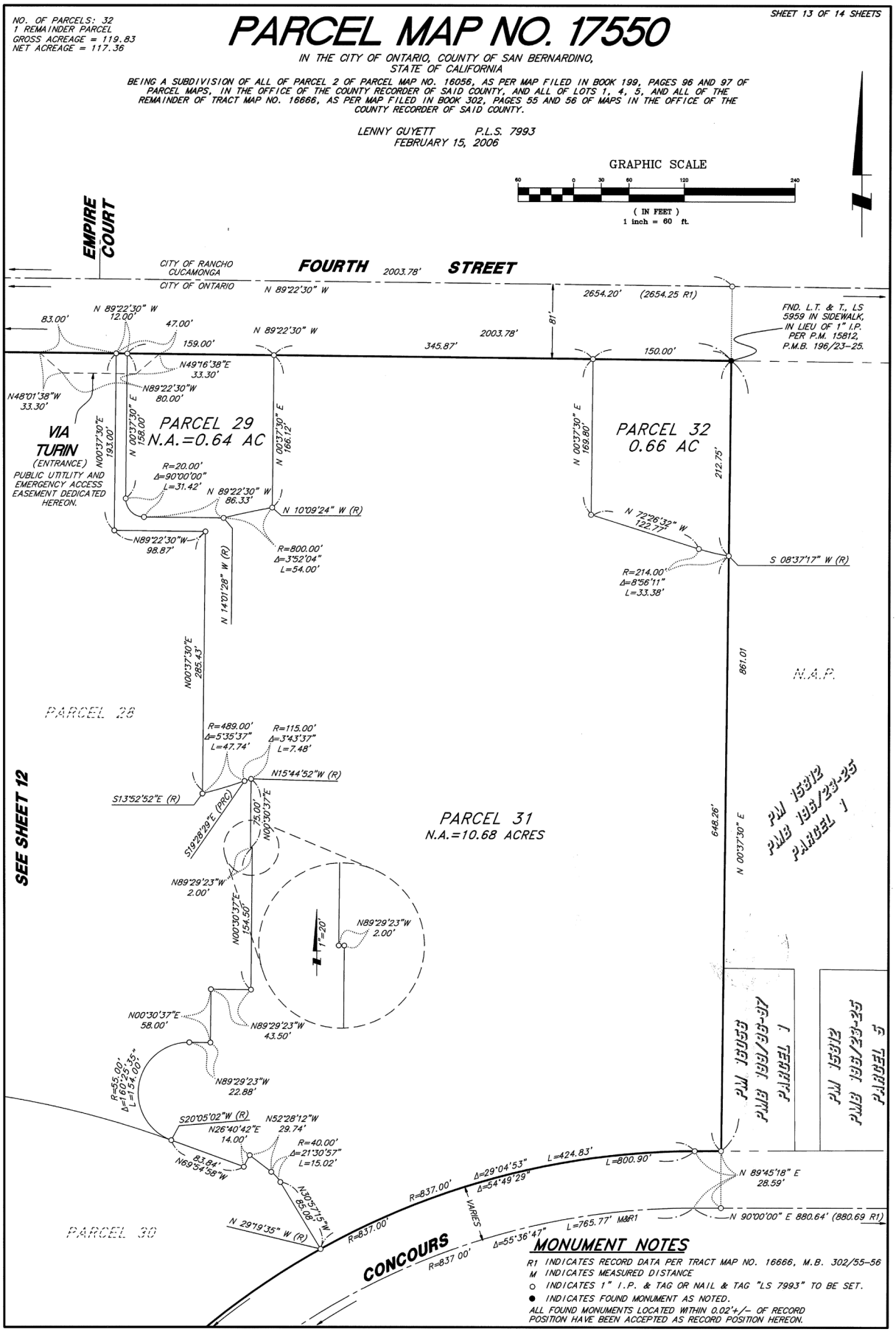
CURVE	RADIUS	DELTA	LENGTH
C1	419.00'	8°28'01"	61.92'
C2	481.00'	15°29'50"	130.10'
C3	429.50'	8°28'01"	63.47'
C4	470.50'	15°29'50"	127.26'
C5	837.00'	03°52'54"	56.71'
C6	450.00'	8°28'01"	66.50'
C7	450.00'	15°14'33"	119.71'
C8	775.00'	4°00'49"	54.29'
C9	775.00'	1°37'08"	21.90'
C10	837.00'	1°32'36"	22.55'

LINE TABLE

LINE	LENGTH	BEARING
L1	28.98'	N89°22'30"W
L2	100.00'	N82°09'29"E
L3	10.50'	N07°39'24"E
L4	31.63'	N61°54'35"E
L5	37.06'	N86°55'32"E
L6	100.00'	N82°09'29"E
L7	100.00'	N82°09'29"E
L8	66.30'	N82°35'58"W
L9	71.35'	N33°23'13"E
L10	68.70'	N33°23'13"E

2/6/17


NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36
PARCEL MAP NO. 17550
SHEET 12 OF 14 SHEETS
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
MONUMENT NOTES
R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
FOURTH STREET
EMPIRE COURT
CITY OF RANCHO CUCAMONGA
CITY OF ONTARIO
VIA TURIN
(ENTRANCE)
PUBLIC UTITLITY AND EMERGENCY ACCESS EASEMENT DEDICATED HEREON.
VIA ALBA (PRIVATE)
VIA VILLAGIO (PRIVATE)
PARCEL 27
PARCEL 28
N.A.=8.91 ACRES
PARCEL 29
PARCEL 31
PARCEL 23
PARCEL 22
PARCEL 30
SEE SHEET 10
SEE SHEET 11
SEE SHEET 13
CONCOURS
EASEMENT NOTE:
VIA ALBA (PRIVATE) AND VIA VILLAGIO (PRIVATE) STREETS DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.
10' PUBLIC PEDESTRIAN ACCESS EASEMENT DEDICATED HEREON.
N89°22'30"W 2003.78'
2654.20'
(2654.25 R1)
N89°22'30"W 391.91'
343.91'
N89°22'30"W 166.50'
N89°22'30"W 1381.93'
N89°22'30"W 128.96'
N89°22'30"W 98.87'
N89°22'30"W 80.00'
N89°22'30"W 2.00'
N89°22'30"W 22.88'
N89°22'30"W 43.50'
N89°22'30"W 2003.78'
N 89°22'30" W 12.00'
83.00'
47.00'
N48°01'38"W 33.30'
N49°16'38"E 33.30'
N00°37'30"E 193.00'
N00°37'30"E 285.43'
N00°37'30"E 369.39'
N00°30'37"E 154.50'
N00°30'37"E 58.00'
N00°30'37"E 75.00'
R=489.00' Δ=5°35'37" L=47.74'
R=115.00' Δ=3°43'37" L=7.48'
R=55.00' Δ=160°25'39" L=154.00'
Δ=19°27'32" R=998.00' L=338.94'
N15°44'52"W (R)
S13°52'52"E (R)
S19°28'29"E (PRC)
S20°05'02"W (R)
1"=20'
1248.00'
430.00'
357.00'
408.00'
379.00'
81'
51'
23'
30'
26'


NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36
SHEET 13 OF 14 SHEETS
PARCEL MAP NO. 17550
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006
GRAPHIC SCALE
(IN FEET)
1 inch = 60 ft.
EMPIRE COURT
CITY OF RANCHO CUCAMONGA
CITY OF ONTARIO
FOURTH STREET
PARCEL 29
N.A.=0.64 AC
PARCEL 32
0.66 AC
VIA TURIN
(ENTRANCE)
PUBLIC UTILITY AND EMERGENCY ACCESS EASEMENT DEDICATED HEREON.
PARCEL 28
PARCEL 31
N.A.=10.68 ACRES
PARCEL 30
N.A.P.
PM 15912
PMB 193/33-35
PARCEL 1
PM 15912
PMB 193/33-35
PARCEL 2
PM 15912
PMB 193/33-35
PARCEL 3
SEE SHEET 12
CONCOURS
FND. L.T. & T., LS 5959 IN SIDEWALK, IN LIEU OF 1" I.P. PER P.M. 15812, P.M.B. 196/23-25.
MONUMENT NOTES
R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M INDICATES MEASURED DISTANCE
○ INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.
● INDICATES FOUND MONUMENT AS NOTED.
ALL FOUND MONUMENTS LOCATED WITHIN 0.02'+/- OF RECORD POSITION HAVE BEEN ACCEPTED AS RECORD POSITION HEREON.

216/20

NO. OF PARCELS: 32
1 REMAINDER PARCEL
GROSS ACREAGE = 119.83
NET ACREAGE = 117.36

PARCEL MAP NO. 17550

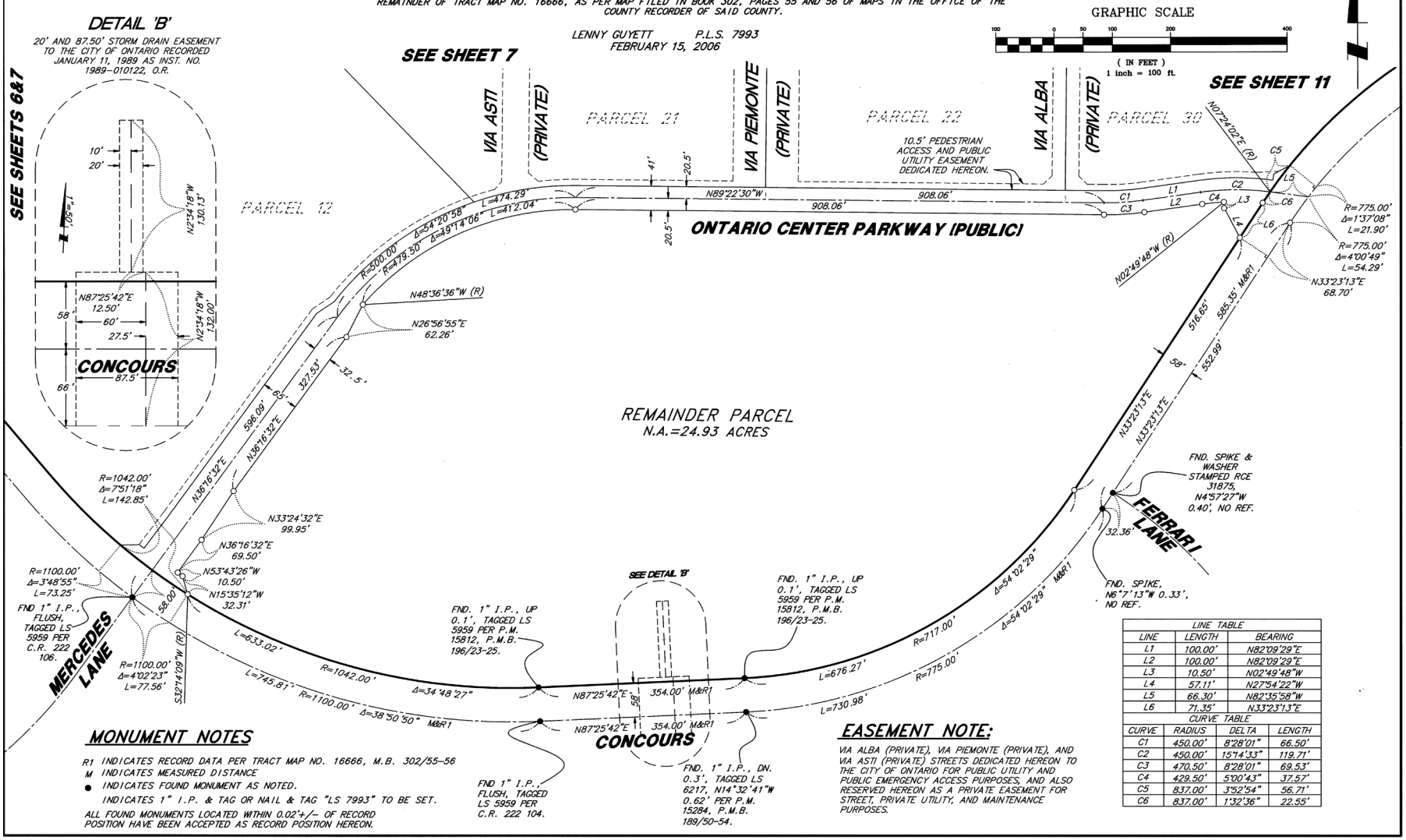
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

BEING A SUBDIVISION OF ALL OF PARCEL 2 OF PARCEL MAP NO. 16056, AS PER MAP FILED IN BOOK 199, PAGES 96 AND 97 OF PARCEL MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, AND ALL OF LOTS 1, 4, 5, AND ALL OF THE REMAINDER OF TRACT MAP NO. 16666, AS PER MAP FILED IN BOOK 302, PAGES 55 AND 56 OF MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

LENNY GUYETT P.L.S. 7993
FEBRUARY 15, 2006

SHEET 14 OF 14 SHEETS

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.



MONUMENT NOTES

R1 INDICATES RECORD DATA PER TRACT MAP NO. 16666, M.B. 302/55-56
M INDICATES MEASURED DISTANCE
● INDICATES FOUND MONUMENT AS NOTED.
INDICATES 1" I.P. & TAG OR NAIL & TAG "LS 7993" TO BE SET.

ALL FOUND MONUMENTS LOCATED WITHIN 0.02'+/- OF RECORD POSITION HAVE BEEN ACCEPTED AS RECORD POSITION HEREON.

EASEMENT NOTE:

VIA ALBA (PRIVATE), VIA PIEMONTE (PRIVATE), AND VIA ASTI (PRIVATE) STREETS DEDICATED HEREON TO THE CITY OF ONTARIO FOR PUBLIC UTILITY AND PUBLIC EMERGENCY ACCESS PURPOSES, AND ALSO RESERVED HEREON AS A PRIVATE EASEMENT FOR STREET, PRIVATE UTILITY, AND MAINTENANCE PURPOSES.

LINE TABLE

LINE	LENGTH	BEARING
L1	100.00'	N82°09'29"E
L2	100.00'	N82°09'29"E
L3	10.50'	N02°49'48"W
L4	57.11'	N27°54'22"W
L5	66.30'	N82°35'58"W
L6	71.35'	N33°23'13"E

CURVE TABLE

CURVE	RADIUS	DELTA	LENGTH
C1	450.00'	8°28'01"	66.50'
C2	450.00'	15°14'33"	119.71'
C3	470.50'	8°28'01"	69.53'
C4	429.50'	5°00'43"	37.57'
C5	837.00'	3°52'54"	56.71'
C6	837.00'	1°32'36"	22.55'

NO. OF PARCELS: 1
24.93 ACRES GROSS
24.93 ACRES NET

SHEET 1 OF 2 SHEETS

PARCEL MAP NO. 17978

IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO,
STATE OF CALIFORNIA

ALL OF THE REMAINDER PARCEL OF PARCEL MAP NO. 17550, AS PER MAP FILED IN BOOK 216, PAGES 7 THROUGH 20, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

MARISSA CROWTHER P.L.S. 6152
FEBRUARY 15, 2006

OWNER'S STATEMENT

WE HEREBY STATE THAT WE ARE ALL AND THE ONLY PARTIES HAVING ANY RECORD TITLE INTEREST IN THE LAND SUBDIVIDED AS SHOWN ON THE ANNEXED MAP, AND WE HEREBY CONSENT TO THE PREPARATION AND RECORDATION OF THIS PARCEL MAP.

WE HEREBY DEDICATE TO THE CITY OF ONTARIO A 10.5 FOOT EASEMENT FOR PEDESTRIAN ACCESS AND PUBLIC UTILITY PURPOSES, TO BE MAINTAINED BY THE PROPERTY OWNERS, AS SHOWN ON THE ANNEXED MAP.

THE CITY OF ONTARIO, A CALIFORNIA MUNICIPAL CORPORATION

BY: Gregory C. Devereaux

THE ONTARIO REDEVELOPEMENT AGENCY, A PUBLIC BODY, CORPORATE AND POLITIC

BY: Gregory C. Devereaux

NOTARY ACKNOWLEDGMENT

STATE OF CALIFORNIA)
ss
COUNTY OF SAN BERNARDINO)

ON SEPTEMBER 27, 2006, BEFORE ME, TRACI R. MCGINLEY NOTARY PUBLIC, PERSONALLY APPEARED GREGORY C. DEVEREAUX, PERSONALLY KNOWN TO ME (OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS(ARE) SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/~~SHE/THEY~~ EXECUTED THE SAME IN HIS/~~HER/THEIR~~ AUTHORIZED CAPACITY(~~IES~~), AND THAT BY HIS/~~HER/THEIR~~ SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S) OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL

SIGNATURE Traci R. McGinley TRACI R. MCGINLEY

COMMISSION # 1483449 — NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE

APRIL 13, 2008 — MY COMMISSION EXPIRES

NOTARY ACKNOWLEDGMENT

STATE OF CALIFORNIA)
ss
COUNTY OF SAN BERNARDINO)

ON SEPTEMBER 27, 2006, BEFORE ME, TRACI R. MCGINLEY NOTARY PUBLIC, PERSONALLY APPEARED GREGORY C. DEVEREAUX, PERSONALLY KNOWN TO ME (OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS(ARE) SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/~~SHE/THEY~~ EXECUTED THE SAME IN HIS/~~HER/THEIR~~ AUTHORIZED CAPACITY(~~IES~~), AND THAT BY HIS/~~HER/THEIR~~ SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S) OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL

SIGNATURE Traci R. McGinley TRACI R. MCGINLEY

COMMISSION # 1483449 — NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE

APRIL 13 2008 — MY COMMISSION EXPIRES

ABANDONMENT NOTE

PURSUANT TO SECTION 66499.20-1/2 OF THE SUBDIVISION MAP ACT, THE FILING OF THIS MAP CONSTITUTES ABANDONMENT OF THAT CERTAIN EASEMENT FOR STORM DRAIN PURPOSES IN FAVOR OF THE CITY OF ONTARIO RECORDED JANUARY 11, 1989 PER INSTRUMENT NO. 1989-010122 OF OFFICIAL RECORDS OF SAN BERNARDINO COUNTY.

SURVEYOR'S STATEMENT

I, MARISSA CROWTHER, HEREBY STATE THAT I AM A LICENSED LAND SURVEYOR OF THE STATE OF CALIFORNIA AND THAT THIS MAP, CONSISTING OF TWO SHEETS IS A TRUE AND COMPLETE REPRESENTATION OF A SURVEY MADE BY ME OR UNDER MY DIRECTION IN MARCH 2005 AT THE REQUEST OF PANATTONI DEVELOPEMENT, AND THAT ALL THE MONUMENTS SHOWN HEREON ARE OF THE CHARACTER AND OCCUPY THE POSITIONS INDICATED, IN COMPLIANCE WITH SECTION 66495 AND 66496 OF THE SUBDIVISION MAP ACT AND ARE OR WILL BE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED. I HEREBY STATE THAT THIS PARCEL MAP SUBSTANTIALLY CONFORMS WITH THE CONDITIONALLY APPROVED TENTATIVE MAP, IF ANY.

MARISSA CROWTHER, PLS 6152
REGISTRATION EXPIRES: 3-31-08

SEPT 19 2006
DATED:

PROFESSIONAL LAND SURVEYOR MARISSA CROWTHER EXP. 3-31-08 STATE OF CALIFORNIA

CITY ENGINEER'S STATEMENT

I HEREBY STATE THAT I HAVE EXAMINED THIS MAP, AND THAT THE SUBDIVISION SHOWN HEREON IS SUBSTANTIALLY THE SAME AS IT APPEARED ON THE TENTATIVE MAP AND ANY APPROVED ALTERATIONS THEREOF, AND THAT ALL THE PROVISIONS OF THE SUBDIVISION MAP ACT AND CITY OF ONTARIO MUNICIPAL CODE HAVE BEEN COMPLIED WITH AND I AM SATISFIED THAT THIS MAP IS TECHNICALLY CORRECT.

JOHN P. SULLIVAN
CITY ENGINEER, R.C.E. 24079
CITY OF ONTARIO, CALIFORNIA
REGISTRATION EXPIRES: 12/31/07

REGISTERED PROFESSIONAL ENGINEER JOHN P. SULLIVAN No. 24079 Exp. 12-31-07 CIVIL STATE OF CALIFORNIA

9-25-06
DATED:

PLANNING COMMISSION'S STATEMENT

I DO HEREBY STATE THAT THE SUBDIVISION SHOWN ON THE ANNEXED MAP IS IN ACCORDANCE WITH THE TENTATIVE MAP APPROVED AT A MEETING OF THE PLANNING COMMISSION OF THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, HELD ON THE TWENTY-FIFTH DAY OF APRIL, 2006.

9.21.06
DATED:

BY: Jerry L. Blum
JERRY L. BLUM
SECRETARY OF THE ONTARIO PLANNING COMMISSION

CITY COUNCIL'S STATEMENT

I HEREBY STATE THAT THE CITY COUNCIL OF THE CITY OF ONTARIO BY RESOLUTION NO. 2006-033, DULY SECONDED, PASSED AND APPROVED THE ANNEXED MAP ON THE 6TH DAY OF JUNE, 2006, AND ACCEPTED THE DEDICATION TO THE CITY OF ONTARIO OF A 10.5 FOOT EASEMENT FOR PEDESTRIAN ACCESS AND PUBLIC UTILITY PURPOSES, SUBJECT TO THE IMPROVEMENT IN ACCORDANCE WITH CITY STANDARDS, AS SHOWN ON THE ANNEXED MAP, AND ALSO ACCEPTED THE ABANDONMENT OF THAT CERTAIN EASEMENT FOR STORM DRAIN PURPOSES IN FAVOR OF THE CITY OF ONTARIO RECORDED JANUARY 11, 1989 PER INSTRUMENT NO. 1989-010122 OF OFFICIAL RECORDS OF SAN BERNARDINO COUNTY.

CITY OF ONTARIO INCORPORATED DECEMBER 1891 CALIFORNIA

09-26-06
DATED:

Debora Thomsen
DEBORA THOMSEN
CITY CLERK/DEPUTY
CITY OF ONTARIO, CALIFORNIA

AUDITOR'S STATEMENT

I HEREBY STATE THAT ACCORDING TO THE RECORDS OF THIS OFFICE, AS OF THIS DATE, THERE ARE NO LIENS AGAINST THE REAL PROPERTY SHOWN UPON THE ANNEXED MAP FOR UNPAID STATE, COUNTY, MUNICIPAL OR LOCAL TAXES, OR SPECIAL ASSESSMENTS COLLECTED AS TAXES, EXCEPT TAXES OR SPECIAL ASSESSMENTS NOT YET PAYABLE, ESTIMATED TO BE $0.

LARRY WALKER, COUNTY AUDITOR/~~CONTROLLER~~
COUNTY OF SAN BERNARDINO

10/02/06
DATED:

BY: Jenn Mooney
DEPUTY

BOARD OF SUPERVISOR'S STATEMENT

I HEREBY STATE THAT A BOND IN THE SUM OF $ 0 HAS BEEN EXECUTED AND FILED WITH THE BOARD OF SUPERVISORS ~~SECRETARY~~ OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, CONDITIONED UPON THE PAYMENT OF ALL TAXES, STATE, COUNTY, MUNICIPAL, OR LOCAL, AND ALL SPECIAL ASSESSMENTS, COLLECTED AS TAXES, WHICH AT THE TIME OF FILING OF THE ANNEXED MAP WITH THE COUNTY RECORDER IS A LIEN AGAINST SAID PROPERTY, BUT NOT YET PAYABLE AND THAT THE SUBDIVIDER HAS FILED WITH ME A CERTIFICATE BY THE PROPER OFFICER GIVING HIS ESTIMATE OF THE AMOUNT OF SAID TAXES AND ASSESSMENTS, AND SAID BOND I HEREBY ACCEPTED.

SEAL
DENA M. SMITH
CLERK OF THE BOARD OF SUPERVISOR'S OF
THE COUNTY OF SAN BERNARDINO

10/02/06
DATED:

BY: Jenn Mooney
DEPUTY

COUNTY RECORDER'S CERTIFICATE

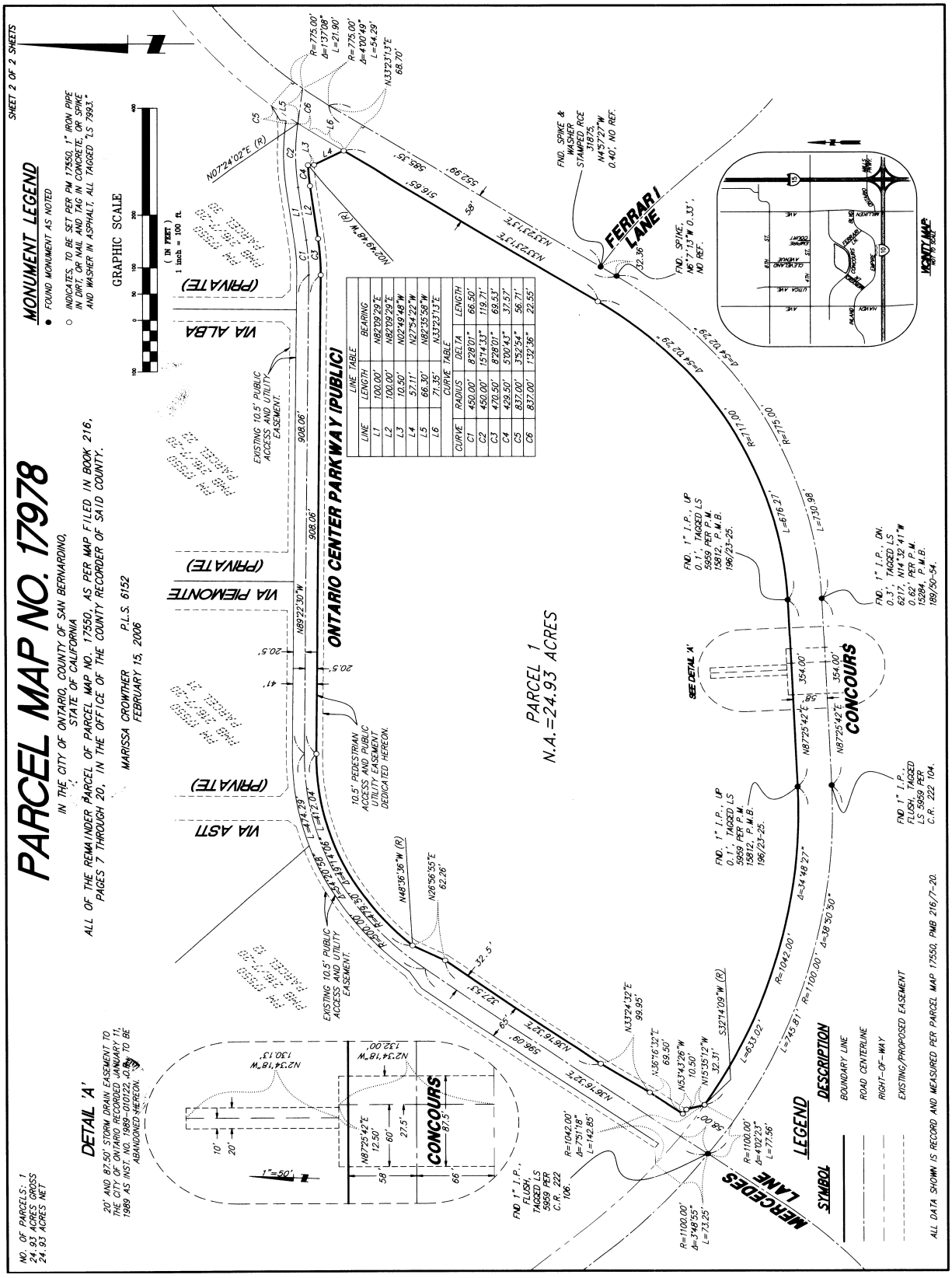
THIS MAP HAS BEEN FILED UNDER DOCUMENT NUMBER 2006-0673115
THIS 2ND DAY OF OCTOBER 2006 AT 1:09 P.M. IN BOOK 216 AT PAGE 14-45,
AT THE REQUEST OF FIRST AMERICAN TITLE,
IN THE AMOUNT OF $ 0

* 1:09PM

Recorded in Official Records, County of San Bernardino
Doc#: 2006-0673115
10/02/2006 1:09 PM

LARRY WALKER, COUNTY AUDITOR
THE COUNTY OF SAN BERNARDINO

BY: Diana T. Hernandez
DEPUTY RECORDER


PARCEL MAP NO. 17978
IN THE CITY OF ONTARIO, COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA
ALL OF THE REMAINDER PARCEL OF PARCEL MAP NO. 17550, AS PER MAP FILED IN BOOK 216, PAGES 7 THROUGH 20, IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.
MARISSA CROWTHER P.L.S. 6152
FEBRUARY 15, 2006
SHEET 2 OF 2 SHEETS
MONUMENT LEGEND
FOUND MONUMENT AS NOTED
INDICATES, TO BE SET PER PM 17550, 1" IRON PIPE IN DIRT, OR NAIL AND TAG IN CONCRETE, OR SPIKE AND WASHER IN ASPHALT, ALL TAGGED "LS 7993."
GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.
ONTARIO CENTER PARKWAY (PUBLIC)
VIA ALBA (PRIVATE)
VIA PIEMONTE (PRIVATE)
VIA ASTI (PRIVATE)
FERRARI LANE
MERCEDES LANE
CONCOURS
PARCEL 1
N.A.=24.93 ACRES
EXISTING 10.5' PUBLIC ACCESS AND UTILITY EASEMENT.
10.5' PEDESTRIAN ACCESS AND PUBLIC UTILITY EASEMENT DEDICATED HEREON.
SEE DETAIL 'A'
DETAIL 'A'
1"=50'
20' AND 87.50' STORM DRAIN EASEMENT TO THE CITY OF ONTARIO RECORDED JANUARY 11, 1989 AS INST., NO. 1989-010122, TO BE ABANDONED HEREON.
NO. OF PARCELS: 1
24.93 ACRES GROSS
24.93 ACRES NET
LEGEND
SYMBOL
DESCRIPTION
BOUNDARY LINE
ROAD CENTERLINE
RIGHT-OF-WAY
EXISTING/PROPOSED EASEMENT
ALL DATA SHOWN IS RECORD AND MEASURED PER PARCEL MAP 17550, PMB 216/7-20.
VICINITY MAP
NOT TO SCALE
LINE TABLE
CURVE TABLE

APPENDIX B - SUBAREAS

Table B.1: 2021 Piemonte Overlay OCSP Parcels/Subarea Correlation

OCSP Parcel Numbers or Portions Thereof	Subareas
1, 2, 3, 4, 5, 6, 7, 8, 9	1
10	2
11	3
12, 13	4
14, 15	5
16, 17, 18, 19	6
20	7, 8
21	9
22	10
23	11, 12
24, 25, 26, 27	13
28, 29, 31, 32	14
30	15
Remainder Parcel	16, 17, 18, 19

APPENDIX C - ONTARIO CENTER SPECIFIC PLAN STATISTICAL SUMMARY

Table C.1: Statistical Areas D & E / ~~Subarea~~ Planning Areas 7, 8, 9, ~~&~~ 10, 12 & 15

Development	Maximum GFA (in SF)	Maximum No. DUs
Existing or Entitled Development		
955 N Duesenberg Dr (Vintage Apartments) - 300 DUs	~~290,151~~	309
950 N Duesenberg Dr (Camden Landmark Apartments) - 472 DUs	~~461,049~~	491
4000 E Ontario Center Parkway (Arena)	200,020	
1051 N Milliken Ave (Kohl's)	96,736	
1041 N Milliken Ave (Starbucks)	1,500	
1021 N Milliken Ave (Applebee's)	4,603	
4290 E Fourth St (El Pollo Loco)	2,406	
4275 E Concours St (Home Thai/Professional Nail/Sunrise Optometry)	8,528	
4295 E Concours St (Comerica Bank)	3,262	
901 N Via Piemonte (5-story Office)	125,685	
4150 E Fourth St (Spa/Wax Center/Weight Watchers)	8,385	
4190 E Fourth St (Jeweler/Hair Salon/Dentist)	7,320	
4240 E Fourth St (Wells Fargo)	4,845	
4120 E Fourth St (Big Al's/Petsmart/DSW Shoes)	91,280	
4200 E Fourth St (Target = 140,941 SF + 10,800 SF garden center)	151,742	
900 N Via Piemonte (Marriott - Element Ontario Hotel, 131 rooms)	92,823	
901 N Via Piemonte (Office)	125,685	
Southwest Corner of N Via Alba & E Via Villagio - 72 DUs		72
Northeast Corner of Ontario Center Pkwy & N Via Alba - 110 DUs		110
Total	~~1,457,512~~ ~~924,823~~	~~800~~ **982**
Remaining Allocation		
Office/Commercial	608,488	
Hotel 1 - ~~236~~ 131 Rooms	~~180,000~~ 87,177	
Hotel 2 - 100 Rooms	110,400	
Residential Units	483,600	**~~806~~ 1,500
Total	**1,382,488**	
GRAND TOTAL	**2,840,000**	~~1,606~~ 2,300

Note: ** Residential units replace office/retail gross floor area (GFA) at the rate of one dwelling unit for each 600 SF of office/commercial GFA (based on equivalent traffic generation, water demand, and wastewater generation rates).

Table C.2: Statistical Area D / ~~Subarea~~ Planning Area 7

Development	Maximum GFA (in SF)
Existing Development	
Vintage Apartments - 300 DUs	290,151
Total	**290,151**
Remaining Allocation	
Office/Commercial	239,449
Hotel - 100 Rooms	110,400
Total	**349,849**
GRAND TOTAL	**640,000**

Table C.3: Statistical Area E / ~~Subarea~~ Planning Areas 8, 9 & 10

Development	Maximum GFA (in SF)
Existing or Entitled Development	
Camden Apartments - 472 DUs	461,049
Arena	200,020
Kohl's	96,736
Starbucks	1,500
Applebee's	4,603
El Pollo Loco	2,406
Home Thai/Nails/Optometry	8,528
Comerica Bank	3,262
5-Story Office	125,685
Spa/Waxing/Weight Watchers	8,385
Jeweler/Hair Salon/Dentist	7,320
Wells Fargo	4,845
Big Al's/Petsmart/DSW Shoes	91,280
Target	151,742
Marriott - Element Ontario Hotel (131 rooms)	92,823
901 N Via Piemonte (Office)	125,685
Southwest Corner of N Via Alba & E Via Villagio (72 units)	
Northeast Corner of Ontario Center Pkwy & N Via Alba (110 units)	
Total	**~~1,167,361~~ 1,385,859**
Remaining Allocation	
Office/Commercial	~~369,039~~ 243,354
Hotel - ~~236~~ 105 Rooms	~~180,000~~ 87,177
Residential - 806 DUs	483,600
Total	**1,032,639**
GRAND TOTAL	**2,200,000**

APPENDIX D - 2006 OVERLAY LAND USE ALLOCATION & MAXIMUM DEVELOPMENT INTENSITY ANALYZED FOR TRAFFIC GENERATION

The 2006 traffic analysis for the Piemonte at Ontario Center Project Addendum to the Ontario Center EIR (Applied Planning Inc., February 2006) used the anticipated development shown in Table D.1: 2006 Piemonte Overlay Intensity Allocation by Subarea for Traffic Analysis to determine the remaining traffic capacity for the Overlay area. That traffic analysis used lower numbers that were permitted by the 2006 Overlay. However, it also concluded that the 2006 Piemonte Overlay only used 28% of the daily trips, 29% of the peak daily evening trips and 92% of the peak morning trips.

Table D.1: 2006 Piemonte Overlay Intensity Allocation by Subarea for Traffic Analysis

Sub-areas	Net Acres	Land Use					Maximum Floor Area	Maximum Dwelling Units
		Commercial	Entertainment/ Retail	Special Use (Hotel)	Offices	Residential		
1	13.02	•	•	100 Rooms	•		220,713	
2	2.28				•		24,800	
3	1.36	•			•		18,000	
4	12.35				•		251,370	
5	8.29					•		403
6	3.20	•	•		•		43,300	
7	2.68	•	•			•	25,300	170
8	0.76							
9*	5.16				•		125,685	
10	3.24			236 Rooms			180,000	
11	0.91		•			•	32,300	218
12	2.49							
13	4.07		•				49,200	
14*	20.35	•			•		228,400	
15	4.27				•		93,000	
Totals	84.43						1,292,068	791
* Built-out Subarea								

APPENDIX E - PIEMONTE TRIP GENERATION COMPARISON AND THE PIEMONTE/EMPIRE LAKES 4TH STREET ACCESS CONFIGURATION - FEHR & PEERS MEMORANDUM (DATED JUNE 8, 2016)

Fehr & Peers completed a draft Transportation Impact Study (TIS) for the proposed Empire Lakes project in the City of Rancho Cucamonga. That study documented potential transportation impacts associated with the proposed project.

Since completing that study, we have completed a trip generation estimate for the Piemonte Site based on their most recent site plan that will be submitted to the City of Ontario. We also completed additional work in support of designing the 4th Street access to both the Piemonte Site and the Empire Lakes site. The purpose of this memorandum is to document the methodology, recommendations, and results of the project access assessment.

Piemonte Trip Generation Estimates

Piemonte Trip Generation As Approved

As part of the Empire Lakes traffic study, the portion of the Piemonte Site that has not yet been developed was estimated using information from the Piemonte at Ontario Center Project Addendum to the Ontario Center EIR (Applied Planning Inc., February 2006). Table E-1: Piemonte Trip Generation – As Currently Approved summarizes the trip generation estimate used in the Empire Lakes traffic study:

Table E-1: Piemonte Trip Generation – As ~~Currently~~ Approved in 2006

Use	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total Net Piemonte (From Study)	29,800	1,284	812	2,096	1,124	1,471	2,595
Parcel 1 (Constructed)	4,990	71	46	117	150	162	312

Parcel 2 (Constructed)	3,182	69	54	123	99	104	203
Parcel 10 (Constructed)	1,107	154	21	175	29	140	169
Undeveloped Piemonte	**20,521**	**990**	**691**	**1,681**	**846**	**1,065**	**1,911**

Source: Piemonte at Ontario Center Project Addendum to the Ontario Center EIR (Applied Planning Inc., February 2006).

As shown in Table E-1: Piemonte Trip Generation – As Currently Approved, the portion of Piemonte that is not yet developed is estimated to generate 20,521 daily trips, 1,681 AM peak hour trips, and 1,911 PM peak hour trips. These trips were utilized in the Empire Lakes traffic study.

Piemonte Trip Generation As Currently Proposed

The site concept for the Piemonte site provided by Lewis Operating Companies (dated March 11, 2016) is attached. Using this site plan, Fehr & Peers estimated the trip generation for the project site as shown in Table E-2: Piemonte Trip Generation – As ~~Currently~~ Proposed in 2016 on the following page.

As shown in Table E-2: Piemonte Trip Generation – As ~~Currently~~ Proposed in 2016, with the proposed site plan the undeveloped portion of Piemonte would be projected to generate 13,905 daily trips, 957 AM peak hour trips, and 1,357 PM peak hour trips.

Table E-3: Piemonte Trip Generation Comparison of 2006 and 2016 Data compares the as-approved trip generation to the currently proposed trip generation. As shown in the table, the undeveloped portion of Piemonte, as currently proposed, is anticipated to generate 6,616 fewer daily trips, 724 fewer AM peak hour trips, and 554 fewer PM peak hour trips.

Given that the currently proposed development in Piemonte is less than what was approved, the assumptions in the Empire Lakes traffic study is considered conservative as part of this effort.

Table E-2: Piemonte Trip Generation – As ~~Currently~~ Proposed in 2016

Use	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Lewis and Lincoln Proposed Uses							
Zone 1 - Retail	3,822	53	33	86	159	173	332
Zone 2 - Office	552	69	9	78	13	62	75
Zone 3 - Residential	1,915	29	118	147	116	63	179
Zone 4 - Residential	1,144	18	70	88	69	38	107
Zone 4 - Retail	3,565	50	30	80	149	161	310
Zone 5 - Residential	765	12	47	59	46	25	71
Total Gross Trip Generation Proposed	**11,763**	**231**	**307**	**538**	**552**	**522**	**1,074**
Internalization (Consistent with Previous Study) 17% Daily, 12% AM Peak Hour, 18% PM Peak Hour	**-2,000**	**-28**	**-37**	**-65**	**-99**	**-94**	**-193**
Total Trip Generation	**9,763**	**203**	**270**	**473**	**453**	**428**	**881**
Parcel 6 Trip Generation (from previous study)	1,928	81	52	133	74	65	139
Parcel 13 Trip Generation (from previous study)	2,214	309	42	351	57	280	337
Total New Trips In Piemonte	**13,905**	**593**	**364**	**957**	**584**	**773**	**1,357**

Source: Fehr & Peers, 2016. Site Plan provided by Lewis Operating Companies (March 2016). Note: Parcel 6 and Parcel 13 are not included in the Lewis Site Plan and trip generation from the previous Applied Planning dated February 2006 study is used.

Table E-3: Piemonte Trip Generation Comparison of 2006 and 2016 Data

Use	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Undeveloped Piemonte (as approved)	20,521	990	691	1,681	846	1,065	1,911
Undeveloped Piemonte (as proposed)	13,905	593	364	957	584	773	1,357
Net Difference	**-6,616**	**-397**	**-327**	**-724**	**-262**	**-292**	-554

Source: Fehr & Peers, 2016

4Th Street Access Methodology

Given the proximity of up-stream and down-stream intersections to the proposed site access, micro-simulation was utilized to evaluate traffic operations. Micro-simulation utilizes driver behavior parameters to simulate how driver decisions affect traffic operations. Additionally, micro-simulation has the ability to evaluate how vehicles queues can extend over space and time and account for the operational effects associated with those queues.

To evaluate the network, Fehr & Peers utilized the SimTraffic 8.0 software which is consistent with the Highway Capacity Manual methodology (Transportation Research Board, 2010). Assumptions utilized in this assessment specific to this software are documented below:

- Lane configurations utilized are based on the proposed design shown in Attachment A
- Signal timing information began with existing timing data provided by the City and were optimized for the corridor related to signal timing splits and timing offsets
- A base saturation flow rate of 1,900 vehicles per hour per lane
- A peak hour factor of 0.95 was applied
- A total of 20 simulations were completed with different random seeds
- The results are based on the average of all 20 runs as there were no "outliers" in the simulation results
- The simulation results were utilized to assist in designing the intersection for both level of service and to accommodate expected queues
- Fehr & Peers updated the trip assignment information to/from the Piemonte to reflect the trip generation information noted above based on the locations of land use provided on the attached site plan.

Please note that the analysis for site access focused on the forecasts developed for the cumulative scenario. This provides the highest volume of traffic and is considered the most appropriate scenario for sizing infrastructure.

4Th Street Access Analysis Results

The level of service (LOS) was calculated for both the 4th Street/Cleveland Avenue and 4th Street/The Vine study intersections to evaluate traffic operations. LOS is a qualitative measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving. Table E-4: Intersection HCM LOS Criteria describes the LOS thresholds for signalized intersections identified in the HCM. Table E-5: Cumulative Plus Project Conditions Intersection LOS (2016) summarizes the AM and PM peak hour level of service results for the two study intersections. Table E-6: Cumulative Plus Project Left-Turn Queues (2016) summarizes the queues at the intersections.

Table E-4: Intersection HCM LOS Criteria

LOS	Description	Signalized Delay (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0

Source: Highway Capacity Manual (Transportation Research Board, 2010).

Table E-5: Cumulative Plus Project Conditions Intersection LOS (2016)

Intersection		Traffic Control	Peak Hour	Delay	LOS
19	4th Street/Cleveland Avenue	Signal	AM	16.0	B
			PM	20.8	C
20	4th Street/The Vine (Project Access)	Signal	AM	14.8	B
			PM	16.7	B

Notes:

1. Delay is calculated using SimTraffic Micro-Simulation using HCM 2010 Methodology

Source: Fehr & Peers, 2016

Table E-6: Cumulative Plus Project Left-Turn Queues (2016)

Location	AM	PM
4th Street/Cleveland Avenue Intersection		
Eastbound Left-Turn (225′)	225′	77′
Westbound Left-Turn (142′ Storage)	140′	133′
4th Street/The Vine Intersection		
Eastbound Left-Turn[1] (310′ Storage)	106′	257′
Westbound Left-Turn[1] (250′ Storage)	191′	206′

Notes:

Queues reported from Synchro and represent the 95th-percentile queue.

Bold indicates where queue exceeds available storage.

1. Proposed Configuration has dual lanes. Total queue in both lanes reported

Source: Fehr & Peers, 2016

As shown in Table E-5: Cumulative Plus Project Conditions Intersection LOS (2016), both study intersections are projected to operate at acceptable levels of service during both peak hours. Additionally, as shown in Table E-6: Cumulative Plus Project Left-Turn Queues (2016), the queues are accommodated in the proposed turn pockets.

APPENDIX F - TOYOTA ARENA MIXED-USE DEVELOPMENT TRAFFIC IMPACT ANALYSIS - RK Engineering Group (September 17, 2021)

RK Engineering Group, Inc. completed a draft Transportation Impact Analysis (TIA) for the proposed mixed-use development . That study documented potential transportation impacts associated with the proposed project.

The purpose of this memorandum is to document the methodology, recommendations, and results of the project access assessment.

Mixed-Use Trip Generation Estimates

The mixed-use development capacity and trip generation associated with the 2022 Piemonte Overlay Specific Plan Amendment has been analyzed. Table F-1: OCSP Trip Generation Cmoparison with Proposed Mixed-Use Land Uses (SA 8, 11, 16 & 17) summarizes the trip generation estimate used in the traffic analysis:

Table F-1: OCSP Trip Generation Comparison with Proposed Mixed-use Land Uses (SA 8, 11, 16 & 17)

	Daily	AM Peak Hour	PM Peak Hour
Allowable trips per OCSP	98,837	1,961	7,556
Total Net Adept-Piemonte Trips	5,691	300	458
Trip Generation Difference Between OCSP and proposed Overlay Amendment	93,146	1,661	7,098
Percent of Trips Use by proposed Overlay Amendment	6.1%	18%	6.4%

The Traffic Impact Analysis compared the proposed Mixed-use Land use trip generation to the available trip counts allowed under the Ontario Center Specific Plan. In summary, the OCSP has a remaining trip capacity of 98,837 daily trips, and the proposed Mixed-use is anticipated to generate a net trip count of 5,691, which is well within the remaining capacity established for the OCSP area. In addition, the peak hour trip counts for the proposed Mixed-use land uses, 300

trips in the AM and 458 trips in the PM, are also within the peek hour Allowable trips per OCSP.

CEQA Vehicle Miles Traveled Analysis

Development projects within the Piemonte Overlay are subject to a Vehicle Miles Traveled (VMT) analysis, purupsant to the recommendations and practices described in Planning Commission Resolution No. PC20-021.

According to City guidelines, land use projects located within a Transit Priority Area (TPA) and have the following project characteristics are presumed to have a less than significant impact absent substantial evidence to the contrary:

- Has a Floor Area Ratio of 0.75 or higher;
- Includes no more parking for residents, customers or employees than the City Development Code mandades;
- Is consisten with the Sustainable Communitys Strategy (SCS) as determined by the City with input from SCAG or SBCTA; and
- If there are existing affordable residential units, replaces those residential units with at least as many similarly affordable units and not with a smaller number of moderate or hight-income residential units.

Certain areas within the Piemonte Overlay are within the TPA and may qualify to be presumed to have a less than significant impact.

APPENDIX ~~F~~G - OCSP PLANTING MATRIX

Table ~~F~~G.1: Applicable OCSP Planting Matrix

Species (*Latin name* - Common name)	Concours Street	Fourth Street	Haven Avenue	Primary Entrance Statement	Secondary Entrance Statement
TREES (P = Primary Tree, S = Secondary Tree)					
Acacia saligna – Willow Acacia		S			
Arbutus unedo – Strawberry Tree					X
Bauhinia variegata – Orchid Tree					X
Brachychiton acerfolius – Flame Tree		S			
Brachychiton populneum – Bottle Tree	S	S			
Celtis australis – European Hackberry					X
Chorisia speciosa – Floss-silk Tree	P	P		X	X
Cinnamomum camphora – Camphor Tree		P		X	X
Cupaniopsis anacardiodes – Carrotwood				X	X
Eriobotrya deflexa – Loquat					X
Ficus nitida – Ficus	S		P	X	
Ficus religiosa – Bo Tree				X	
Ficus rubiginosa – Rusty Leaf Fig				X	X
Fraxinus velutina 'Modesto' – Modesto Ash				X	
Geijera parvifolia – Australian Willow					X
Quercus kelloggii – California Black Oak					X
Quercus rubra – Red Oak	S				
Quercus suber – Cork Oak	P				
Schinus Molle – California Pepper *			S		
Sophora japonica – Japanese Pagoda Tree				X	X
Ulmus parvifolia – Chinese Evergreen Elm	S				X
Washingtonia robusta – Mexican Fan Palm				X	X
Washingtonia filifera – California Fan Palm		S	S	X	X
SHRUBS					
Acacia spp. – Wattle					X
Abelia grandiflora – Glossy Abelia				X	X
Abelia grandiflora 'Edward Goucher' – Dwarf Glossy Abelia				X	
Agapanthus spp. – Lily of the Nile				X	X
Callistemon spp. – Bottlebrush					X
Carissa spp. – Natal Plum				X	X

Table ~~FG~~.1: Applicable OCSP Planting Matrix (Continued)

Species (*Latin name* - Common name)	Concours Street	Fourth Street	Haven Avenue	Primary Entrance	
Carissa grandiflora 'Tuttlei' – Dwarf Natal Plum				X	
Cercis occidentalis – Western Redbud					X
Clivia Miniata – Clivia				X	X
Cotneaster spp. – Cotoneaster					X
Dietes vegeta – Fortnight Lily				X	X
Grevillea noellii – NCN				X	X
Hemerocallis spp. – Daylily				X	X
Hypericum Calycinum – Aaron's Beard					X
Ilex spp. – Holly				X	X
Iris spp. – Iris					X
Juniperus spp. – Juniper				X	X
Kniphofia uvaria – Red Hot Poker					X
Lantana camara				X	X
Nandina domestica – Heavenly Bamboo				X	X
Nandina 'Harbor Dwarf' – Dwarf Bamboo				X	X
Nerium oleander – Oleander				X	X
Pennisetum setaceum – Fountain Grass					
Photinia spp. – Photinia				X	X
Pittosporum spp. – Pittosporum				X	X
Pittosporum tobira 'Wheeleri' – Dwarf Pittosporum				X	X
Plumbago auriculata – Cape Plumbago					X
Podocarpus macrocarpa – Yew Pine				X	X
Potentilla fruticosa – Cinquefoil				X	X
Prunus Caroliniana – Carolina Laurel Cherry					X
Pyracanthus spp. – Pyracantha					X
Raphiolepis spp – Indian Hawthorn				X	X
Viburnum spp. – Viburnum					
Xylosma congestum – Shiny Xylosma				X	X
Yucca schottii					

Table ~~FG~~.1: Applicable OCSP Planting Matrix (Continued)

Species (*Latin name* - Common name)	Concours Street	Fourth Street	Haven Avenue	Primary Entrance	
GROUNDCOVER					
Ajuga reptans – Bronze Ajuga				X	X
Anigozanthos spp. – Kangaroo Paw					X
Bouganvillea spp.				X	X
Carissa grandiflora				X	X
Carpobrotus edulis – Hottentot Fig				X	X
Cerastium tomentosum – Snow-in-Summer				X	
Delosperma alba – White Iceplant				X	X
Drosanthemum hispidum – Rosea Iceplant				X	X
Fragaria chiloensis – Wild Strawberry					X
Gazania spendens – Clumping Gazania				X	X
Hedera helix ' Needlepoint' – Needlepoint Ivy					X
Jasminum humile – Italian Jasmine				X	X
Lantana spp.				X	X
Oenothera berlandieri – Mexican Evening Primrose					X
Pelargonium peitatum – Ivy Geranium				X	X
Potentilla verna – Spring Clinquefoil					X
Rosmarinus officinalis – Rosemary				X	X
Santolina spp. – Lavender Cotton				X	X
Sedum spp. – Sedum				X	X
Tracheiospenium jasminoides – Star Jasmine				X	X
Verbena peruviana – Verbena					X
Vinca minor – Dwarf Periwinkle				X	X
Vinca rosea – Madagascar Periwinkle				X	X
VINES					
Anemopaigma chamberlaynii – Yellow Trumpet Vine					X
Bougainvillea – NCN				X	X
Clytostoma callistegiodes – Violet Trumpet Vine					X
Gelsemium – Carolina Jessamine				X	X
Macfadyena unguis-cati – Cat's Claw					X
Parthenocissus tricuspidata – Boston Ivy				X	X
Tecomaria capensis – Cape Honeysuckle				X	X

Source: The Ontario Center Specific Plan (P&D Technologies) Updated April 2005.

CITY OF ONTARIO PLANNING DEPARTMENT

PLANNING DEPARTMENT ACTIVITY REPORT

Month of February

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

TO: Chairman and Members of the Planning Commission

FROM: Rudy Zeledon, Planning Director

DATE: March 22, 2022

Attached, you will find the Planning Department Monthly Activity Report for the month of February 2022. The report describes all new applications received by the Planning Department and actions taken on applications during the month. Please contact me if you have any questions regarding this information.

The attached reports, along with reports from past months, may also be viewed on the City's web site at: https://www.ontarioca.gov/Planning/Reports/MonthlyActivity.

CITY OF ONTARIO PLANNING DEPARTMENT

Monthly Activity Report: Actions

Month of February 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

DEVELOPMENT ADVISORY BOARD MEETING
February 7, 2021

ENVIRONMENTAL ASSESSMENT, TENTATIVE PARCEL MAP, AND DEVELOPMENT PLAN REVIEW FOR FILE NOS. PMTT21-009 AND PDEV21-017: A Tentative Parcel Map for condominium purposes (File No. PMTT21-009 (TPM 20394)), subdividing 0.86-acre of land into a single lot to establish 22 commercial airspace condominium units, and a Development Plan (File No. PDEV21-017) to construct two commercial buildings totaling 30,971 square feet, located at 125 West Emporia Street, within the MU-1/LUA-2N (Downtown Mixed-Use/Arts District – North) and the EA (Euclid Avenue Overlay) zoning districts. The project is categorically exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15332 (Class 32, In-Fill Development Projects) of the CEQA Guidelines. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 1049-059-14) **submitted by RWSS Development LLC. Planning Commission action is required.**
Action: The Development Advisory Board adopted a decision recommending the Planning Commission approve the Tentative Parcel Map and the Development Plan, subject to conditions.

ENVIRONMENTAL ASSESSMENT, DEVELOPMENT PLAN, AND CONDITIONAL USE PERMIT REVIEW FOR FILE NOS. PDEV21-021 AND PCUP21-009: A Development Plan (File No. PDEV21-021) to construct a 4-story, 128-room Extended Stay/Residence Inn Hotel, in conjunction with a Conditional Use Permit (File No. PCUP21-009) to establish and operate the hotel use on 1.83 acres of land located at 5060 East Fourth Street, within the Freeway Commercial land use district of The Exchange Specific Plan. The project is categorically exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15332 (Class 32, In-Fill Development Projects) of the CEQA guidelines. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 0238-012-30) **submitted by Roger Barbosa. Planning Commission action is required.**
Action: The Development Advisory Board adopted a decision recommending the Planning Commission approve the Development Plan and the Conditional Use Permit, subject to conditions.

ZONING ADMINISTRATOR MEETING
February 7, 2021

Meeting Cancelled

CITY COUNCIL/HOUSING AUTHORITY MEETING
February 1, 2021

ENVIRONMENTAL ASSESSMENT AND ZONE CHANGE REVIEW FOR FILE NO. PZC21-001: A Zone Change (File No. PZC21-001) amending the zoning designation on 2.77 acres located at 1948

South Bon View Avenue, from IL (Light Industrial) to IG (General Industrial). Staff has prepared an Addendum to The Ontario Plan Environmental Impact Report (State Clearinghouse No. 2008101140), certified by the City Council on January 27, 2010. This application introduces no new significant environmental impacts. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 1050-441-05) **submitted by Bon View Land 10, LLC & BV Investments 10, LLC. Planning Commission recommended approval of this project on December 20, 2021 with a 6 – 0 vote.**
Action: The City Council approved and waived further reading of the ordinance approving the Zone Change.

CITY COUNCIL/HOUSING AUTHORITY MEETING
February 15, 2022

No Planning Department Items Scheduled

PLANNING/HISTORIC PRESERVATION COMMISSION MEETING
February 22, 2022

ENVIRONMENTAL ASSESSMENT, PLANNED UNIT DEVELOPMENT, TENTATIVE PARCEL MAP, DEVELOPMENT PLAN, AND CERTIFICATE OF APPROPRIATENESS REVIEW FOR FILE NOS. PUD22-001, PMTT21-009, PDEV21-017, AND PHP21-021: A request for the following entitlements: [1] a Planned Unit Development (File No. PUD22-001) to establish development standards, design guidelines, and infrastructure requirements for the Project site; [2] a Tentative Parcel Map (File No. PMTT21-009 (TPM 20394)) to subdivide a 0.86-acre property into a single lot to establish 22 commercial airspace condominium units; [3] a Development Plan (File No. PDEV21-017) to construct two commercial buildings totaling 33,787 square feet; and [4] a Certificate of Appropriateness (File No. PHP21-021) to allow for the construction of the proposed Project within the Euclid Avenue Overlay Zoning District. The Project Site is located at 125 West Emporia Street, within the MU-1/LUA-2N (Downtown Mixed-Use/Arts District – North) and EA (Euclid Avenue Overlay) zoning districts. The project is categorically exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15332 (Class 32, In-Fill Development Projects) of the CEQA Guidelines. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 1049-059-14) **submitted by RWSS Development LLC. City Council action is required.**
Action: The Planning/Historic Preservation Commission adopted a resolution recommending the City Council approve the Planned Unit Development and resolutions approving the Tentative Parcel Map, Development Plan, and Certificate of Appropriateness, subject to conditions and contingent upon the City Council approval of the Planned Unit Development.

ENVIRONMENTAL ASSESSMENT, DEVELOPMENT PLAN, AND CONDITIONAL USE PERMIT REVIEW FOR FILE NOS. PDEV21-021 AND PCUP21-009: A Development Plan (File No. PDEV21-021) to construct a

4-story, 128-room Extended Stay/Residence Inn Hotel, in conjunction with a Conditional Use Permit (File No. PCUP21-009) to establish and operate the hotel use on 1.83 acres of land located at 5060 East Fourth Street, within the Freeway Commercial land use district of The Exchange Specific Plan. The project is categorically exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15332 (Class 32, In-Fill Development Projects) of the CEQA guidelines. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 0238-012-30) **submitted by Roger Barbosa. City Council action is required.**
Action: The Planning Commission adopted a resolution recommending the City Council approve the Conditional Use Permit and adopted a resolution approving the Development Plan, subject to conditions and contingent upon the City Council approval of the Conditional Use Permit.

DEVELOPMENT ADVISORY BOARD MEETING
February 23, 2022

Meeting Cancelled

ZONING ADMINISTRATOR MEETING
February 23, 2022

ENVIRONMENTAL ASSESSMENT AND CONDITIONAL USE PERMIT REVIEW FOR FILE NO. PCUP21-016: A Conditional Use Permit to establish: [1] a Type 52 ABC License (Veteran's Club) for the sale of beer, wine, and distilled spirits for consumption on the licensed premises only to bona fide members of the licensed organization, their bona fide guests, and bona fide members of other veterans organizations; and [2] a Type 58 ABC License (Caterer's Permit) to cater alcoholic beverages off-site, for the American Legion Post No. 112, within an existing 4,081-square-foot building, on 0.76 acres of land located at 1400 South Vineyard Avenue, Suite A, within the IG (General Industrial) zoning district. The project is categorically exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Section 15301 (Class 1, Existing Facilities) of the CEQA Guidelines. The proposed project is located within the Airport Influence Area of Ontario International Airport and was evaluated and found to be consistent with the policies and criteria of the Ontario International Airport Land Use Compatibility Plan (ALUCP); (APN: 0113-415-17) **submitted by American Legion Post No. 112.**
Action: The Zoning Administrator adopted a decision approving the Conditional Use Permit, subject to conditions.

Monthly Activity Report: New Applications

Month of February 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

PADV22-001: **Submitted by Tom Grahn**

The General Plan Annual Progress Report and Housing Element Annual Progress Report for the reporting period January 1, 2021 to December 31, 2021. **City Council action is required.**

PCUP22-003: **Submitted by Chris Kiralla**

A modification to a previously approved Conditional Use Permit (File No. PCUP13-033), establishing a green waste composting facility, to allow less than two percent food waste mixed with green waste and up to five percent of construction and demolition sourced wood, on approximately 18 acres of land located at 8559 Schaefer Avenue, within the SP/AG (Specific Plan/Agricultural Overlay) zoning districts (APNs: 0216-313-030 and 0216-311-040). **Zoning Administrator action is required.**

PCUP22-004: **Submitted by AgConcepts, Inc.**

A modification to a previously approved Conditional Use Permit (File No. PCUP19-020), establishing a green waste composting facility, to allow less than two percent food waste mixed with green waste, on approximately 37 acres of land located at 7325 Edison Avenue, within the SP/AG (Specific Plan/Agricultural Overlay) zoning districts (APNs: 1053-39-101 and 1053-40-100). **Zoning Administrator action is required.**

PDA-22-001: **Submitted by BrookCal Ontario, LLC**

A Development Agreement with Brookcal Ontario LLC, to establish the terms and conditions of development associated with Tentative Tract Map No. 20529 (File No. PMTT22-010), located at the southeast corner of Ontario Ranch Road and Haven Avenue, within the Planning Area 5 land use district of the Rich-Haven Specific Plan (APNs: 0218-161-14). **City Council action is required.**

PDA-22-002: **Submitted by Richland Developers, Inc.**

A Development Agreement with Haven Ontario NMC 1 LLC and Haven NMC2 LLC, to establish the terms and conditions of development associated with Tentative Tract Map No. 20530 (File No. PMTT22-009), located at the southeast corner of Ontario Ranch Road and Haven Avenue, within the Planning Area 5 land use district of the Rich-Haven Specific Plan (APNs: 0218-016-06, 0218-016-07, 0218-016-18, 0218-203-08, 0218-203-01, 0218-203-02, 0218-203-03, 0218-203-04, 0218-203-07, 0218-203-06, and 0218-203-05). **City Council action is required.**

PDCA22-002: **Submitted by City of Ontario**

A Development Code Amendment: (1) updating Reference H – Community Climate Action Plan; (2) establishing Reference J – Health Risk Assessment Guidelines; (3) establishing Reference K – Objective Design and Development Standards; and (4) update standards pertaining to ADUs and JADUs, consistent with State law. **City Council action is required.**

PDET22-001: **Submitted by City of Ontario**

Land Use Determination application, to establish whether a Civic/Social Organization is similar to, and of no greater intensity than, other allowed land uses with the IG (General Industrial) zoning district. **Zoning Administrator action is required.**

CITY OF ONTARIO PLANNING DEPARTMENT

Monthly Activity Report: New Applications

Month of February 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

PDEV22-008: **Submitted by Euclid Land Ventures, LLC**

A Development Plan to construct six industrial buildings totaling 1,522,240 square feet on 73.6 acres of land located at the southwest corner of Merrill and Campus Avenues, within the Industrial General land use district of the Ontario Ranch Business Park Specific Plan (APNs: 1054-041-01, 1054-041-02, 1054-031-01, 1054-031-02, 1054-261-01, 1054-261-02, 1054-291-01, and 1054-291-02.) Related File: PMTT22-005. **Planning Commission action is required.**

PDEV22-009: **Submitted by Clark Neuhoff**

A Development Plan to construct two industrial buildings totaling 81,000 square feet on 4.43 acres of land located at the southeast corner of Mission Boulevard and Sultana Avenue, within the IL (Light Industrial) zoning district (APNs: 1049-353-09, 1049-353-10, 1049-353-11, 1049-353-12, and 1049-353-14). Related File: PMTT22-006. **Planning Commission action is required.**

PDEV22-010: **Submitted by Duke Realty State Street, LP**

A Development Plan to construct a 326,604-square-feet industrial building on 16.01 acres of land located at the northeast corner of East State Street and South Campus Avenue, within the IG (General Industrial) zoning district (APNs: 1049-111-01, 1049-111-03, 1049-111-04, 1049-111-05, and 1049-111-07). Related File: PMTT22-008. **Planning Commission action is required.**

PDIF22-001: **Submitted by KB Home Coastal, Inc.**

A Development Impact Fee Credit Agreement with KB Home Costal, Inc., a California corporation, associated with three Development Plans (File Nos. PDEV21-039, PDEV21-042, and PDEV21-043), located at the southeast corner of Old Edison and Mill Creek Avenues, within the Esperanza Specific Plan (APNs: 0218-252-08 and 0218-252-38). **City Council action is required.**

PMTT22-005: **Submitted by Euclid Land Ventures, LLC**

A Tentative Parcel Map to subdivide 73.6 acres of land into six parcels located at the southwest corner of Merrill and Campus Avenues, within the Industrial General land use district of the Ontario Ranch Business Park Specific Plan (APNs: 1054-041-01, 02,031-01, 02, 261-01, 02, 291-01, 02.) Related File: PDEV22-008. **Planning Commission action is required.**

PMTT22-006: **Submitted by Clark Neuhoff**

A Tentative Parcel Map to subdivide 4.43 acres of land into two parcels located at the southeast corner of Mission Boulevard. and Sultana Avenue, within the IL (Light Industrial) zoning district (APNs: 1049-353-09, 1049-353-10, 1049-353-11, 1049-353-12, and 1049-353-14). Related Files: PDEV22-009. **Planning Commission action is required.**

PMTT22-007: **Submitted by Prologis**

A Tentative Parcel Map to subdivide 113.69 acres of land into three parcels located at the northeast corner of Merrill and Grove Avenues, within PA-1 and PA-2 of the Industrial land use district of the Merrill Commerce Center Specific Plan (APN: 0218-211-31). Related File: PDEV22-002. **Planning Commission action is required.**

CITY OF ONTARIO PLANNING DEPARTMENT

Monthly Activity Report: New Applications

Month of February 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

PMTT22-008: **Submitted by Duke Realty State Street, LP**

A Tentative Parcel Map to merge 16.01 acres of land from 5 parcels into one parcel, located at the northeast corner of State Street and Campus Avenue, within the IG (General Industrial) zoning district (APNs: 1049-111-01, 1049-111-03, 1049-111-04, 1049-111-05, and 1049-111-07). Related File: PDEV22-010. **Planning Commission action is required.**

PMTT22-009: **Submitted by Richland Developers, Inc**

A Tentative Tract Map (TT 20530) for condominium purposes, subdividing 8.3 acres of land into 4 numbered lots and 15 lettered lots to facilitate the development of 144 multiple-family dwellings generally located northeast of Pollock Street and Twinkle Avenue intersection, within PA-5 of the Rich-Haven Specific Plan (APNs: 0218-016-06, 0218-016-07, 0218-016-18, 0218-203-08, 0218-203-01, 0218-203-02, 0218-203-03, 0218-203-04, 0218-203-07, 0218-203-06, and 0218-203-05). **Planning Commission action is required.**

PMTT22-010: **Submitted by BrookCal Ontario, LLC**

A Tentative Tract Map (TT 20529) for condominium purposes, subdividing 11.11 acres of land into 3 numbered lots and 15 lettered lots to facilitate the development of 120 multiple-family dwellings generally located 400 feet southwest of the Chino and Mill Creek Avenues intersection, within PA-5 of the Rich-Haven Specific Plan (APNs: 0218-161-14). **Planning Commission action is required.**

PMTT22-011: **Submitted by Ernie Rivas**

A Tentative Parcel Map (PM 20452) subdividing 23 acres of land into nine parcels located at 4410 Ontario Mills Parkway, within the Commercial/Office land use district of the Ontario Mills (formerly California Commerce Center North) Specific Plan (APNs: 0238-041-29, 0238-041-30, 0238-041-31, and 0238-041-32). **Planning Commission action is required.**

PPRE22-001: **Submitted by Chad Manista**

A Preliminary Plan for the development of a 179,396-square-foot industrial building on 4.12 acres of land located at 2042 South Grove Avenue, within the Office/Commercial land use district of the Grove Avenue Specific Plan (APN: 0105-049-111). **Staff action is required.**

PPRE22-002: **Submitted by B9 Wanamaker Owner, LLC**

A Preliminary Plan for the development of a 346,522-square-foot industrial building on approximately 16 acres of land located at 1350 Woodruff Way, within the Commercial/Food/Hotel land use district of the California Commerce Center Specific Plan and a property located at 1375 Woodruff Way, within the Light Industrial land use district of the California Commerce Center Specific Plan (APNs: 0238-201-41 and 0238-221-22). **Staff action is required.**

PSGN22-015: **Submitted by Veronica Mejia**

A Sign Plan to install one wall-mounted sign and add signage to an existing monument sign for LINK LOGISTICS, located at 5125 East Ontario Mills Parkway, within the IG (General Industrial) zoning district (APN: 0238-021-02). **Staff action is required.**

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PSGN22-016: **Submitted by Mark Miller**

A Sign Plan to install one nonilluminated wall site for ARMORCAST PRODUCTS COMPANY (HUBBELL), located at 500 South Dupont Avenue, within the California Commerce Center Specific Plan (APN: 0211-222-39). **Staff action is required.**

PSGN22-017: **Submitted by Veronica Mejia**

A Sign Plan to install one wall-mounted sign and add signage to an existing monument sign for LINK LOGISTICS, located at 1670 South Champagne Avenue, within the IH (Heavy Industrial) zoning district (APN: 0238-133-42). **Staff action is required.**

PSGN22-018: **Submitted by Veronica Mejia**

A Sign Plan to install one wall-mounted sign and add signage to an existing monument sign for LINK LOGISTICS, located at 2825 East Jurupa Street, within the Hofer Ranch Airport Business Park Specific Plan (APN: 0211-211-17). **Staff action is required.**

PSGN22-019: **Submitted by Veronica Mejia**

A Sign Plan to install one wall-mounted sign and add signage to an existing monument sign for LINK LOGISTICS, located at 2880 East Jurupa Street, within the Hofer Ranch Airport Business Park Specific Plan (APN: 0211-261-15). **Staff action is required.**

PSGN22-020: **Submitted by Veronica Mejia**

A Sign Plan to install one wall-mounted sign and add signage to an existing monument sign for LINK LOGISTICS, located at 1100 South Etiwanda Avenue, within the IH (Heavy Industrial) zoning district (APN: 0238-101-65). **Staff action is required.**

PSGN22-021: **Submitted by Edward Vinciquera**

A Sign Plan to install two illuminated wall-mounted signs and one illuminated blade sign for FEELING GROOVY, located at 3490 East Ontario Ranch Road, within The Avenue Specific Plan (APN: 0218-402-51). **Staff action is required.**

PSGN22-022:

A Sign Plan to install one illuminated wall-mounted sign for ONTARIO FOOT MASSAGE, located at 1945 East Riverside Drive, within the CN (Neighborhood Commercial) zoning district (APN: 0113-564-27). **Staff action is required.**

PSGN22-023: **Submitted by Inland Signs, Inc.**

A Sign Plan to install two wall-mounted signs for CONNECT STAFFING, located at 1802 East G Street, within the CCS (Convention Center Support Commercial) zoning district (APN: 0110-241-18). **Staff action is required.**

PSGN22-024: **Submitted by Inland Signs, Inc.**

A Sign Plan to install one wall-mounted sign for HULK FIT, located at 2888 East Spruce Street, within the California Commerce Center South Specific Plan (APN: 0211-275-23). **Staff action is required.**

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PSGN22-025:

A Sign Plan to install one illuminated wall-mounted sign for ARIZONA COLLEGE OF NURSING, located at 3401 North Centrelake Drive, within the Centrelake Business Park Specific Plan (APN: 0210-551-09). **Staff action is required.**

PSGN22-026:

A Sign Plan to install one illuminated wall-mounted sign for LESLIE'S POOL SUPPLIES, located at 1595 South Dupont Avenue, within the California Commerce Center Specific Plan (APN: 0211-281-10). **Staff action is required.**

PSGN22-027: **Submitted by Eagle Signs, Inc.**

A Sign plan to install two freestanding monument signs for SEASONS AT ONTARIO, located at 955 North Palmetto Avenue, within the MDR-25 (Medium-High Density Residential – 18.1 to 25.0 du/ac) zoning district (APN: 1010-141-08). **Staff action is required.**

PSPA22-001: **Submitted by BrookCal Ontario LLC & RichlandDevelopers Inc.**

An Amendment to the Rich-Haven Specific Plan, changing the land use designation on 96.7 acres of land from 5.1 – 12 du/ac to 12.1 – 25 du/ac, located at the northwest corner of Mill Creek Avenue and Ontario Ranch Road, within Planning Areas 4, 5 and 6 of the Rich-Haven Specific Plan (APNs: 0218-211-29 and 0218-161-14). **City Council action is required.**

PTUP22-011: **Submitted by Ted Schidlovsky**

A Temporary Use Permit for the installation of a temporary sales trailer and sales office for Tay's Landing. **Staff action is required.**

PTUP22-012: **Submitted by Ontario Hispanic Chamber of Commerce**

A Special Event Permit for the Ontario Hispanic Chamber of Commerce to have a one-day event at De Anza Park, located at 1405 South Fern Avenue. Event to be held on 5/1/2022. **Staff action is required.**

PTUP22-013: **Submitted by Ontario Recreation and Community Services Department**

A Special Event Permit for a Tot Olympic event at Celebration Park North, located at 4980 South Celebration Avenue. Event to be held on 3/12/2022. **Staff action is required.**

PTUP22-014: **Submitted by Ontario Recreation and Community Services Department**

A Special Event Permit for the 2nd Annual Puppy Love Dog Pawty event at James R. Bryant Dog Park, located at 648 West D Street. Event to be held on 2/12/2022. **Staff action is required.**

PTUP22-015: **Submitted by Ovitt Family Community Library**

A Special Event Permit for a "Big Trucks Meet Up" event in the Ovitt Family Community Library parking lot, located at 127 East C Street. Event to be held on 6/4/2022. **Staff action is required.**

Monthly Activity Report: New Applications

Month of February 2022

303 East B Street, Ontario, California 91764 Phone: 909.395.2036 / Fax: 909.395.2420

PTUP22-016: **Submitted by City of Ontario Human Resources/Risk Management Agency**

A Special Event Permit to hold a mobile health screening/flu vaccination event for City employees provided by Kaiser Permanente at City Hall, located in the outside courtyard area, located at 303 East B Street. Event to be held on 3/16/2022. **Staff action is required.**

PTUP22-017: **Submitted by Homestead Steaks**

A Temporary Use Permit to sell prepackaged frozen USDA certified food in the Ontario Mills Mall parking lot, located at 1 East Mills Circle. Event to be held from 2/18/2022 to 3/2/2022. **Staff action is required.**

PTUP22-018: **Submitted by Rodeo X**

A Temporary Use Permit to host a gathering for truck enthusiasts at 3430 East Ontario Ranch Road, in the Rodeo X parking lot, located at 3430 East Ontario Ranch Road. Event to be held on 3/20/2022. **Staff action is required.**

PTUP22-019: **Submitted by City of Ontario**

A Special Event Permit for the City to host "Taste of Ontario" event for city departments and agencies to display the services and programs that staff provides to the community, located at 224 North Euclid Avenue (Ontario Town Square Park). Event to be held on 3/19/2022. **Staff action is required.**

PTUP22-020: **Submitted by Ruben Plascencia**

A Temporary Use Permit submitted by Paraiso Natives to operate an interim nursery for 2 years on property located at 2131 East Philadelphia Street. **Staff action is required.**

PTUP22-021: **Submitted by The Ontario Recreation and CommunityServices Department**

A Special Event Permit for a Spring Egg Hunt at Celebration Park North, located at 4980 South Celebration Avenue. Event will be held on 4/9/2022. **Staff action is required.**

PVER22-010:

A Zoning Verification for property located at 2600 East Francis Street, within the IG (General Industrial) zoning district (APN: 0211-242-39). **Staff action is required.**

PVER22-011:

A Zoning Verification for property located at 4290 East Brickell Street, within the California Commerce Center Specific Plan (APN: 0211-222-34). **Staff action is required.**

PVER22-012: **Submitted by Samantha Watt**

A Zoning Verification for property located at 958 East Holt Avenue, within the IP (Industrial Park) zoning district (APN: 1049-131-08). **Staff action is required.**

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PVER22-013: **Submitted by Planning & Zoning Resource Company**

A Zoning Verification for property located at 1800 South Archibald Avenue, within the IG (General Industrial) zoning district. **Staff action is required.**

PVER22-014: **Submitted by Planning & Zoning Resource Company**

A Zoning Verification for property located at 1391 South Vintage Avenue, within the IH (Heavy Industrial) zoning district (APN: 0238-101-52). **Staff action is required.**

PVER22-015: **Submitted by Planning & Zoning Resource Company**

A Zoning Verification for property located at 1630 East Holt Boulevard, within the BP (Business Park) zoning district. **Staff action is required.**

PVER22-016: **Submitted by Planning & Zoning Resource Company**

A Zoning Verification for property located at 1650 East Holt Boulevard, within the BP (Business Park) zoning district. **Staff action is required.**

PVER22-017: **Submitted by The Planning & Zoning Resource Company**

A Zoning Verification for property located at 1750 South Archibald Avenue, within the Corsaire Specific Plan (APN: 0211-242-45). **Staff action is required.**

PVER22-018: **Submitted by Global Zoning**

A Zoning Verification for property located at 1514 South Bon View Avenue, within the IG (General Industrial) zoning district (APN:1050-121-04). **Staff action is required.**