

Appendix F: Traffic Impact Analysis

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HEXAGON TRANSPORTATION CONSULTANTS, INC.

731 W. Cutting Boulevard

Transportation Analysis – Non CEQA Analysis

Prepared for:

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Executive Summary

This report presents the results of the transportation analysis conducted for the proposed warehouse development at 731 W. Cutting Boulevard in Richmond, California. The project would replace the existing industrial use with 144,763 square feet (s.f.) of warehouse space, 8,995 s.f. of office space, and a surface parking lot. The project site is located in the northeast corner of the Canal Boulevard and W. Cutting Boulevard intersection. Access to the project site would be provided via one driveway on Canal Boulevard and one driveway on W. Cutting Boulevard. The driveway on Canal Boulevard would primarily be used by employees, and the driveway on W. Cutting Boulevard would primarily be used by trucks entering and exiting the site.

The transportation issues of the project were evaluated following the standards and methodologies established by the City of Richmond. Since it is estimated that the project would generate more than 100 peak hour vehicle trips, a Congestion Management Program (CMP) analysis consistent with Contra Costa County Transportation Commission (CCCTA) guidelines was prepared for the local transportation analysis (LTA).

Local Transportation Effects

Project Trip Generation

Based on trip generation rates recommended by the Institute of Transportation Engineers (ITE), it is estimated that the proposed project would generate a total of 1,020 daily trips, including 136 trips in the AM peak hour, and 184 trips in the PM peak hour.

Intersection Traffic Operations

The results of the intersection level of service analysis (see Table ES-1) show that the following study intersections would operate at unacceptable conditions, with and without the project, during the AM and PM peak hours.

- Canal Boulevard/I-580 WB Ramps (Background)
- Canal Boulevard/I-580 EB Ramps (Background)
- Harbour Way/Cutting Boulevard (Cumulative)

However, the addition of project trips would not cause the average delay to increase by more than 5.0 seconds at these intersections. Thus, the project would not have an adverse effect on operations at these intersections, based on the City's Traffic Impact Analysis Guidelines for signalized intersections.

The unsignalized study intersection of 2nd Street/W. Cutting Boulevard would not satisfy the peak hour volume signal warrant under background and cumulative conditions, and therefore the project would not have an adverse effect at this intersection.

Other Transportation Issues

The proposed site plan shows adequate site access and on-site circulation. The project would enhance pedestrian circulation by removing and reducing the width of multiple driveways along its frontage. The planned Class IV two-way cycle track with a buffer on the south side of W. Cutting Boulevard between Garrard Boulevard and Hoffman Boulevard, with a new sidewalk next to the cycle track where it is currently missing would improve bicycle and pedestrian facilities connections around the project area. The project would not cause an adverse effect to existing transit facilities in the study area.

Hexagon has the following recommendations resulting from the parking, site access, and circulation analysis.

- The project should upgrade the curb ramps on the northeast corner of Canal Boulevard/W. Cutting Boulevard to be compliant with current American Disability Act (ADA) standards.
- The center turn lane on W. Cutting Boulevard to the west of the proposed driveway should be extended by approximately 150 feet by cutting into the landscaped median on W. Cutting Boulevard to provide adequate storage for trucks entering the project site.
- The proposed driveway on Canal Boulevard should be moved farther south and connect to the south end of the proposed parking lot.
- Prior to final design, the applicant should ensure that the project driveways and property line clearance comply with the City of Richmond Fire Code.
- The site plan does not show any bicycle parking spaces on-site. It is recommended that the project provide 9 long-term and 9 short-term bicycle parking spaces on site.

Table ES 1
Intersection Level of Service Summary

#	Intersection	Control	Peak Hour	Count Date	Existing		Background		Background plus Project		Cumulative		Cumulative plus Project	
					Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS
1	Canal Boulevard & I-580 Westbound Ramps ³	Signal	AM	03/27/18	20.1	C	21.2	C	20.8	C	22.4	C	22.4	C
			PM	03/27/18	42.4	D	61.8	E	63.3	E	>120	F	>120	F
2	Canal Boulevard & I-580 Eastbound Ramps ³	Signal	AM	03/27/18	28.1	C	27.5	C	27.6	C	28.0	C	28.3	C
			PM	03/27/18	66.6	E	65.4	E	64.2	E	>120	F	>120	F
3	Canal Boulevard & Cutting Boulevard * ⁴	Signal	AM	02/28/19	21.9	C	28.8	C	30.7	C	26.1	C	27.6	C
			PM	02/28/19	21.2	C	28.3	C	30.3	C	31.5	C	33.4	C
4	2nd Street & Cutting Boulevard ^{4,5}	Side-Street Stop	AM	09/02/21	18.5	C	29.5	D	36.8	E	47.5	E	65.7	F
			PM	09/02/21	14.3	B	19.9	C	22.1	C	28.0	D	32.3	D
5	Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard ^{3,5}	Signal	AM	08/31/21	14.1	B	15.7	B	15.4	B	16.9	B	17.6	B
			PM	08/31/21	15.0	B	15.3	B	15.3	B	18.5	B	18.5	B
6	I-580 On-Ramp & Cutting Boulevard ^{4,5}	Signal	AM	08/31/21	15.5	B	15.2	B	15.2	B	21.4	C	21.5	C
			PM	08/31/21	4.6	A	4.9	A	5.1	A	7.8	A	8.1	A
7	Harbour Way & Cutting Boulevard * ⁴	Signal	AM	02/28/19	46.7	D	49.8	D	50.0	D	53.7	D	54.1	D
			PM	02/28/19	46.5	D	47.7	D	47.4	D	61.4	E	62.0	E
Notes:														
* indicates CMP Intersection														
Bold indicates LOS E or LOS F.														
¹ For the side-street stop intersection, the average delay is the average delay experienced by the worst movement on the minor street.														
² For the signal control intersections, the average delay is the average delay of all vehicles entering the intersection.														
³ Level of service based on the Highway Capacity Manual (HCM) 2000 report from Synchro.														
⁴ Level of service based on the Highway Capacity Manual (HCM) 6th report from Synchro.														
⁵ The volumes at these intersection were adjusted to pre-COVID conditions.														

1. Introduction

This report presents the results of the transportation analysis (TA) conducted for the proposed warehouse development at 731 W. Cutting Boulevard in Richmond, California (see Figure 1). The project would replace the existing industrial use with 144,763 s.f. of warehouse space, 8,995 s.f. of office space, and a surface parking lot. The project site is located in the northeast corner of the Canal Boulevard and W. Cutting Boulevard intersection. Access to the project site would be provided via one driveway on Canal Boulevard and one driveway on W. Cutting Boulevard. The driveway on Canal Boulevard would primarily be used by employees, and the driveway on W. Cutting Boulevard would primarily be used by trucks entering and exiting the site (see Figure 2).

Scope of Study

The purpose of the study is to identify potential transportation adverse effects related to the proposed development. The potential adverse effects of the project were evaluated in accordance with the standards and methodologies set forth by the City of Richmond. The analysis also includes a vehicle queuing analysis, an evaluation of potential project adverse effects on bicycle, pedestrian, and transit facilities, and a review of site access, on-site circulation, and parking.

The study analyzes the traffic effects of the proposed development on the key intersections in the vicinity of the site during the weekday AM and PM peak hours of traffic. Locally, the AM peak hour of traffic is usually between 7:00 AM and 9:00 AM, and the PM peak hour is typically between 4:00 PM and 6:00 PM. It is during these periods that the most congested traffic conditions occur on an average weekday.

Study intersections

The study includes those intersections that provide primary access to the project site and intersections that would experience a traffic increase of 10 or more peak-hour trips per lane. The study intersections are listed below and shown on Figure 1.

1. Canal Boulevard and I-580 Westbound Ramps
2. Canal Boulevard and I-580 Eastbound Ramps
3. Canal Boulevard and W. Cutting Boulevard*
4. S. 2nd Street and W. Cutting Boulevard (unsignalized)
5. Hoffman Boulevard / W. Cutting Boulevard and I-580 Eastbound Off-Ramp
6. Cutting Boulevard and I-580 Westbound Ramps
7. Harbour Way S. and Cutting Boulevard*

* = indicates CMP intersection

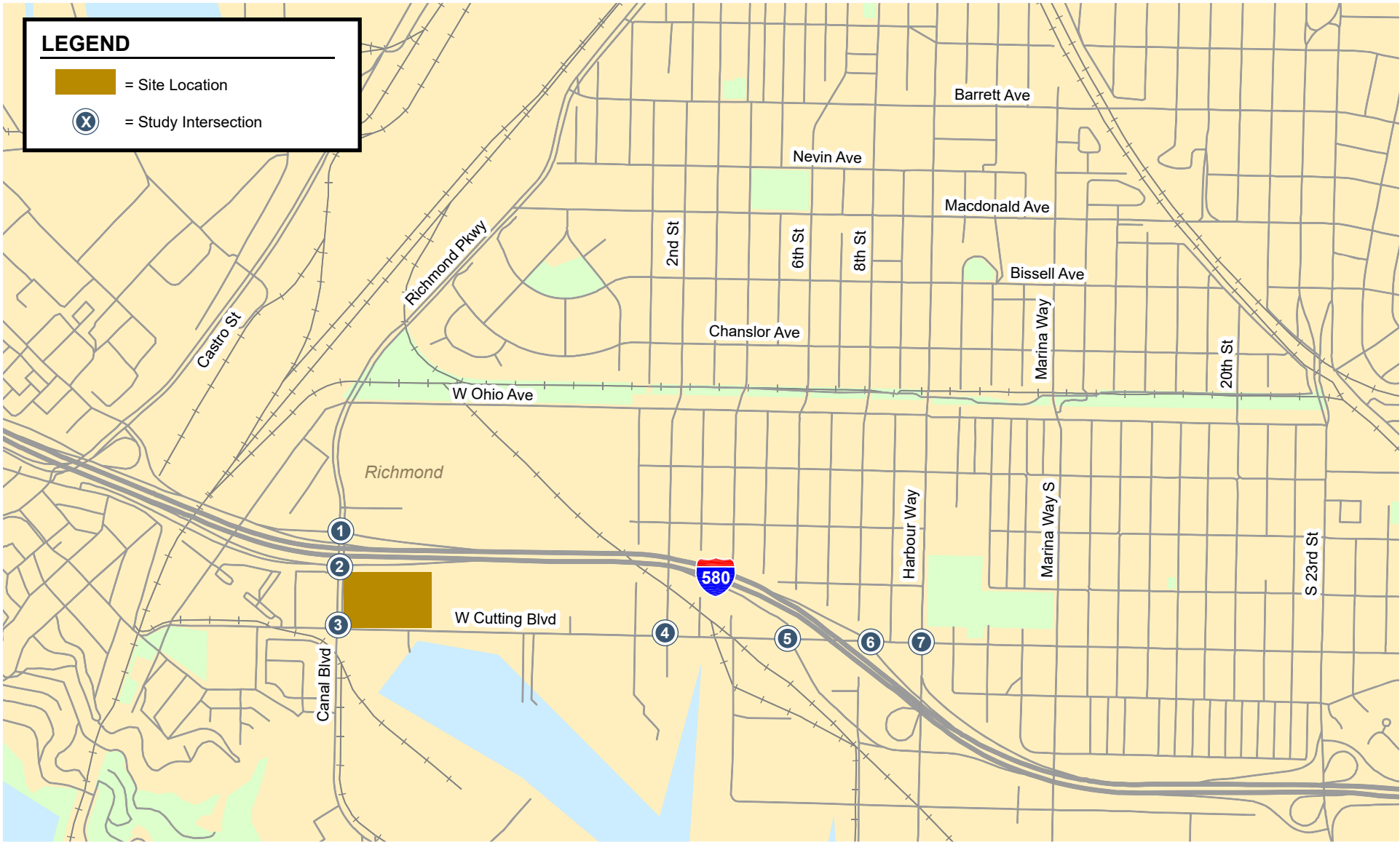


Figure 1
Site Location and Study Intersections

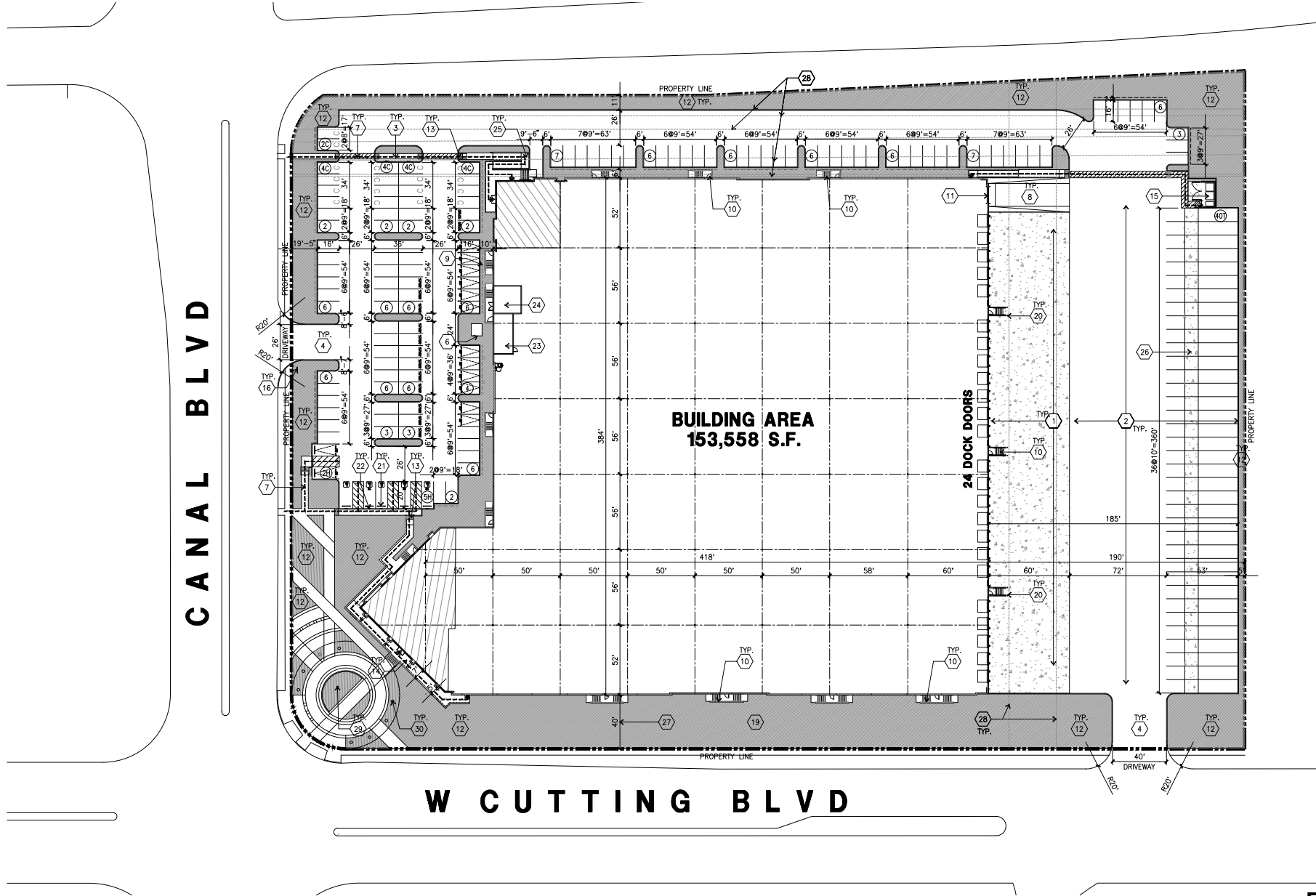


Figure 2
Site Plan

Intersection operations conditions were evaluated for the following scenarios:

- **Existing Conditions.** Existing traffic volumes for intersections 1 and 2 were obtained from historical turning movement counts conducted in March 2018 as part of other studies. For the CMP intersections 3 and 4, AM and PM peak hour counts conducted in February 2019 for the 2019 Central Contra Costa Transportation Agency (CCCTA) Congestion Management Program (CMP) Monitoring Project were obtained. For intersections 4, 5 and 6, new turning movement counts were conducted in August 2021. These new counts were escalated to pre-pandemic levels by applying a growth factor. All traffic count data are contained in Appendix A.
- **Existing Plus Project Conditions.** Existing plus project traffic volumes were estimated by adding to existing traffic volumes the trips associated with the proposed project. Existing plus project conditions were evaluated relative to existing conditions in order to determine potential project-generated substantial increases in intersection delay.
- **Background Conditions.** Background traffic volumes were estimated by adding to existing peak hour volumes the projected volumes from approved but not yet completed developments. Approved projects trips that were considered under background conditions are included in Appendix D.
- **Background Plus Project Conditions.** Background plus project traffic volumes were estimated by adding to background traffic volumes the trips associated with the proposed project. Background plus project conditions were evaluated relative to background conditions in order to determine potential project-generated substantial increases in intersection delay.
- **Cumulative Conditions.** 2040 Cumulative conditions represent future traffic volumes on the future transportation network accounting for future developments contained in the regional plan including regional traffic growth, approved projects, and projects not yet identified or approved. The 2040 cumulative no project AM and PM peak hour traffic volumes were estimated using the Contra Costa County Regional Travel Demand Model. Cumulative plus project conditions were evaluated by adding the project trips generated at the study intersections to cumulative no project volumes.

Intersection Operations Analysis Methodology

This section presents the methods used to evaluate traffic conditions at the study intersections and the potential adverse effects due to the project. It includes descriptions of the data requirements, the analysis methodologies, and the applicable level of service standards for identifying deficiencies.

Data Requirements

The data required for the analysis were obtained from the City of Richmond. The following data were collected from these sources:

- existing traffic volumes
- approved project trips
- existing lane configurations
- signal timing and phasing

Level of Service Standards and Analysis Methodologies

Traffic conditions at the study intersections were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The analysis methods for signalized and unsignalized intersections are described below.

City of Richmond Signalized Intersections

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual* (HCM), using SYNCHRO software. The HCM operations method evaluates signalized intersection operations on the basis of average control delay time for all vehicles at the intersection. The City of Richmond level of service standard for signalized intersections is LOS D or better. The correlation between average control delay and level of service is shown in Table 1. Delays were calculated using signal timing provided by either the City of Richmond Engineering Department or Caltrans. LOS for the study intersections were analyzed using the Highway Capacity Manual (HCM) 6th edition methodology to maintain consistency with previous studies. For intersections that could not be analyzed using 6th edition due to limitations in the methodology, HCM 2000 was used.

Table 1
Signalized Intersection Level of Service Definitions Based on Control Delay

Level of Service	Description	Average Control Delay Per Vehicle (sec.)
A	Signal progression is extremely favorable. Most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to the very low vehicle delay.	10.0 or less
B	Operations characterized by good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average vehicle delay.	10.1 to 20.0
C	Higher delays may result from fair signal progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though may still pass through the intersection without stopping.	20.1 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable signal progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	This is considered to be the limit of acceptable delay. These high delay values generally indicate poor signal progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Individual cycle failures occur frequently.	55.1 to 80.0
F	This level of delay is considered unacceptable by most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major-contributing causes of such delay levels.	greater than 80.0
Source: Transportation Research Board, 2000 <i>Highway Capacity Manual</i> (Washington, D.C., 2000) p10-16.		

City of Richmond Unsignalized Intersections

Levels of service at the unsignalized intersection were based on the Highway Capacity Manual method, calculated with Synchro software. This method is applicable for two-way stop-controlled intersections. For two-way stop-controlled intersections, the reported levels of service are based on the worst approach delay at the intersection. The City of Richmond does not have a level of service standard for unsignalized intersections. Therefore, intersection levels of service for unsignalized intersections are reported for informational purposes only. The correlation between average control delay and LOS for unsignalized intersections is shown in Table 2.

Table 2
Unsignalized Intersection Level of Service Definitions Based on Control Delay

Level of Service	Description	Average Delay Per Vehicle (Sec.)
A	Little or no traffic delay	10.0 or less
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	Extreme traffic delays	greater than 50.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* (Washington, D.C., 2000) p17-2.

Intersection Vehicle Queuing Analysis

For selected high-demand movements at the study intersections, the estimated maximum vehicle queues were compared to the existing or planned storage capacity. The queuing analysis is presented for informational purposes only, since the City of Richmond has not defined a policy related to queuing.

The basis of the analysis is as follows: (1) Synchro is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length is compared to the existing or planned available storage capacity for the movement.

For signalized intersections, the 95th percentile queue length value indicates that during the peak hour, a queue of this length or less would occur on 95 percent of the signal cycles or, a queue length larger than the 95th percentile queue would only occur on 5 percent of the signal cycles (about 3 cycles during the peak hour for a signal with a 60-second cycle length). Therefore, left-turn pocket storage designs based on the 95th percentile queue length would ensure that storage space would be exceeded only 5 percent of the time for a signalized movement.

Adverse Intersection Operations Effects

The criteria used to determine intersection operations effects on signalized intersections are based on City of Richmond Level of Service standards.

The project is said to create an adverse effect at a signalized intersection in the City of Richmond if for either peak hour:

1. The level of service at the intersection degrades from an acceptable LOS D or no project conditions to an unacceptable LOS E or F under plus project conditions, or
2. The level of service at the intersection is an unacceptable LOS E or F under no project conditions and the addition of project trips causes the average delay at the intersection to increase by five (5) or more seconds.

The project is said to create an adverse effect at an unsignalized intersection in the City of Richmond if for either peak hour, the operation of an unsignalized study intersection is projected to decline with the addition of project traffic, and if the installation of a traffic signal would be warranted based on the Peak Hour Signal Warrant (Warrant 3) as published in the Manual on Uniform Traffic Control Devices (MUTCD - Caltrans 2012).

Caltrans Facility Operation

Intersections of ramps from I-580 are under the jurisdiction of Caltrans. Under their adopted standards stated in the Guide for the Preparation of Traffic Impact Studies, Caltrans “endeavors to maintain a target LOS at the transition between LOS “C” and LOS “D””. Based on previous studies done in Richmond, it is understood that the standard is to be applied to the overall average intersection delay and not that associated with any single movement or approach.

Contra Costa Transportation Authority (CCTA) and West Contra Costa Transportation Advisory Committee

The CCTA is the County agency established to implement Measure C passed by voters in 1998 and its extension, Measure J, passed in 2004. These measures increased sales tax by one-half percent to fund a list of specific transportation improvement projects in Contra Costa County. Measure C also required the development of a Growth Management Program (GMP) to help control the spread of congestion.

The CCTA serves as the Congestion Management Agency (CMA) for Contra Costa County. CCTA adopted the county's first Congestion Management Program (CMP) in October 1991. The most recent CMP was adopted by CCTA in 2019. The CMP requires an analysis of any project that is expected to generate more than 100 peak hour vehicle trips. Since the project would generate more than 100 peak hour trips, an analysis of CMP facilities in the study area is required.

The Contra Costa Transportation Authority (CCTA) includes several Regional Transportation Planning Committees that cover specific sub-areas of the County. Richmond is within the purview of the West Contra Costa County Transportation Advisory Committee (WCCTAC). The WCCTAC regularly updates the *West County Plan for Routes of Regional Significance*. The Action Plan assesses transportation issues within the West Contra Costa County and outlines a recommended package of goals, objectives and actions for addressing those issues. The latest Action Plan was adopted by the WCCTAC Board in September 2017.

The Action Plan designates Routes of Regional Significance and sets Multi-modal Traffic Service Objectives (MTSOs) for each route. The only Route of Regional Significance near the project site is I-580. The MTSO for I-580 is to maintain a Delay Index of 2.5 or less. Delay Index is defined as the ratio between travel time on a segment of road during congested conditions, and the travel time on the same segment during uncongested, free-flow conditions.

Report Organization

This report has a total of four chapters. Chapter 2 describes the existing roadway network, transit service, bicycle, and pedestrian facilities. Chapter 3 describes the method by which project traffic is estimated, intersection operations analysis for the study scenarios, any adverse intersection traffic effects caused by the project, delay index analysis, intersection vehicle queuing analysis, site access and on-site circulation review, effects on bicycle, pedestrian, and transit facilities, and parking. Chapter 4 presents the conclusions of the transportation analysis.

2. Existing Conditions

This chapter describes the existing conditions for transportation facilities in the vicinity of the site, including the roadway network, transit service, pedestrian and bicycle facilities, and the existing traffic operations at key intersections in the study area.

Existing Roadway Network

Regional access to the project site is provided via Interstate 580 (I-580). Local access to the project site is provided via W. Cutting Boulevard, Canal Boulevard, S. 2nd Street, Hoffman Boulevard, and Harbour Way. These facilities are described below.

I-580 is a six-lane freeway in the vicinity of the site. I-580 extends northward through Marin County and southeastwards to Berkeley where it merges with I-80. Access to and from the site is provided via interchanges at Canal Boulevard and Cutting Boulevard.

W. Cutting Boulevard is a four-lane roadway that runs in an east-west direction south of the project site with a speed limit of 40 mph. There are left turn pockets provided at major intersections, and there is a center turning lane provided between Canal Boulevard and Hoffman Boulevard to access the driveways on both sides of the street. Rail lines going to the Harbor Channel, located south of the project site, cross W. Cutting Boulevard west of Canal Boulevard. Continuous sidewalks are present on both sides of W. Cutting Boulevard west of S. 1st Street and east of Hoffman Boulevard. Between S. 1st Street and Hoffman Boulevard, sidewalk is present only along the north side of the street. Bike lanes are also present on W. Cutting Boulevard west of Hoffman Boulevard. No on-street parking is allowed on the street in the vicinity of the project site. West of Harbour Way, W. Cutting Boulevard is designated as a truck route. W. Cutting Boulevard provides direct access to the project site.

Canal Boulevard is a four-lane arterial that runs in the north-south direction west of the project site with a speed limit of 40 mph. The street has a center median and left turn pockets provided at major intersections. Continuous sidewalks are present on both sides of Canal Boulevard north of W. Cutting Boulevard and on the west side south of W. Cutting Boulevard in the vicinity of the project site. Bike lanes are also present on Canal Boulevard south of W. Cutting Boulevard. No on-street parking is allowed on the street in the vicinity of the project site. South of Garrard Boulevard, Canal Boulevard is designated as a truck route. Canal Boulevard provides direct access to the project site.

S. 2nd Street is a two-lane roadway that runs in the north-south direction east of the project site. South of W. Cutting Boulevard, the street transitions to a driveway. Continuous sidewalks and on-street

parking are present on both sides of the street north of W. Cutting Boulevard. Access to the project site is via W. Cutting Boulevard.

Hoffman Boulevard is a four-lane north-south street segment between W. Cutting Boulevard and Harbour Way S. Left-turn pockets are present at major intersections, continuous sidewalk is present on the east side of the street, and no on-street parking is permitted on the street. Access to the project site is via W. Cutting Boulevard.

Harbour Way is a four lane north-south street east of the project site with a speed limit of 25 mph. Left-turn pockets are present at major intersections, sidewalks are present on both sides of the road, and no on-street parking is permitted on the street in the vicinity of the project site. South of W. Cutting Boulevard, Harbour Way is designated as a truck route. Access to the project site is via W. Cutting Boulevard.

Existing Pedestrian and Bicycle Facilities

Existing Pedestrian Facilities

A complete network of sidewalks is present along the streets in the vicinity of the project site, including along W. Cutting Boulevard and Canal Boulevard. Between S. 1st Street and Hoffman Boulevard, sidewalk is present only along the north side of W. Cutting Boulevard. Marked crosswalks with pedestrian signal heads and push buttons are located at all signalized intersections on at least three legs. The existing curb ramps at some intersections in the vicinity of the project site do not comply with current Americans with Disabilities Act (ADA) guidelines. Overall, the existing network of sidewalks and crosswalks has good connectivity and provides pedestrians with safe routes to the project site.

Existing Bicycle Facilities

The bicycle facilities that exist within one mile of the project site (see Figure 3) include bike paths (Class I), bike lanes (Class II bikeway), bike routes (Class III bikeway), and separated bikeways (Class IV). Bike paths or shared-use paths are facilities with exclusive right of way for bicyclists and pedestrians, away from the roadway and with cross flows by motor traffic minimized. Bike lanes are lanes designated for use by bicycles with special lane marking, pavement legends, and signage. Bike routes are streets shared by bikes and motor vehicles. Separated bikeways are bike lanes with a physical separation between the bikeway and the travel lanes.

Class I bike paths in the study area consist of:

- W. Cutting Boulevard between Garrard Boulevard and Canal Boulevard
- Richmond Greenway Trail that begins to the east of 2nd Street and to the north of Ohio Avenue
- Richmond Parkway between Ohio Avenue and Hensley Street (eastside of street)
- Richmond San Rafael Bridge Path across the Richmond-San Rafael Bridge provides a green route and connects bicyclists between Marin and Contra Costa counties

Class II bike lanes exist on the following roadways:

- W. Cutting Boulevard between Canal Boulevard and Hoffman Boulevard
- Canal Boulevard between W. Cutting Boulevard and Seacliff Drive
- Harbour Way S. between Hoffman Boulevard and San Francisco Bay Trail (westside of street)
- Wright Avenue between Harbour Way S. and Marina Way S.
- Garrard Boulevard between Richmond Avenue and Canal Boulevard (eastside of street)
- Hall Avenue between Harbour Way S. and San Francisco Bay Trail

Class III bike routes exist on the following roadways:

- S. Harbor Way between Hoffman Boulevard and San Francisco Bay Trail (eastside of street)
- Marina Way S. between Wright Avenue and San Francisco Bay Trail

Class IV separated bikeways are provided on the following roadways:

- Garrard Boulevard between W. Cutting Boulevard and Canal Boulevard (westside of street)
- Ohio Avenue between Canal Boulevard and S. 2nd Street (northside of street)

Existing Transit Services

Existing transit service in the study area is provided by Alameda County (AC) Transit (see Figure 4) with connections to Bay Area Rapid Transit (BART) and Amtrak, which provide regional rail service. The following AC Transit bus route (Route 72M) which provides service in the project area is described below. Transit service near the project site is temporarily reduced due to COVID-19 and shelter-in-place.

AC Transit Route 72M runs at 30-minute headways during the AM and PM peak periods between Point Richmond and Jack London Square via Garrard Boulevard near the project site. The closest bus stop for this route is located at the intersection of Garrard Boulevard and W. Cutting Boulevard, approximately 1,500 feet west of the project site.

Bay Area Rapid Transit (BART)

Bay Area Rapid Transit (BART) provides regional rail service throughout the East Bay and across the Bay to San Francisco and the Peninsula. The nearest station is the Richmond BART station, located about 2 miles northeast of the project site. Route 72M provides bus service between the project site and the Richmond BART station via the bus stop located at Garrard Boulevard and W. Cutting Boulevard.

Amtrak

Amtrak provides inter-city rail service throughout California and the country. The Richmond station is located adjacent to the Richmond BART station. The Richmond station is served by the Capitol Corridor line, which operates between San Jose and Sacramento.

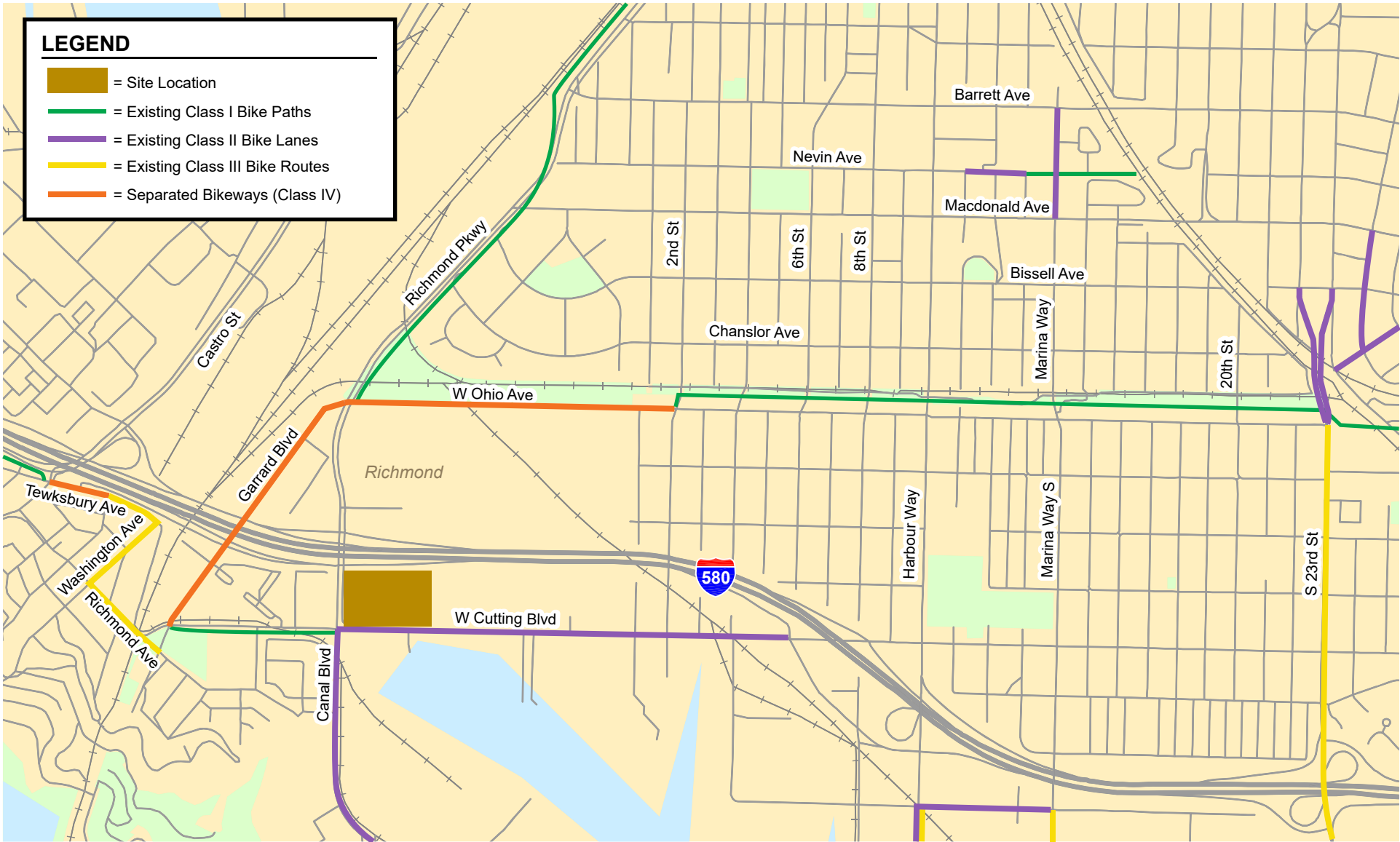


Figure 3
Existing Bicycle Facilities

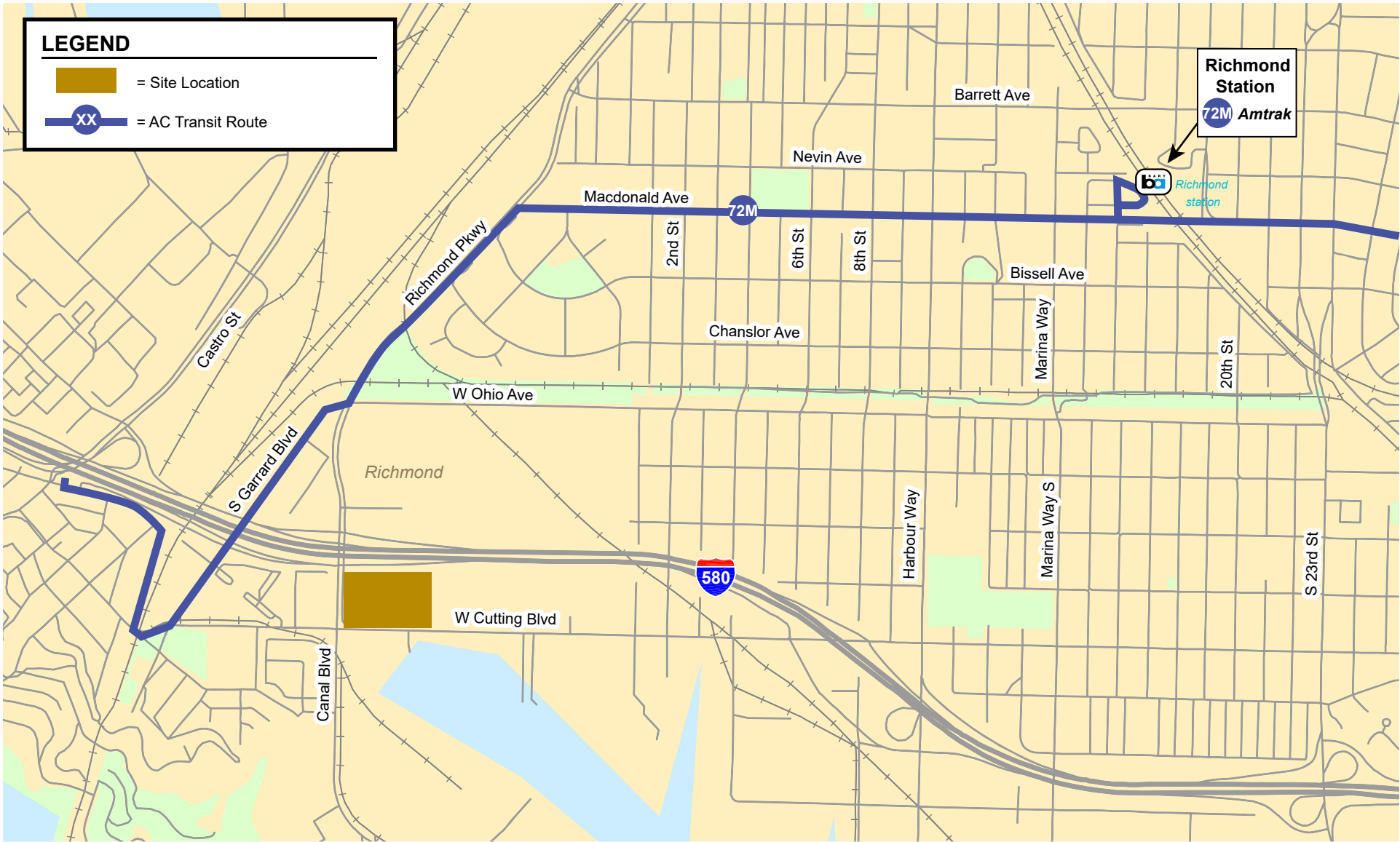


Figure 4
Existing Transit Service

Existing Intersection Lane Configurations

The existing lane configurations at the study intersections are shown on Figure 5.

Existing Traffic Volumes

The existing conditions analysis is based on pre-COVID traffic volumes. Existing traffic volumes for intersections 1 and 2 were obtained from historical turning movement counts conducted in March 2018 as part of other studies. For the CMP intersections 3 and 7, AM and PM peak hour counts conducted in February 2019 for the 2019 Central Contra Costa Transportation Agency (CCCTA) Congestion Management Program (CMP) Monitoring Project were obtained. For intersections 4, 5 and 6, new turning movement counts were conducted in August 2021. These new counts were escalated to pre-pandemic levels by applying a growth factor. The growth factor was derived by comparing the 2019 and 2021 counts at the Canal Boulevard/Cutting Boulevard intersection and Harbour Boulevard/Cutting Boulevard. Further adjustments were made to the escalated traffic volumes based on imbalances in traffic volumes between adjacent intersections. The existing peak-hour intersection volumes are shown in Figure 6. All traffic count data are contained in Appendix A.

Existing Intersection Traffic Operations

Under existing conditions, the analysis shows that all signalized study intersections operate at acceptable levels of service D or better during the AM and PM peak hours except for the intersection of Canal Boulevard and the I-580 eastbound ramps (see Table 3). The analysis shows that the Canal Boulevard/I-580 eastbound ramps intersection operates at an unacceptable LOS E during the PM peak hour.

The analysis shows that the unsignalized intersection of Cutting Boulevard and 2nd Street operates at acceptable levels of service and does not meet the peak hour volume signal warrant. The level of service calculations are provided in Appendix B, and the signal warrant analysis for the intersection of Cutting Boulevard and 2nd Street is provided in Appendix C.

Table 3
Existing Intersection Levels of Service

#	Intersection	Control	Peak Hour	Count Date	Existing	
					Avg. Delay (sec)	LOS
1	Canal Boulevard & I-580 Westbound Ramps ³	Signal	AM	03/27/18	20.1	C
			PM	03/27/18	42.4	D
2	Canal Boulevard & I-580 Eastbound Ramps ³	Signal	AM	03/27/18	28.1	C
			PM	03/27/18	66.6	E
3	Canal Boulevard & Cutting Boulevard * ⁴	Signal	AM	02/28/19	21.9	C
			PM	02/28/19	21.2	C
4	2nd Street & Cutting Boulevard ^{4,5}	Side-Street Stop	AM	09/02/21	18.5	C
			PM	09/02/21	14.3	B
5	Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard ^{3,5}	Signal	AM	08/31/21	14.1	B
			PM	08/31/21	15.0	B
6	I-580 On-Ramp & Cutting Boulevard ^{4,5}	Signal	AM	08/31/21	15.5	B
			PM	08/31/21	4.6	A
7	Harbour Way & Cutting Boulevard * ⁴	Signal	AM	02/28/19	46.7	D
			PM	02/28/19	46.5	D

Notes:

* indicates CMP Intersection

Bold indicates LOS E or LOS F.

¹ For the side-street stop intersection, the average delay is the average delay experienced by the worst movement on the minor street.

² For the signal control intersections, the average delay is the average delay of all vehicles entering the intersection.

³ Level of service based on the Highway Capacity Manual (HCM) 2000 report from Synchro.

⁴ Level of service based on the Highway Capacity Manual (HCM) 6th report from Synchro.

⁵ The volumes at these intersection were adjusted to pre-COVID conditions.

731 W Cutting Boulevard Warehouse Distribution Center TA, Richmond

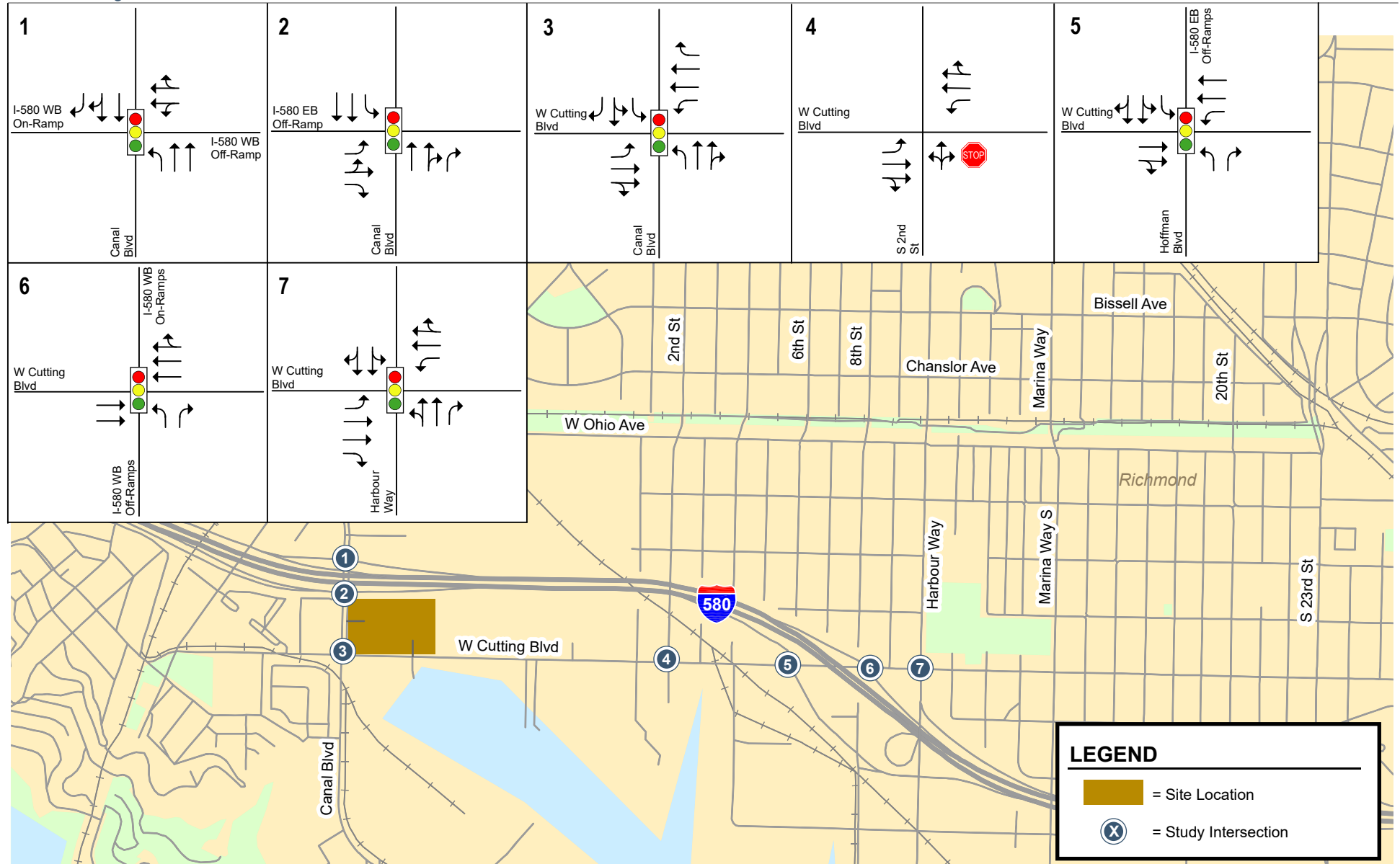


Figure 5
Existing Lane Configurations

731 W Cutting Boulevard Warehouse Distribution Center TA, Richmond

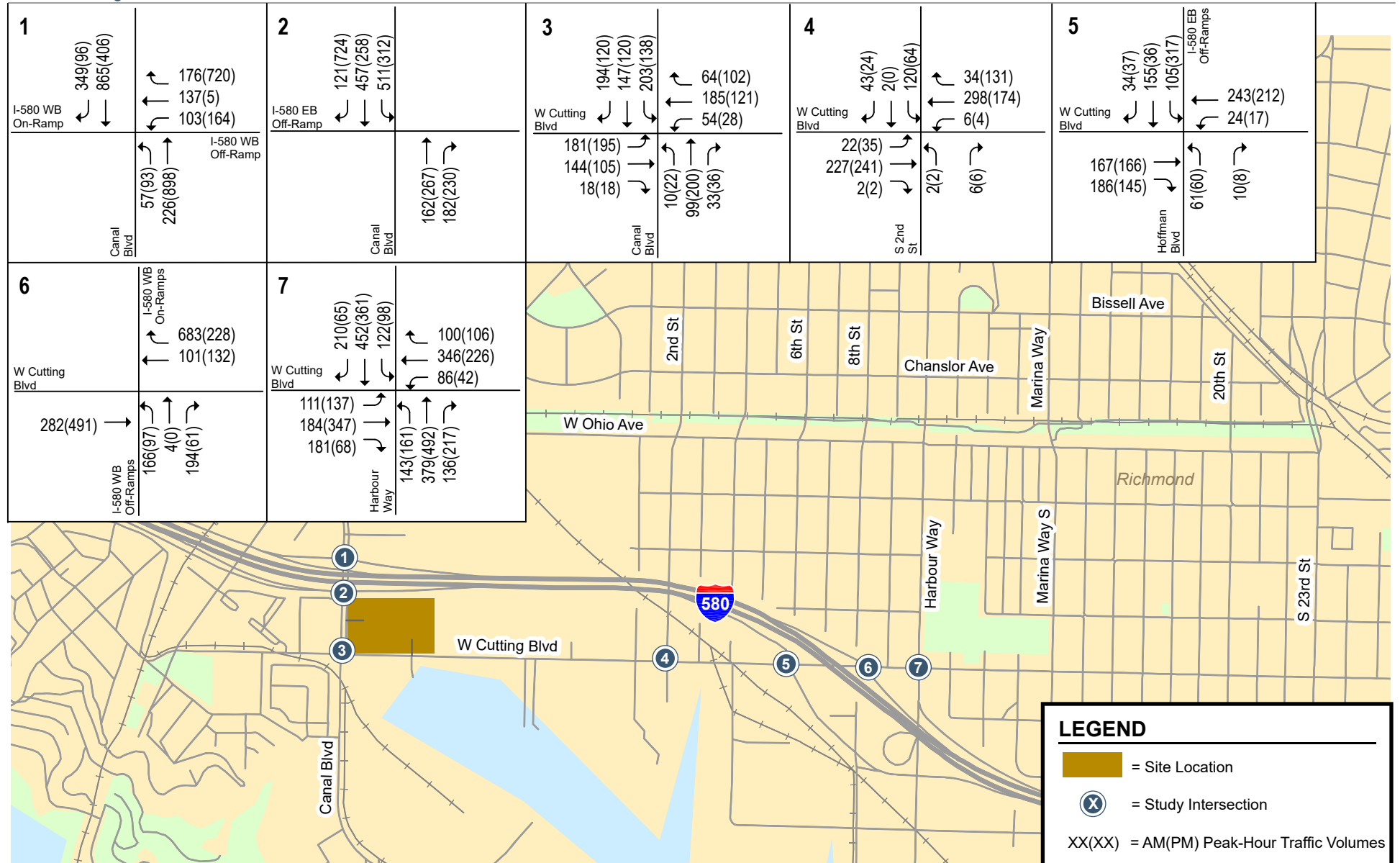


Figure 6
Existing Traffic Volumes

3.

Local Transportation Analysis

This chapter describes the local transportation analysis including the method by which project traffic is estimated, intersection operations analysis for background and cumulative conditions, any adverse intersection traffic effects caused by the project under existing, background and cumulative conditions, intersection vehicle queuing analysis, site access and on-site circulation review, and effects on bicycle, pedestrian, and transit facilities.

Intersection Operations Analysis

The City of Richmond intersection analysis methodology and standards are described in Chapter 1.

Project Trip Estimates

Trip Generation

Vehicle trips generated by the project were estimated using the trip rates published in the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 10th Edition (2017) for "General Office" (Land Use 710) and "High-Cube Fulfillment Center Warehouse (Sort)" (Land Use 155, in ITE Trip Generation Manual, 10th Edition Supplement (Feb 2020)). High-cube fulfillment center warehouses include warehouses characterized by a significant storage function and direct distribution of ecommerce product to end users. Each fulfillment center in the ITE database has been characterized as either sort or non-sort facility. A sort facility is a fulfillment center that ships out smaller items, requiring extensive sorting, typically by manual means and has higher trip generation rates. Currently, the project site is occupied by an industrial use that is not in operation. Therefore, no existing trip credits were applied. Truck trip generation was also estimated to determine the number of trucks utilizing the project site. The truck trip generation estimate was based on a percentage (3%) of total vehicle trips recommended in the ITE Trip Generation Manual. Truck deliveries typically avoid the AM and PM peak hours and thus, these percentages are lower during peak hours.

Table 4 shows that the project would generate 1,020 daily vehicle trips, including 136 trips (111 inbound and 25 outbound) during the AM peak hour and 184 trips (70 inbound and 114 outbound) during the PM peak hour.

Table 4
Project Trips Generation Estimates

	ITE Land Use Code	Size	Daily		AM Peak Hour			PM Peak Hour				
			Rate	Trips	Rate	Trips		Rate	Trips			
						In	Out		Total	In	Out	Total
Proposed Uses												
General Office Building ¹	710	8,995 s.f.	9.74	88	1.16	9	1	10	1.15	2	8	10
High-Cube Fulfillment Center Warehouse (Sort) ²	155	144,763 s.f.	6.44	932	0.87	102	24	126	1.20	68	106	174
Truck Trip Generation ³			3%	28	2%	2	1	3	2%	1	2	3
Passenger Vehicles			97%	904	98%	100	23	123	98%	67	104	171
Net Project Trip				1,020		111	25	136		70	114	184
Notes: s.f. - square feet												
¹ Land Use Code 710: General Office Building (average rates expressed in trips per 1,000 s.f.)												
² Land Use Code 155: High-Cube Fulfillment Center Warehouse (average rates expressed in trips per 1,000 s.f.)												
³ Weighted Average percentage for Truck Trips taken from the <i>ITE Trip Generation Manual, 10th Edition, 2017</i> .												

Trip Distribution and Assignment

The trip distribution pattern for the project was estimated based on existing travel patterns on the surrounding roadway system and the locations of complementary land uses. The peak-hour vehicle trips associated with the project were added to the roadway network in accordance with the trip distribution pattern, the roadway network connections, and the locations of the project driveways. All project trips would enter and exit the project site via a driveway on Canal Boulevard and a driveway on W. Cutting Boulevard. The driveway on Canal Boulevard would primarily be used by employees, and the driveway on W. Cutting Boulevard would primarily be used by trucks. The driveway on Canal Boulevard would be restricted to right-in and right-out movements due to the raised median on Canal Boulevard. The driveway on W Cutting Boulevard would be a full access driveway. Left turns into and out of the project site would be facilitated via the existing center turn lane on W Cutting Boulevard. Trip distribution and trip assignment are shown on Figure 7.

731 W Cutting Boulevard Warehouse Distribution Center TA, Richmond

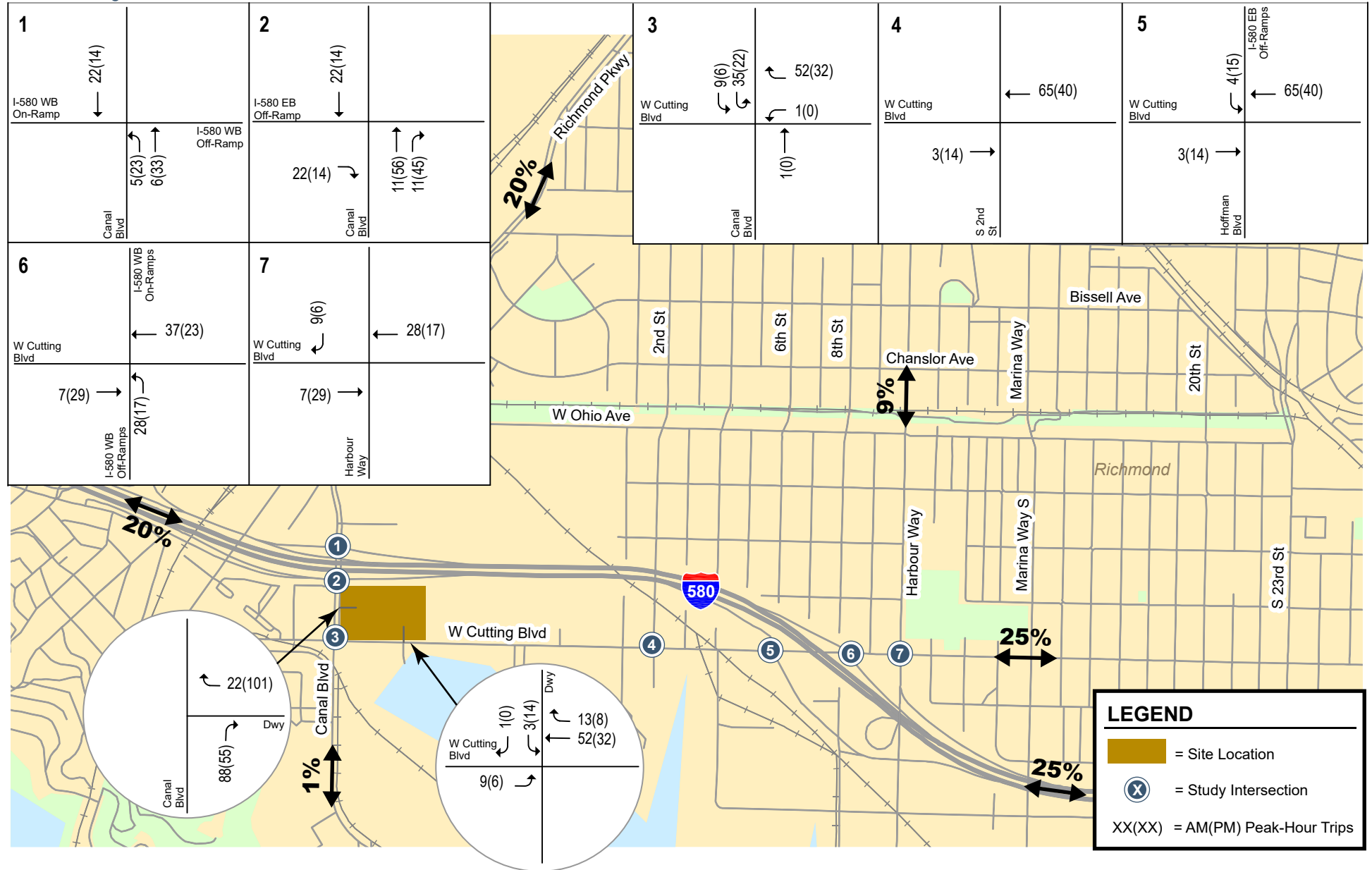


Figure 7
Trip Distribution and Assignment

Roadway Network under Background and Project Conditions

Based on information provided by the City of Richmond, the City's "Cutting & Harbour Way South Bikeways Project" will be constructed in the fall of 2021. The bikeway project will construct a Class IV protected two-way cycle track with a buffer on the south side of W. Cutting Boulevard between S Garrard Boulevard and Hoffman Boulevard, continuing on Hoffman to Harbour Way South, and on Harbour Way South to the end of the road near the Richmond Ferry terminal. A new sidewalk next to the cycle track where it is currently missing will be constructed. In order to accommodate the cycle track, the eastbound travel lanes on Cutting Boulevard will be reduced from 2 lanes to 1 lane. On Hoffman, the existing three or four travel lanes will be converted to one in each direction with a center turn lane. The following changes to the lane configurations were assumed under background conditions based on the interim improvements identified on Cutting Boulevard in the *Richmond Ferry to Bridge to Greenway Complete Streets Plan*.

- W Cutting Blvd/Canal Blvd
 - o Eastbound approach – 1 left-turn and 1 shared through-right lane
 - o Southbound approach – 1 left-turn, 1 through, 1 right-turn lane
- W Cutting Blvd/2nd St
 - o Eastbound approach – 1 left-turn and 1 shared through-right lane
- W Cutting Blvd/Hoffman Blvd
 - o Southbound approach – 1 left-turn, 1 shared left-through lane and one right-turn lane

Traffic Volumes under Background and Project Conditions

Background peak hour traffic volumes were estimated by adding to existing volumes the estimated traffic from approved but not yet constructed developments. The following approved but not yet constructed projects were considered under background conditions:

- Richmond Power Plant (207,700 s.f. building space consisting of a greenhouse, café/restaurant, offices and conference room, nursery and processing center on the northwest corner of Goodrick Avenue and Richmond Parkway)
- One West Barrett Avenue (125,000 s.f. warehouse with 4,685 s.f. administration building on the northeast corner of A Street and West Barrett Avenue)
- Quarry Residential (200 condominiums at 1135 Canal Boulevard, south of Canal Boulevard and Seacliff Drive)
- Terminal One Residential (334 dwelling units including 26 townhomes and 308 multifamily condominium flats at 1500 Dornan Drive, southeast of Dornan Drive and Brickyard Cove)

The added traffic from approved but not yet constructed developments was obtained from the traffic impact analysis reports prepared for these projects (included in Appendix D). Background traffic volumes are shown on Figure 8.

Project trips were added to background traffic volumes to obtain background plus project traffic volumes (see Figure 9).

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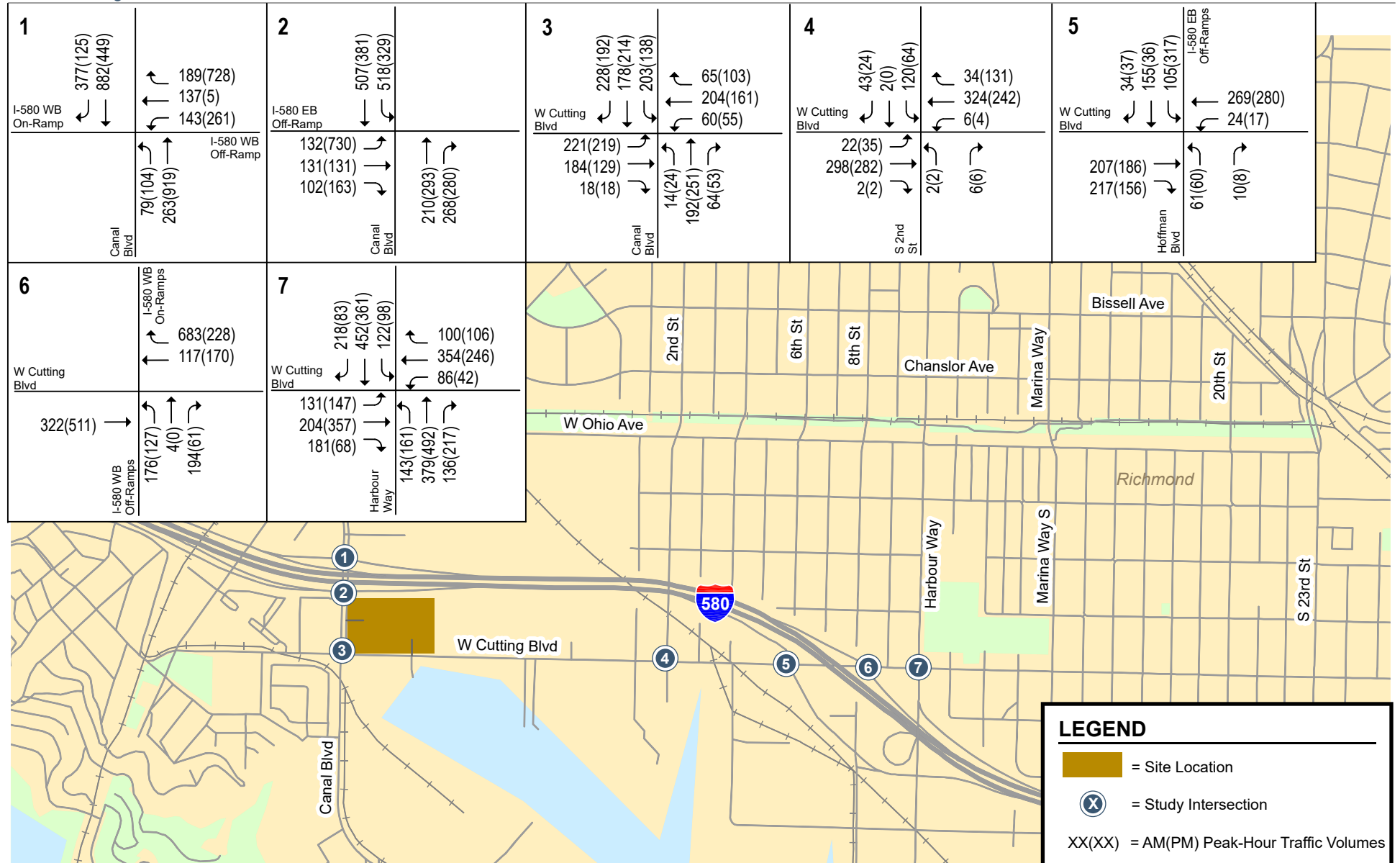


Figure 8
Background Traffic Volumes

731 W Cutting Boulevard Warehouse Distribution Center TA, Richmond

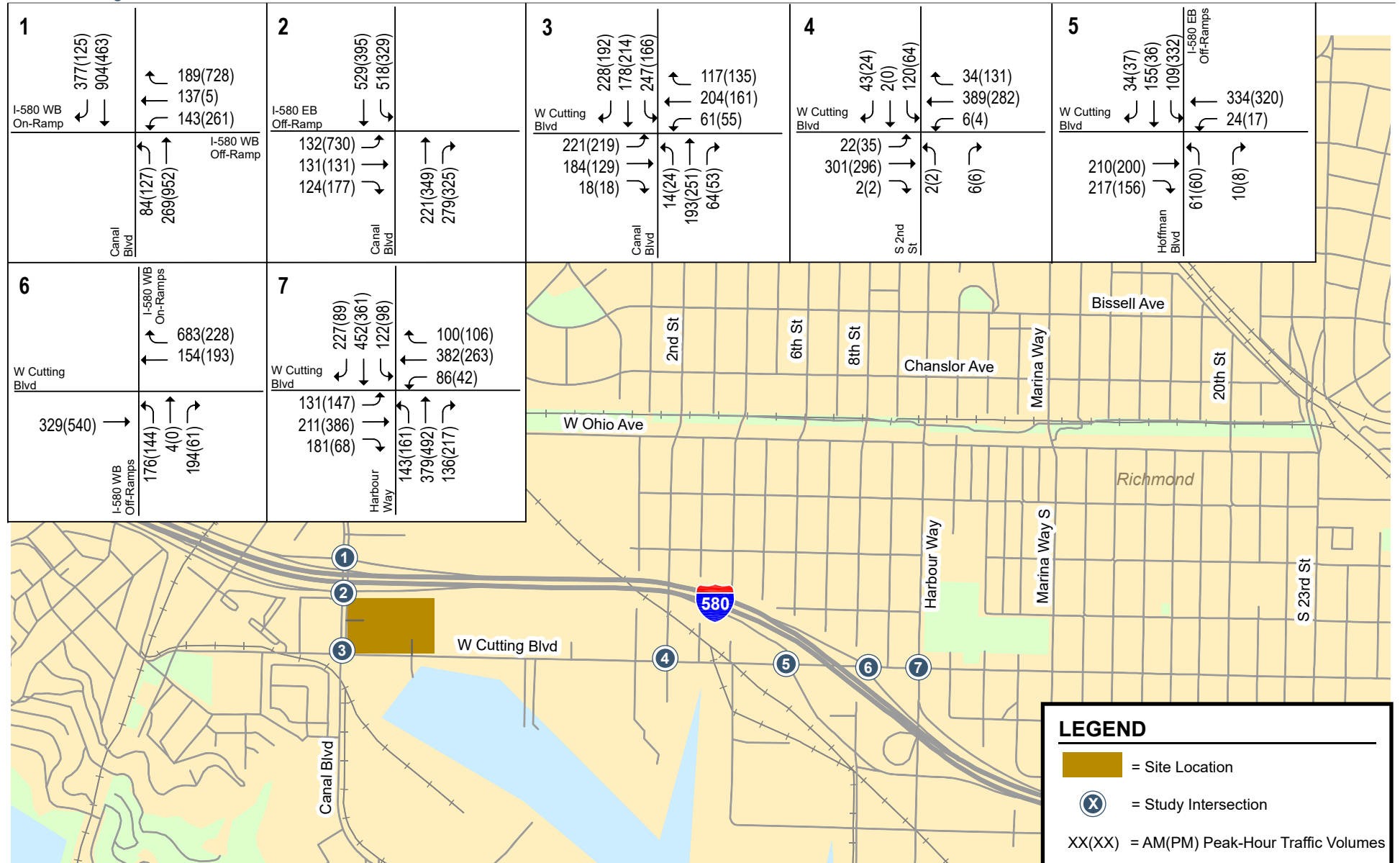


Figure 9
Background Plus Project Traffic Volumes

Intersection Traffic Operations under Background and Project Conditions

Intersection traffic operations at the study intersections were evaluated against the City of Richmond level of service standard (LOS D). The results of the intersection level of service analysis (see Table 5) shows that most of the signalized intersections would operate at an acceptable level of service, LOS D or better, during the AM and PM peak hours under background and background plus project conditions.

The analysis shows that at some intersections, where the project would add trips to non-critical movements, the average delay under project conditions would slightly improve compared to no-project conditions. This occurs because the intersection delay is a weighted average of all intersection movements and the addition of project traffic to movements with delays lower than the average intersection delay (such as right turns) can pull the average delay for the entire intersection lower. The following two intersections would not meet the standard under background conditions.

- Canal Boulevard/I-580 WB Ramps (LOS E during the PM peak hour under background and background plus project conditions)
- Canal Boulevard/I-580 EB Ramps (LOS E during the PM peak hour under background and background plus project conditions)

The I-580 ramp intersections along Canal Boulevard would operate at unacceptable LOS E during the PM peak hour under background conditions. With the added traffic from the proposed project, both the ramp intersections would continue to operate at unacceptable LOS E during the PM peak hour, but the project would not increase the average delay by more than 5 seconds at either intersection. Thus, the project would not have an adverse effect on the traffic operations at the Canal Boulevard and I-580 ramp intersections, as defined by the City of Richmond.

At the unsignalized intersection of W Cutting Boulevard/2nd Street, the project would increase the delay for the worst movement (southbound approach) from 30 seconds without the project to 37 seconds with the project and from 20 seconds without the project to 22 seconds with the project during the AM and PM peak hours, respectively. However, the intersection would not meet the peak hour signal warrant under background or background plus project conditions. Thus, the project would not have an adverse effect at this intersection.

The intersection level of service calculation sheets are included in Appendix B.

Table 5
Background Plus Project Intersection Levels of Service

#	Intersection	Control	Peak Hour	Background		Background plus Project		
				Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	Incr. in Avg. Delay
1	Canal Boulevard & I-580 Westbound Ramps ³	Signal	AM	21.2	C	20.8	C	-0.4
			PM	61.8	E	63.3	E	1.5
2	Canal Boulevard & I-580 Eastbound Ramps ³	Signal	AM	27.5	C	27.6	C	0.1
			PM	65.4	E	64.2	E	-1.2
3	Canal Boulevard & Cutting Boulevard * ⁴	Signal	AM	28.8	C	30.7	C	1.9
			PM	28.3	C	30.3	C	2.0
4	2nd Street & Cutting Boulevard ⁴	Side-Street Stop	AM	29.5	D	36.8	E	7.3
			PM	19.9	C	22.1	C	2.2
5	Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard ^{3,5}	Signal	AM	15.7	B	15.4	B	-0.3
			PM	15.3	B	15.3	B	0.0
6	I-580 On-Ramp & Cutting Boulevard ⁴	Signal	AM	15.2	B	15.2	B	0.0
			PM	4.9	A	5.1	A	0.2
7	Harbour Way & Cutting Boulevard * ⁴	Signal	AM	49.8	D	50.0	D	0.2
			PM	47.7	D	47.4	D	-0.3

Notes:

* indicates CMP Intersection

Bold indicates LOS E or LOS F.

¹ For the side-street stop intersection, the average delay is the average delay experienced by the worst movement on the minor street.

² For the signal control intersections, the average delay is the average delay of all vehicles entering the intersection.

³ Level of service based on the Highway Capacity Manual (HCM) 2000 report from Synchro.

⁴ Level of service based on the Highway Capacity Manual (HCM) 6th report from Synchro.

Roadway Network under Cumulative and Project Conditions

The lane configurations at the study intersections under cumulative conditions were assumed to be the same as under the background conditions.

Traffic Volumes under Cumulative and Project Conditions

Cumulative AM and PM peak hour volumes were developed using the Contra Costa Transportation Authority (CCTA) Travel demand Model based on the 2040 land use data. The Furness technique, which estimates future intersection turning movement volumes based on comparing existing traffic counts and the model results, was used to develop the 2040 AM and PM peak hour intersection turning movement volumes. The cumulative traffic volumes are shown in Figure 10, and the cumulative plus project traffic volumes are shown on Figure 11.

Intersection Traffic Operations under Cumulative and Project Conditions

Intersection traffic operations at the study intersections were evaluated against the City of Richmond level of service standard (LOS D). The results of the intersection level of service analysis (see Table 6) show that some of the signalized intersections would operate at an acceptable level of service, LOS D or better, during the AM and PM peak hours under cumulative and cumulative plus project conditions. The following intersections would not meet the standard.

- Canal Boulevard/I-580 WB Ramps (LOS F during the PM peak hour under cumulative and cumulative plus project conditions)
- Canal Boulevard/I-580 EB Ramps (LOS F during the PM peak hour under cumulative and cumulative plus project conditions)
- Harbour Way/Cutting Boulevard (LOS E during the PM peak hour under cumulative and cumulative plus project conditions)

The I-580 ramp intersections along Canal Boulevard would operate at an unacceptable LOS F during the PM peak hour under cumulative conditions. With the added traffic from the proposed project, both the ramp intersections would continue to operate at an unacceptable LOS F during the PM peak hour, but the project would not increase the average delay by more than 5 seconds at either intersection. Thus, the project would not have an adverse effect on the traffic operations at the Canal Boulevard and I-580 ramp intersections. The signalized intersection of Harbour Way/Cutting Boulevard would operate at LOS E during the PM peak hour under cumulative no project conditions. With the addition of project trips, this intersection would continue to operate at an unacceptable LOS E, but the project would not increase the average intersection delay by more than 5 seconds. Thus, the project would not have an adverse effect on the traffic operations at the Harbour Way/Cutting Boulevard intersection.

At the unsignalized intersection of W Cutting Boulevard/2nd Street, the project would increase the delay for the worst movement (southbound approach) from 48 seconds without the project to 66 seconds with the project and from 28 seconds without the project to 32 seconds with the project during the AM and PM peak hours, respectively. It should be noted that vehicles making left turns could use the median to make a two-step turn movement, which should result in much less delay. The intersection would not meet the peak hour signal warrant under cumulative or cumulative plus project conditions. Thus, the project would not have an adverse effect at this intersection under cumulative conditions.

The intersection level of service calculation sheets are included in Appendix B.

731 W Cutting Boulevard Warehouse Distribution Center TA, Richmond

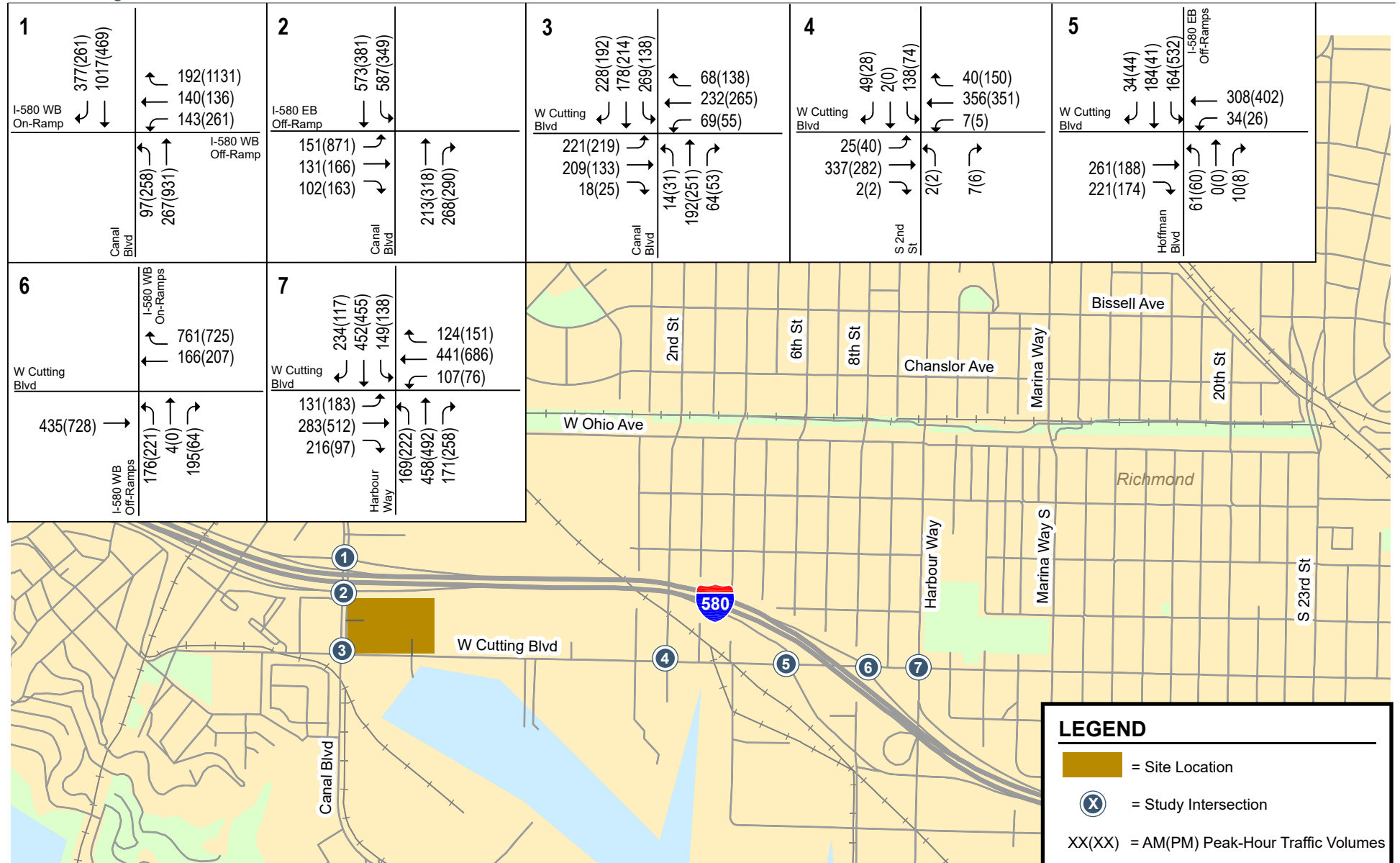


Figure 10
Cumulative Traffic Volumes

731 W Cutting Boulevard Warehouse Distribution Center TA, Richmond

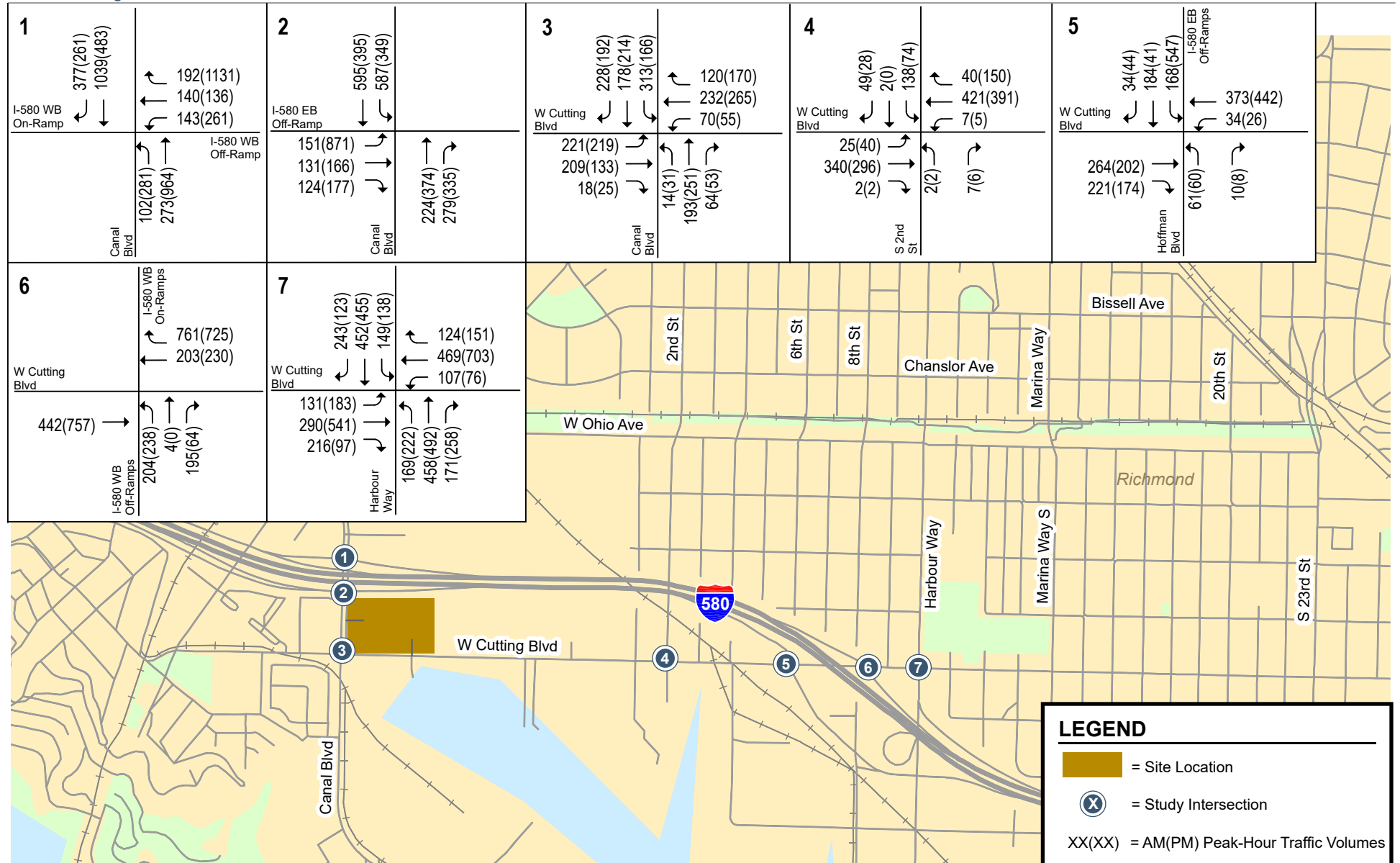


Figure 11
Cumulative Plus Project Traffic Volumes

Table 6
Cumulative Plus Project Intersection Levels of Service

#	Intersection	Control	Peak Hour	Cumulative		Cumulative plus Project	
				Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS
1	Canal Boulevard & I-580 Westbound Ramps ³	Signal	AM	22.4	C	22.4	C
			PM	>120	F	>120	F
2	Canal Boulevard & I-580 Eastbound Ramps ³	Signal	AM	28.0	C	28.3	C
			PM	>120	F	>120	F
3	Canal Boulevard & Cutting Boulevard * ⁴	Signal	AM	26.1	C	27.6	C
			PM	31.5	C	33.4	C
4	2nd Street & Cutting Boulevard ⁴	Side-Street Stop	AM	47.5	E	65.7	F
			PM	28.0	D	32.3	D
5	Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard ^{3,5}	Signal	AM	16.9	B	17.6	B
			PM	18.5	B	18.5	B
6	I-580 On-Ramp & Cutting Boulevard ⁴	Signal	AM	21.4	C	21.5	C
			PM	7.8	A	8.1	A
7	Harbour Way & Cutting Boulevard * ⁴	Signal	AM	53.7	D	54.1	D
			PM	61.4	E	62.0	E

Notes:
 * indicates CMP Intersection
Bold indicates LOS E or LOS F.

¹ For the side-street stop intersection, the average delay is the average delay experienced by the worst movement on the minor street.
² For the signal control intersections, the average delay is the average delay of all vehicles entering the intersection.
³ Level of service based on the Highway Capacity Manual (HCM) 2000 report from Synchro.
⁴ Level of service based on the Highway Capacity Manual (HCM) 6th report from Synchro.

CMP Evaluation

Based on the 2017 *West County Action Plan for Routes of Regional Significance*, the only Route of Regional Significance near the project is I-580. The established MTSO for I-580 is to maintain a Delay Index of 2.5 or less. CCTA regularly monitors the values of the MTSOs defined by all of the subregions in their Action Plans for Routes of Regional Significance. The most recent monitoring effort was conducted in early 2013. CCTA also developed the 2040 forecasts by applying the CCTA regional travel demand model. Table 7 below summarizes the Delay Index for I-580 eastbound and westbound based on observations conducted in 2013 and future forecasts for 2040. The 2040 AM Delay Index on both I-580 eastbound and westbound is 1.2, and the 2040 PM Delay Index is 1.6 and 1.3 on I-580 eastbound and westbound, respectively, which are all well below the acceptable threshold of 2.5.

Table 7
Delay Index on CMP Routes

West County Freeway MTSO Values I-580 Freeway Analysis – Delay Index									
Direction	MTSO Delay Index	2013 Observations				2040 Forecasts			
		Speed (mph)		Delay Index		Speed (mph)		Delay Index	
		AM	PM	AM	PM	AM	PM	AM	PM
EB	2.5	55	51	1.2	1.3	52	41	1.2	1.6
WB	2.5	58	58	1.1	1.1	52	50	1.2	1.3

Source: - West County Action Plan for Routes of Regional Significance, September 2017

Table 8 shows the number of vehicle trips on I-580 attributed to the project. Since the project would add trips equal to less than 1% of the freeway capacity, the project would not have a considerable effect on the 2040 forecasted AM and PM peak hour congested speeds and thus would not change the Delay Index. The proposed project would not have an adverse effect on the Routes of Regional Significance in the study area.

Table 8
I-580 Freeway Analysis

Freeway	Segment	Direction	Peak Hour	Existing Conditions		Project Trips	
				Mixed-Flow Lanes		Mixed-Flow	
				# of Lanes	Capacity (vph)	Volume	% Capacity
I-580	Castro/Marine Street to Canal Boulevard	EB	AM	3	6900	22	0.3%
			PM	3	6900	14	0.2%
I-580	Canal Boulevard to Castro/Marine Street	WB	AM	3	6900	5	0.1%
			PM	3	6900	23	0.3%
I-580	Canal Boulevard to Cutting Boulevard	EB	AM	3	6900	11	0.2%
			PM	3	6900	45	0.7%
I-580	Cutting Boulevard to Marina Bay Parkway	EB	AM	3	6900	11	0.2%
			PM	3	6900	45	0.7%
I-580	Marina Bay Parkway to Cutting Boulevard	WB	AM	3	6900	28	0.4%
			PM	3	6900	17	0.2%

Notes:
Freeway capacity of 2,300 vehicles per hour per lane was assumed.

Vehicle Queuing Analysis

The operations analysis is based on vehicle queuing for left turning movements where the project would add at least 10 new peak-hour trips (see Table 9). For locations where the project would add at least 10 new peak-hour trips, the 95th percentile queue from Synchro is reported. The following turn movements were examined as part of the queuing analysis for this project:

- Northbound left turn at Canal Boulevard & I-580 westbound ramps
- Southbound left turn at Canal Boulevard & W. Cutting Boulevard
- Southbound left turn at Hoffman Boulevard/I-580 off-ramp & W. Cutting Boulevard
- Northbound left turn at I-580 on-ramp & W. Cutting Boulevard

The analysis shows that the increase in vehicular queues attributed to the project at these locations would be accommodated within the available turn pockets. The project would not cause any significant queueing issues at any of the study intersections.

Table 9
Intersection Vehicle Queuing Analysis Results

Intersection	Movement	Peak Period	Storage Length (ft)	Existing	Background	Background Plus Project	
				95th Percentile Queue (feet) ^{1,2}	95th Percentile Queue (feet) ^{1,2}	Percentile Queue (feet) ^{1,2}	Estimated Incr. in 95th Percentile Queue (feet)
1 Canal Boulevard & I-580 Westbound Ramps	NB LT	AM	200	75	100	100	0
		PM	200	150	150	200	50
3 Canal Boulevard & Cutting Boulevard	SB LT/ SB TH	AM	450	125	175	225	50
		PM	450	100	175	175	0
5 Hoffman Boulevard/I-580 Off-Ramp & Cutting Boulevard	SB LT	AM	330	75	75	75	0
		PM	330	125	125	150	25
6 I-580 On-Ramps & Cutting Boulevard	NB LT	AM	440	50	50	75	25
		PM	440	25	50	50	0

Notes:
 NB = northbound; SB = southbound
 LT = left turn movement; TH = through movement
¹ Based on 95th percentile queue reported by Synchro software.
² Queue lengths rounded to nearest 25 feet.

Site Access and Circulation

The site access and circulation evaluation is based on the April 30, 2021 site plan prepared by HPA Architecture. Site access and on-site vehicular circulation were reviewed in accordance with generally accepted traffic engineering standards.

Site Access

Access to the project site would be provided via one driveway on Canal Boulevard and one driveway on W. Cutting Boulevard. The driveway on Canal Boulevard would provide direct access to the employee parking lot and would primarily be used by employees. This driveway would be restricted to right turns entering and exiting the site due to the raised median on Canal Boulevard. The driveway on W. Cutting Boulevard would be located on the far eastern portion of the site and would primarily be used by trucks entering and exiting the site. This driveway would provide full access to vehicles entering and exiting the site. Left turns into and out of the site would be facilitated via the center turn lane on W. Cutting Boulevard. The center turn lane on W. Cutting Boulevard provides only 60 feet of storage and would not be adequate to accommodate large trucks turning into the site. In order to provide adequate storage, it is recommended that the center turn lane be extended by approximately 150 feet by cutting into the landscaped median on W. Cutting Boulevard.

Project Driveway Design

Currently, there are 3 driveways on-site: 2 located on W. Cutting Boulevard and 1 located on Canal Boulevard. The project proposes to remove the western most driveway on W. Cutting Boulevard and retain the eastern most driveway. The Canal Boulevard driveway will have its width reduced. According to the site plan, the W. Cutting Boulevard driveway is shown to be 40 feet wide, which meets the 40-foot maximum width identified by City guidelines for two-way driveways. The Canal Boulevard driveway is shown to be 26 feet, which meets the 24-foot minimum width identified by City guidelines for two-way driveways. Therefore, the project driveway design is adequate.

Sight Distance at Project Driveways

The proposed driveway locations were evaluated to determine if the sight distance at the driveways would be adequate. The project driveways should be free and clear of any obstructions to optimize sight distance, thereby ensuring that exiting vehicles can see pedestrians on the sidewalk and other vehicles traveling on adjacent roadways. Any landscaping and signage should be located in such a way as to ensure an unobstructed view for drivers entering and exiting the site. Adequate sight distance reduces the likelihood of a collision at driveways and provides drivers with the ability to locate sufficient gaps in traffic to exit a driveway. Sight distance of a driveway is evaluated based on the stopping sight distance recommended by Caltrans for a given design speed. For the driveway on W. Cutting Boulevard, which has a posted speed limit of 40 mph, the Caltrans stopping sight distance is 300 feet. Therefore, a driver must be able to see 300 feet to the east to locate a sufficient gap to turn out of the driveway. As shown on the site plan, the project proposes no tall vegetation or objects that would block a driver's ability to see 300 feet down the street on W. Cutting Boulevard. On-street parking is prohibited along the project frontage on W. Cutting Boulevard. Therefore, sight distance would be adequate.

For the driveway on Canal Boulevard, which has a posted speed limit of 35 mph, the Caltrans stopping sight distance is 250 feet. Since drivers exiting on Canal Boulevard can only turn right due to the median, a driver must be able to see 250 feet to the south to locate a sufficient gap to turn out of the driveway. As shown on the site plan, the project proposes no tall vegetation or objects that would block a driver's ability to see 250 feet down the street on Canal Boulevard. On-street parking is prohibited along the project frontage on Canal Boulevard. Therefore, sight distance would be adequate.

Project Driveway Operations

The proposed driveways on Canal Boulevard and W. Cutting Boulevard would be stop controlled. The total number of vehicles that would access the driveway on Canal Boulevard would be 107 (85 inbound and 22 outbound) during the AM peak hour and 156 (55 inbound and 101 outbound) during the PM peak hour. The total number of vehicles that would access the driveway on W. Cutting Boulevard would be 26 (22 inbound and 4 outbound) during the AM peak hour and 28 (14 inbound and 14 outbound) during the PM peak hour.

A micro simulation analysis using SimTraffic software was conducted to analyze the driveway operations. The simulation analysis showed that at the Canal Boulevard driveway, the average delay for traffic exiting onto Canal Boulevard would be 3.1 seconds during the AM peak hour and 5 seconds during the PM peak hour under background plus project conditions. The maximum queue exiting the driveway would be 2 vehicles during the AM peak hour and 3 vehicles during the PM peak hour.

At the W. Cutting Boulevard driveway, the simulation analysis showed an average delay of 5.8 seconds and 6.8 seconds during the AM and PM peak hour, respectively, for traffic exiting the project site. The maximum queue exiting the driveway would be 1 vehicle during the AM peak hour and 3 vehicles during the PM peak hour.

No significant on-site queueing is anticipated at the project driveways under background plus project conditions.

Under cumulative plus project conditions, the simulation analysis showed that the northbound traffic queue on Canal Boulevard at the I-580 eastbound ramp intersection (from the northbound left-turn movement at the downstream intersection of I-580 westbound ramps) would extend past the proposed project driveway on Canal Boulevard during the PM peak hour, and traffic exiting the project site

towards I-580 westbound would experience long delays. Therefore, it is recommended that the proposed driveway on Canal Boulevard be moved farther south and connect to the south end of the proposed parking lot. It is also noted that the driveway on Canal Boulevard and the driveway on W. Cutting Boulevard would be connected via an internal drive isle, and should project traffic experience long delay exiting onto Canal Boulevard under future conditions, vehicles would likely drive internally from the employee parking lot and use the driveway on W. Cutting Boulevard to exit the project site.

On-Site Circulation

On-site vehicular circulation was reviewed in accordance with generally accepted traffic engineering standards. Employee parking would be provided along the western and northern ends of the project site, and truck parking would be provided at the eastern end of the project site. Internal access between the driveway on Canal Boulevard and the driveway on Cutting Boulevard would be provided via the drive aisles in the employee and truck parking lots.

The project would provide 90-degree parking within the proposed project site. The City's standard minimum width for two-way drive aisles is 24 feet wide where 90-degree parking is provided. According to the site plan, the drive aisles throughout the parking garage measure 26 feet wide at the western and northern ends of the project site and 72 feet wide at the eastern end of the project site. This would provide sufficient space for trucks and vehicles to enter and exit the site. Overall, the proposed site plan would provide adequate vehicular circulation and connectivity through the parking areas.

Parking Stall Dimensions

The City of Richmond Off-Street Parking Design Standards require that standard 90-degree parking stalls be a minimum of 8.5 feet wide by 18 feet long and compact-size parking stalls be 8 feet wide by 16 feet long. The site plan shows the standard parking stalls would be 9 feet wide and 18 feet long, and the ADA and van accessible parking spaces would be 9 feet wide by 20 feet long, meeting the City of Richmond's requirements. The compact spaces would be 9 feet wide by 16 feet long, which also meets the City's standard.

Garbage Collection

The site plan shows the trash enclosure area to be located at the northeast corner of the project site with access from W. Cutting Boulevard (see Figure 2). Garbage collection activities for the project are expected to occur on-site. It is expected that garbage collection would occur during the off-peak hours. The site plan shows adequate truck access to the trash enclosure via the 40-foot driveway on W. Cutting Boulevard. The site provides adequate turning movement for trucks to enter and exit the project site.

Emergency Vehicle Access

The City of Richmond Fire Code requires driveways to provide at least 20 feet width for fire access. The project driveways would measure between 26 feet wide and 40 feet wide, and the drive aisles would measure between 26 feet wide and 72 feet wide. The City of Richmond Fire Department requires that all portions of the buildings be within 150 feet of a fire department access road and requires a minimum of 10 feet clearance from the property line along all sides of the buildings. Prior to final design, the applicant should ensure that the project driveways and property line clearance comply with the City of Richmond Fire Code.

Pedestrian, Bicycle and Transit Facilities

All new development projects in Richmond should encourage multi-modal travel, consistent with the goals of the City's General Plan. It is the goal of the General Plan that all development projects accommodate and encourage the use of non-automobile transportation modes. In addition, the adopted City Bike Master Plan establishes goals, policies, and actions to make bicycling a daily part of life in Richmond. The Bike Master Plan includes designated bike lanes along City streets, as well as on designated bike corridors. In order to further the goals of the City, pedestrian and bicycle facilities should be encouraged with new development projects.

Pedestrian and Bicycle Facilities

Currently, there are existing sidewalks along the streets in the vicinity of the project site. The project would maintain the existing sidewalks on Canal Boulevard and W. Cutting Boulevard along its frontages. Between S. 1st Street and Hoffman Boulevard, sidewalk is present only along the north side of W. Cutting Boulevard. Marked crosswalks with pedestrian signal heads and push buttons are located at all signalized intersections on at least three legs. Overall, the existing network of sidewalks and crosswalks has good connectivity and provides pedestrians with safe routes to the project site.

According to the site plan, the project proposes to retain the existing 40-foot eastern driveway on W. Cutting Boulevard and remove the existing western driveway on W. Cutting Boulevard. The proposed project would also reduce the existing 90-foot driveway on Canal Boulevard to 26 feet. The elimination of the one driveway on W. Cutting Boulevard and a reduction in driveway width on Canal Boulevard would reduce pedestrian exposure to traffic, which would be an improvement in pedestrian facilities over existing conditions. The site plan also shows good connectivity within the project site. There are pedestrian facilities that connect the sidewalks to the project building at the southeast corner and the parking areas at the west and north ends. There is also an adequate walking path from the building to the trash enclosure at the northeast corner of the project site. The curb ramps at the intersection of Canal Boulevard and Cutting Boulevard are not compliant with current American Disability Act (ADA) design standards. Thus, it is recommended that the project upgrade the existing curb ramps on the northeast corner of the Canal/Cutting intersection to match current ADA standards.

There are existing bike lanes on W. Cutting Boulevard and Canal Boulevard in the vicinity of the project site. There are bike lanes on W. Cutting Boulevard between Canal Boulevard and Hoffman Boulevard and Canal Boulevard between W. Cutting Boulevard and Seacliff Drive.

There are plans to provide additional bike lanes via the "Cutting & Harbour Way South Bikeways Project." The goal of the plan is to connect the Richmond Ferry Terminal to Point Richmond and the Richmond/San Rafael Bridge bike/pedestrian path. The plan consists of installing a protected Class IV two-way cycle track on the south side of W. Cutting Boulevard between S. Garrard Boulevard and Hoffman Boulevard, continuing on Hoffman Boulevard to Harbour Way S., and on Harbour Way S. to the south end of the road. This planned cycle track would improve bicycle access to the site. The two-way cycle track would be constructed by reducing the eastbound lanes on W. Cutting Boulevard from two lanes to one lane. Since the cycle track would not affect the westbound travel lanes on W. Cutting Boulevard, the project site plan would be compatible with the proposed cycle track on the south side of W. Cutting Boulevard.

Transit Service

The AC Transit Route 72M serves the immediate vicinity of the project with approximately 30-minute headways during the AM and PM peak commute hours. The closest bus stop to the project site is located at the intersection of Garrard Boulevard and W. Cutting Boulevard, approximately 1,500 feet

west of the project site. There are sidewalks along W. Cutting Boulevard that provide connectivity to the bus stop.

Construction Activities

Typical activities related to the construction of any development could include lane narrowing and/or lane closures and sidewalk closures. In the event of any type of street closure, clear signage (e.g., closure and detour signs) must be provided to ensure vehicles, pedestrians and bicyclists are able to adequately reach their intended destinations safely. The project would be required to submit a construction management plan for City approval that addresses schedule, closures/detours, staging, parking, and truck routes.

Parking

Vehicular Parking

Parking provided on the site was evaluated based on the City of Richmond parking standards (Richmond Municipal Code Chapter 15.04.607, Table 15.04.607.040). Per the zoning Code, the required number of parking spaces for warehousing/storage and distribution is 0.5 spaces per 1,000 square feet. The site plan shows that the project would provide parking at a rate of 0.75 spaces per 1,000 square feet. Parking for the office component would be provided at the rate of 3 spaces per 1,000 square feet. The project would provide a total of 137 spaces for the 144,763 square feet warehouse and 8,995 square feet of office space, which exceeds the City's parking requirement for warehousing and matches the requirement for light industrial uses. The project is also required to provide ADA parking spaces on-site. According to the Richmond Municipal Code, the project is required to provide 5 ADA parking spaces, based on the 137 spaces. The site plan shows that 5 ADA parking spaces would be provided on the west side of the project site. The vehicle parking spaces would be located at the western and northern sides of the project site. In addition, the project is proposing to provide 40 trailer parking spaces on the eastern side of the project site.

Bicycle Parking

The project is required to provide 1 short-term bicycle space and 1 long-term bicycle space per 20 auto vehicle parking spaces for the warehouse component of the project. The project also must provide the greater of 1 short-term bicycle space per 10,000 square feet or 4, and the greater of 1 long-term bicycle space per 2,000 square feet or 4 for the office component of the project. Therefore, the project is required to provide 5 short-term spaces and 5 long-term bicycle spaces for the warehouse component and 4 short-term bicycle spaces and 4 long-term bicycle spaces for the office component. Thus, the project must provide a total of 9 short-term bicycle parking spaces and 9 long-term bicycle parking spaces. The site plan does not show any bicycle parking spaces provided. Therefore, it is recommended that the project provide on-site bicycle parking spaces consistent with the code.

4. Conclusions

This study was conducted for the purpose of identifying the potential transportation issues related to the proposed development. The transportation impacts of the project were evaluated following the standards and methodologies established by the City of Richmond. Based on the standards set by the City of Richmond, a local transportation analysis (LTA) was conducted for the project.

Local Transportation Effects

Project Trip Generation

Based on trip generation rates recommended by the Institute of Transportation Engineers (ITE), it is estimated that the proposed project would generate a total of 1,020 daily trips, including 136 trips in the AM peak hour, and 184 trips in the PM peak hour.

Intersection Traffic Operations

The results of the intersection level of service analysis (see Table ES-1) show that the following study intersections would operate at unacceptable conditions, with and without the project, during the AM and PM peak hours.

- Canal Boulevard/I-580 WB Ramps (Background)
- Canal Boulevard/I-580 EB Ramps (Background)
- Harbour Way/Cutting Boulevard (Cumulative)

However, the addition of project trips would not cause the average delay to increase by more than 5.0 seconds at these intersections. Thus, the project would not have an adverse effect on operations at these intersections, based on the City's Traffic Impact Analysis Guidelines for signalized intersections.

The unsignalized study intersection of 2nd Street/W. Cutting Boulevard would not satisfy the peak hour volume signal warrant under background and cumulative conditions, and therefore the project would not have an adverse effect at this intersection.

Other Transportation Issues

The proposed site plan shows adequate site access and on-site circulation. The project would enhance pedestrian circulation by removing and reducing the width of multiple driveways along its frontage. The planned Class IV two-way cycle track with a buffer on the south side of W. Cutting Boulevard between Garrard Boulevard and Hoffman Boulevard, with a new sidewalk next to the cycle track where it is currently missing would improve bicycle and pedestrian facilities connections around the project area. The project would not cause an adverse effect to existing transit facilities in the study area.

Hexagon has the following recommendations resulting from the parking, site access, and circulation analysis.

- The project should upgrade the curb ramps on the northeast corner of Canal Boulevard/W. Cutting Boulevard to be compliant with current American Disability Act (ADA) standards.
- The center turn lane on W. Cutting Boulevard to the west of the proposed driveway should be extended by approximately 150 feet by cutting into the landscaped median on W. Cutting Boulevard to provide adequate storage for trucks entering the project site.
- The proposed driveway on Canal Boulevard should be moved farther south and connect to the south end of the proposed parking lot.
- Prior to final design, the applicant should ensure that the project driveways and property line clearance comply with the City of Richmond Fire Code.
- The site plan does not show any bicycle parking spaces on-site. It is recommended that the project provide 9 long-term and 9 short-term bicycle parking spaces on site.

731 W. Cutting Boulevard

Technical Appendices

Appendix A

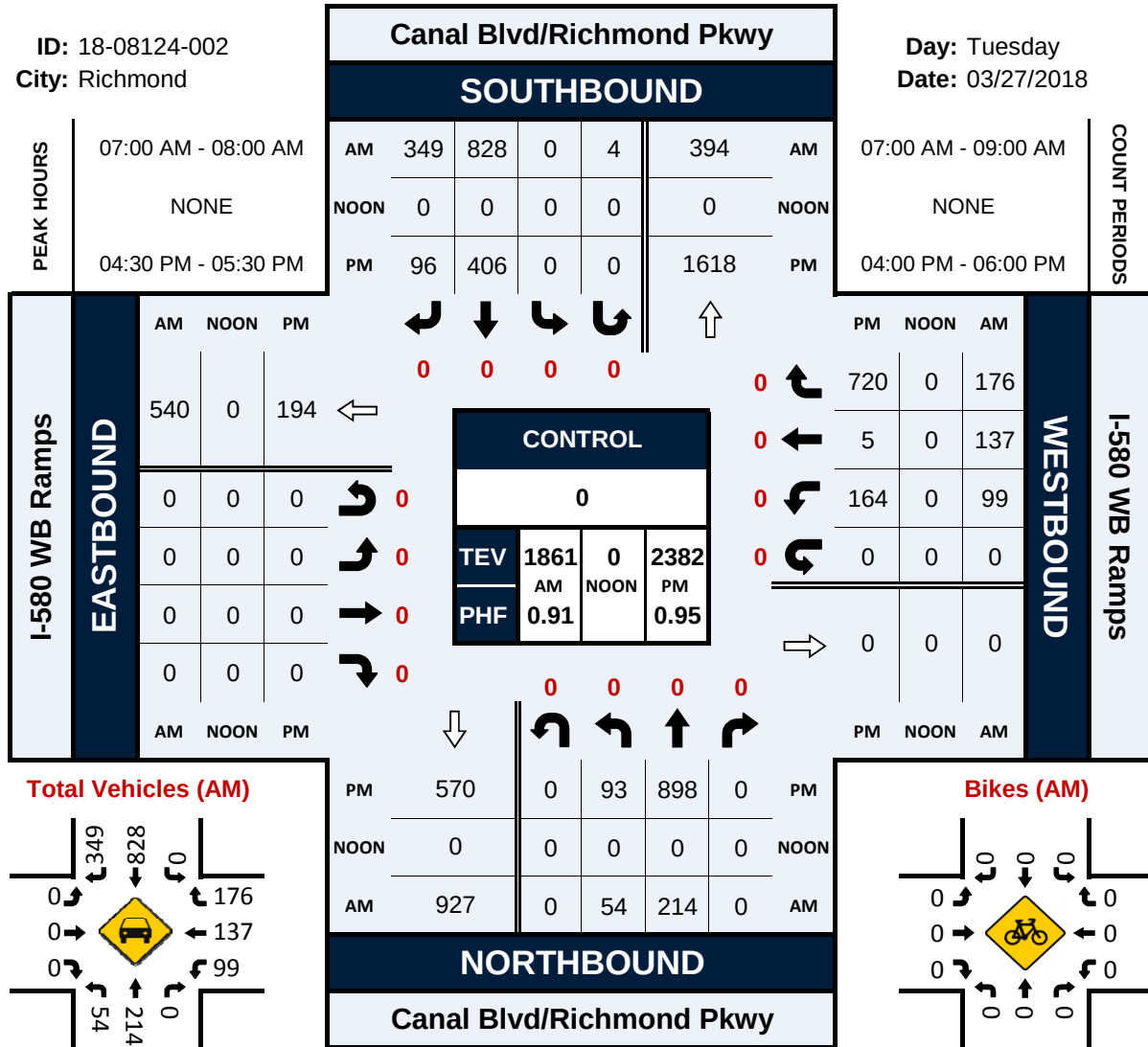
Traffic Counts

Canal Blvd/Richmond Pkwy & I-580 WB Ramps

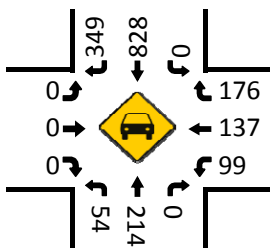
Peak Hour Turning Movement Count

ID: 18-08124-002
City: Richmond

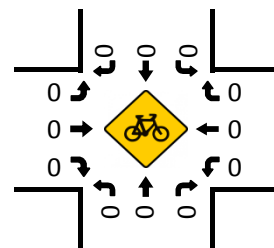
Day: Tuesday
Date: 03/27/2018



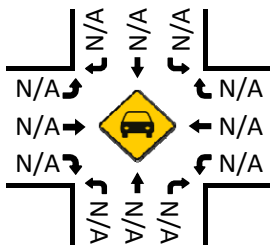
Total Vehicles (AM)



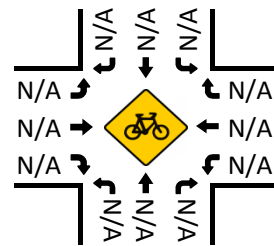
Bikes (AM)



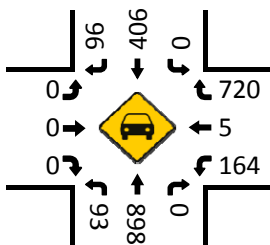
Total Vehicles (Noon)



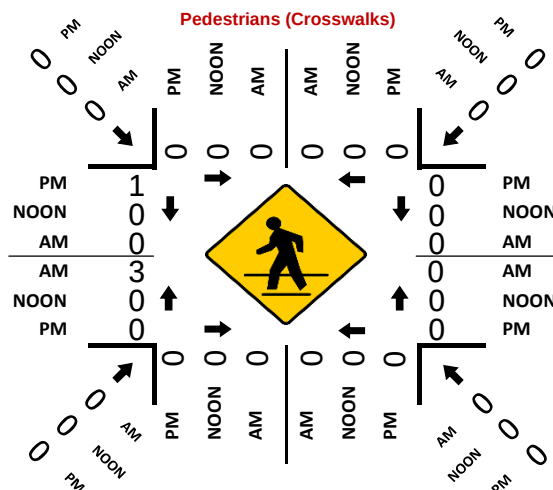
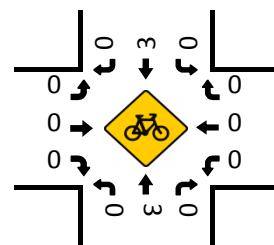
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



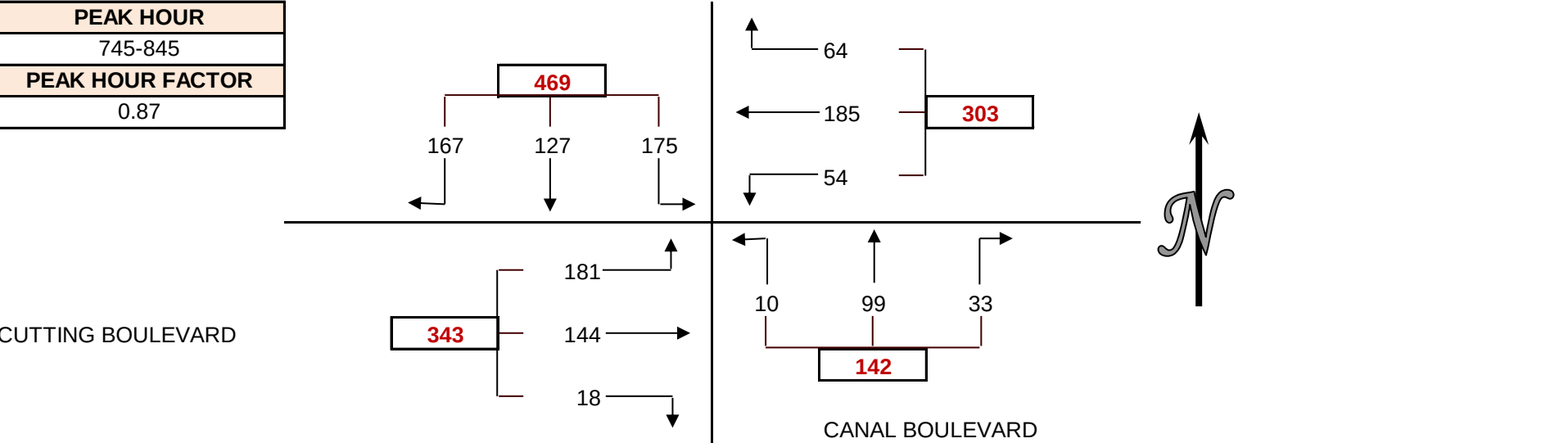
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:
PROJECT:
DATE:
PERIOD:
INTERSECTION:

CITY:

ITERIS
2019 CCCTA CMP MONITORING PROJECT
THURSDAY FEBRUARY 28, 2019
7:00 AM TO 9:00 AM
CANAL BOULEVARD
CUTTING BOULEVARD
W24

VEHICLE COUNTS													
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	21	28	49	24	23	18	6	25	4	3	23	26	250
715-730	11	18	38	33	23	15	2	26	1	6	19	36	228
730-745	7	28	59	51	32	12	5	17	4	6	21	31	273
745-800	12	32	55	29	47	17	8	21	1	4	20	34	280
800-815	41	24	47	10	44	14	5	23	3	4	37	36	288
815-830	65	30	34	14	56	12	11	28	2	1	33	42	328
830-845	49	41	39	11	38	11	9	27	4	9	54	69	361
845-900	39	37	27	5	25	8	4	21	1	1	35	26	229
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	51	106	201	137	125	62	21	89	10	19	83	127	1031
715-815	71	102	199	123	146	58	20	87	9	20	97	137	1069
730-830	125	114	195	104	179	55	29	89	10	15	111	143	1169
745-845	167	127	175	64	185	54	33	99	10	18	144	181	1257
800-900	194	132	147	40	163	45	29	99	10	15	159	173	1206



PEDESTRIAN COUNTS					
15 MIN COUNTS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
700-715	0	0	1	1	2
715-730	0	0	0	0	0
730-745	2	0	0	0	2
745-800	1	0	0	0	1
800-815	0	0	0	0	0
815-830	0	1	1	0	2
830-845	1	0	0	0	1
845-900	1	0	1	0	2
HOUR TOTALS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
700-800	3	0	1	1	5
715-815	3	0	0	0	3
730-830	3	1	1	0	5
745-845	2	1	1	0	4
800-900	2	1	2	0	5

BICYCLE COUNTS					
15 MIN COUNTS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
700-715	0	1	1	0	2
715-730	0	0	0	1	1
730-745	0	1	0	1	2
745-800	0	0	0	0	0
800-815	0	0	0	0	0
815-830	0	2	0	1	3
830-845	0	0	0	1	1
845-900	0	3	0	1	4
HOUR TOTALS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
700-800	0	2	1	2	5
715-815	0	1	0	2	3
730-830	0	3	0	2	5
745-845	0	2	0	2	4
800-900	0	5	0	3	8

APPROACH SUMMARIES											
	NORTH APRCH			EAST APRCH			SOUTH APRCH			WEST APRCH	
	APRCH	EXIT		APRCH	EXIT		APRCH	EXIT		APRCH	EXIT
700-800	358	353		324	305		120	187		229	186
715-815	372	347		327	316		116	180		254	226
730-830	434	336		338	335		128	184		269	314
745-845	469	344		303	352		142	199		343	362
800-900	473	312		248	335		138	192		347	367

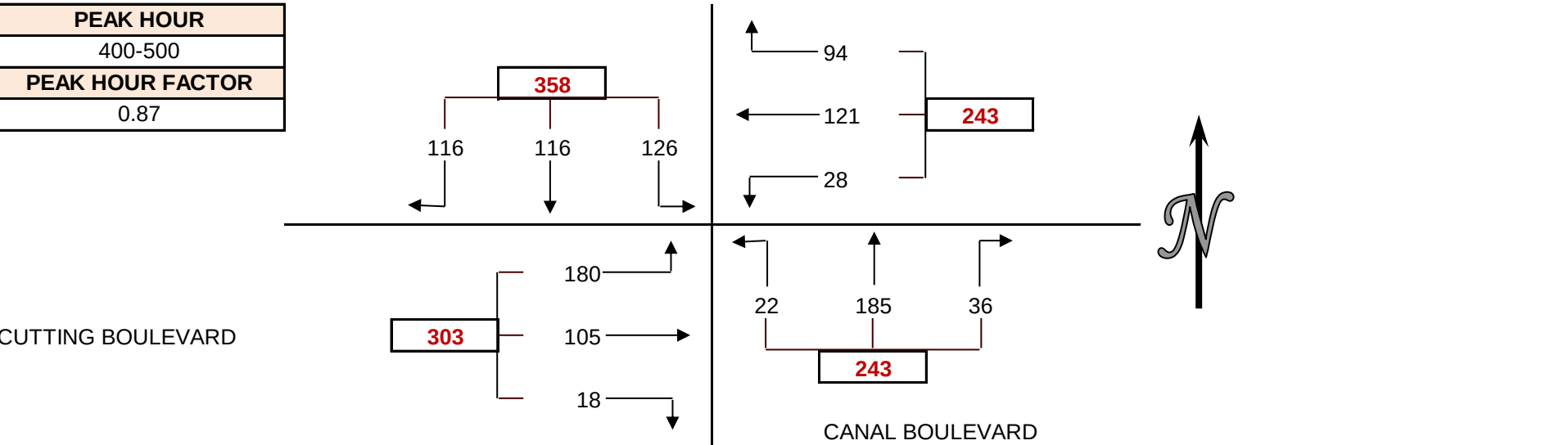
INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:
PROJECT:
DATE:
PERIOD:
INTERSECTION:

ID:

ITERIS, INC.
2019 CCCTA CMP MONITORING PROJECT
THURSDAY FEBRUARY 28, 2019
4:00 PM TO 6:00 PM
CANAL BOULEVARD
CUTTING BOULEVARD
W24

VEHICLE COUNTS													
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	28	29	27	42	40	5	13	49	7	7	30	51	328
415-430	29	33	31	15	30	11	9	40	3	5	23	30	259
430-445	33	29	36	25	30	7	4	51	5	0	26	48	294
445-500	26	25	32	12	21	5	10	45	7	6	26	51	266
500-515	35	27	23	29	30	5	7	52	1	1	23	47	280
515-530	33	29	19	22	38	4	8	35	7	3	22	54	274
530-545	27	28	14	14	40	7	3	53	3	5	23	33	250
545-600	40	30	11	11	27	5	3	38	4	7	25	40	241
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	116	116	126	94	121	28	36	185	22	18	105	180	1147
415-515	123	114	122	81	111	28	30	188	16	12	98	176	1099
430-530	127	110	110	88	119	21	29	183	20	10	97	200	1114
445-545	121	109	88	77	129	21	28	185	18	15	94	185	1070
500-600	135	114	67	76	135	21	21	178	15	16	93	174	1045



PEDESTRIAN COUNTS					
15 MIN COUNTS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-415	1	0	1	1	3
415-430	0	0	0	0	0
430-445	0	0	1	0	1
445-500	1	0	0	0	1
500-515	0	0	0	0	0
515-530	1	0	0	0	1
530-545	0	0	0	0	0
545-600	0	0	0	0	0
HOUR TOTALS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	2	0	2	1	5
415-515	1	0	1	0	2
430-530	2	0	1	0	3
445-545	2	0	0	0	2
500-600	1	0	0	0	1

BICYCLE COUNTS					
15 MIN COUNTS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
400-415	0	1	1	3	5
415-430	0	0	0	0	0
430-445	0	1	0	1	2
445-500	0	0	3	1	4
500-515	0	1	0	0	1
515-530	0	1	0	1	2
530-545	0	0	0	0	0
545-600	0	0	1	0	1
HOUR TOTALS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
400-500	0	2	4	5	11
415-515	0	2	3	2	7
430-530	0	3	3	3	9
445-545	0	2	3	2	7
500-600	0	2	1	1	4

APPROACH SUMMARIES											
	NORTH APRCH			EAST APRCH			SOUTH APRCH			WEST APRCH	
	APRCH	EXIT		APRCH	EXIT		APRCH	EXIT		APRCH	EXIT
400-500	358	459		243	267		243	162		303	259
415-515	359	445		220	250		234	154		286	250
430-530	347	471		228	236		232	141		307	266
445-545	318	447		227	210		231	145		294	268
500-600	316	428		232	181		214	151		283	285

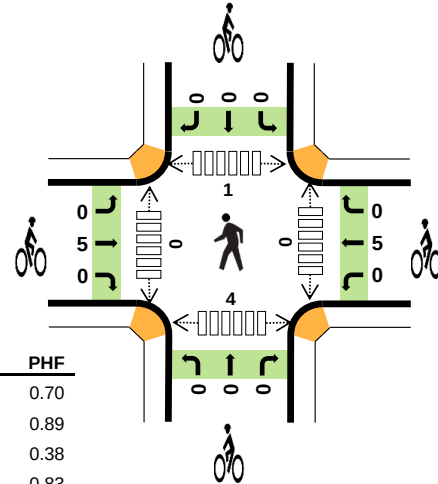
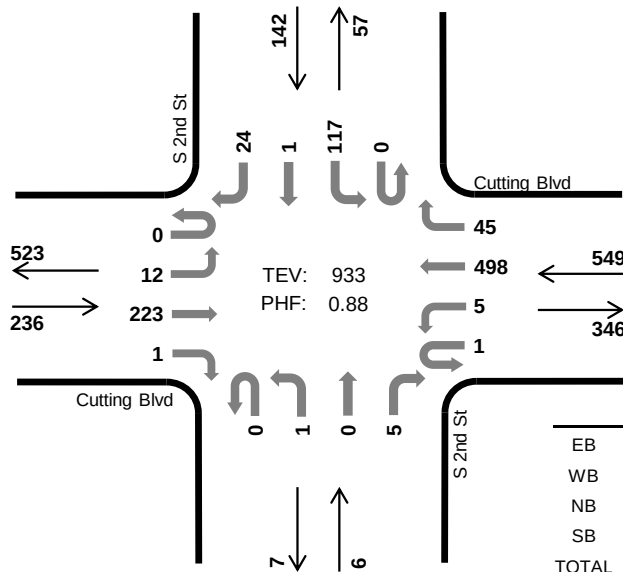
S 2nd St Cutting Blvd



Date: Thu, Sep 02, 2021

Count Period: 7:00 AM to 9:00 AM

Peak Hour: 7:45 AM to 8:45 AM



	HV %:	PHF
EB	6.4%	0.70
WB	9.8%	0.89
NB	0.0%	0.38
SB	4.9%	0.83
TOTAL	8.1%	0.88

Two-Hour Count Summaries

Interval Start		Cutting Blvd				Cutting Blvd				S 2nd St				S 2nd St				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	2	20	0	0	0	27	5	0	0	0	0	0	22	0	4	80	0
7:15 AM		0	3	34	0	0	0	52	6	0	0	0	0	0	23	0	7	125	0
7:30 AM		0	2	40	0	0	2	78	6	0	1	0	0	0	25	0	6	160	0
7:45 AM		0	0	46	0	0	0	109	8	0	0	0	1	0	30	0	10	204	569
8:00 AM		0	3	48	1	0	0	126	6	0	1	0	0	0	34	0	9	228	717
8:15 AM		0	7	47	0	0	2	143	9	0	0	0	0	0	27	0	2	237	829
8:30 AM		0	2	82	0	1	3	120	22	0	0	0	4	0	26	1	3	264	933
8:45 AM		0	5	46	0	0	0	108	16	0	0	0	2	0	8	0	5	190	919
Count Total		0	24	363	1	1	7	763	78	0	2	0	7	0	195	1	46	1,488	0
Peak Hour	All	0	12	223	1	1	5	498	45	0	1	0	5	0	117	1	24	933	0
	HV	0	0	15	0	0	0	50	4	0	0	0	0	0	5	0	2	76	0
	HV%	-	0%	7%	0%	0%	0%	10%	9%	-	0%	-	0%	-	4%	0%	8%	8%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	4	0	1	5	0	0	0	0	0	0	0	1	0	1
7:15 AM	1	7	0	2	10	1	1	0	0	2	0	0	0	0	0
7:30 AM	3	10	0	4	17	0	2	0	0	2	0	1	0	0	1
7:45 AM	5	17	0	1	23	2	2	0	0	4	0	0	1	1	2
8:00 AM	5	8	0	4	17	0	2	0	0	2	0	0	0	1	1
8:15 AM	1	13	0	2	16	2	0	0	0	2	0	0	0	2	2
8:30 AM	4	16	0	0	20	1	1	0	0	2	0	0	0	0	0
8:45 AM	3	5	0	1	9	0	1	0	1	2	0	0	0	0	0
Count Total	22	80	0	15	117	6	9	0	1	16	0	1	2	4	7
Peak Hour	15	54	0	7	76	5	5	0	0	10	0	0	1	4	5

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Cutting Blvd				Cutting Blvd				S 2nd St				S 2nd St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	5	0
7:15 AM	0	0	1	0	0	0	7	0	0	0	0	0	0	2	0	0	10	0
7:30 AM	0	0	3	0	0	0	10	0	0	0	0	0	0	3	0	1	17	0
7:45 AM	0	0	5	0	0	0	17	0	0	0	0	0	0	1	0	0	23	55
8:00 AM	0	0	5	0	0	0	8	0	0	0	0	0	0	2	0	2	17	67
8:15 AM	0	0	1	0	0	0	11	2	0	0	0	0	0	2	0	0	16	73
8:30 AM	0	0	4	0	0	0	14	2	0	0	0	0	0	0	0	0	20	76
8:45 AM	0	0	3	0	0	0	5	0	0	0	0	0	0	1	0	0	9	62
Count Total	0	0	22	0	0	0	76	4	0	0	0	0	0	12	0	3	117	0
Peak Hour	0	0	15	0	0	0	50	4	0	0	0	0	0	5	0	2	76	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Cutting Blvd			Cutting Blvd			S 2nd St			S 2nd St			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
7:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	2	0				
7:30 AM	0	0	0	0	2	0	0	0	0	0	0	0	2	0				
7:45 AM	0	2	0	0	2	0	0	0	0	0	0	0	4	8				
8:00 AM	0	0	0	0	2	0	0	0	0	0	0	0	2	10				
8:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	2	10				
8:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	2	10				
8:45 AM	0	0	0	0	1	0	0	0	0	1	0	0	2	8				
Count Total	0	6	0	0	9	0	0	0	0	1	0	0	16	0				
Peak Hour	0	5	0	0	5	0	0	0	0	0	0	0	10	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

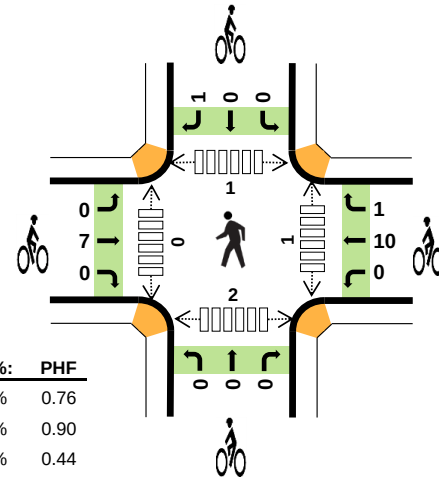
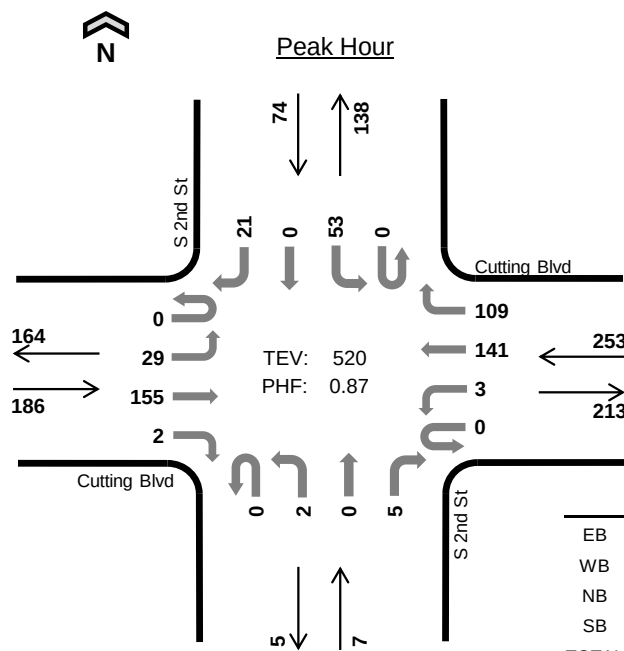
S 2nd St Cutting Blvd



Date: Thu, Sep 02, 2021

Count Period: 4:00 PM to 6:00 PM

Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	2.7%	0.76
WB	9.5%	0.90
NB	0.0%	0.44
SB	5.4%	0.80
TOTAL	6.3%	0.87

Two-Hour Count Summaries

Interval Start		Cutting Blvd				Cutting Blvd				S 2nd St				S 2nd St				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	13	47	1	0	0	40	25	0	1	0	0	0	15	0	8	150	0
4:15 PM		0	6	27	1	0	3	34	30	0	0	0	1	0	12	0	5	119	0
4:30 PM		0	8	43	0	0	0	42	28	0	1	0	3	0	14	0	4	143	0
4:45 PM		0	2	38	0	0	0	25	26	0	0	0	1	0	12	0	4	108	520
5:00 PM		0	5	40	0	0	0	35	31	0	0	0	0	0	10	0	2	123	493
5:15 PM		0	3	39	0	0	0	24	26	0	0	1	1	0	9	0	1	104	478
5:30 PM		0	0	28	0	0	0	34	18	0	0	0	0	0	6	0	3	89	424
5:45 PM		0	4	29	0	0	0	33	19	0	0	0	0	0	9	0	5	99	415
Count Total		0	41	291	2	0	3	267	203	0	2	1	6	0	87	0	32	935	0
Peak Hour	All	0	29	155	2	0	3	141	109	0	2	0	5	0	53	0	21	520	0
	HV	0	2	3	0	0	0	18	6	0	0	0	0	0	2	0	2	33	0
	HV%	-	7%	2%	0%	-	0%	13%	6%	-	0%	-	0%	-	4%	-	10%	6%	0

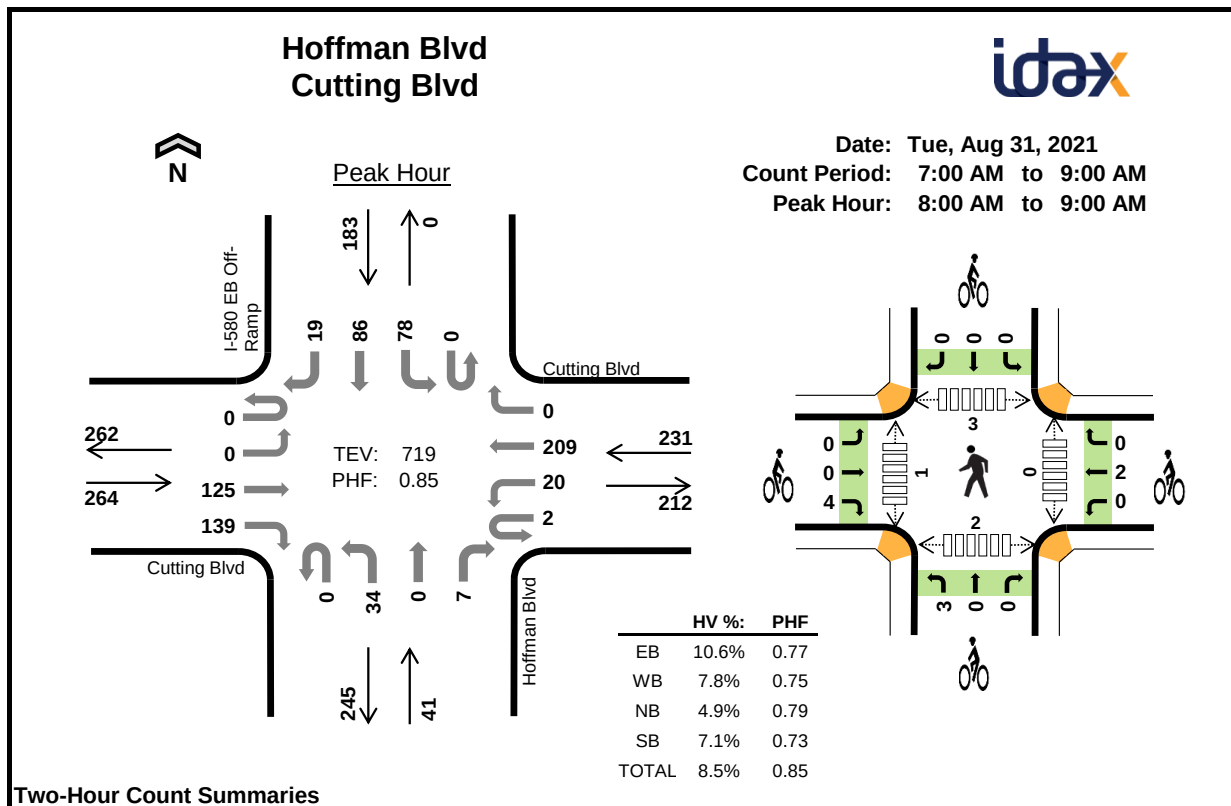
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	2	13	0	2	17	3	2	0	1	6	0	0	0	1	1
4:15 PM	0	5	0	0	5	1	0	0	0	1	0	0	1	0	1
4:30 PM	3	5	0	1	9	2	7	0	0	9	1	0	0	1	2
4:45 PM	0	1	0	1	2	1	2	0	0	3	0	0	0	0	0
5:00 PM	1	2	0	0	3	2	3	0	0	5	0	0	1	1	2
5:15 PM	0	4	0	1	5	1	3	0	0	4	0	0	0	0	0
5:30 PM	3	1	0	0	4	0	5	0	0	5	0	0	0	0	0
5:45 PM	0	4	0	0	4	1	1	0	0	2	0	0	0	1	1
Count Total	9	35	0	5	49	11	23	0	1	35	1	0	2	4	7
Peak Hour	5	24	0	4	33	7	11	0	1	19	1	0	1	2	4

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Cutting Blvd				Cutting Blvd				S 2nd St				S 2nd St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	2	0	0	0	0	11	2	0	0	0	0	0	1	0	1	17	0
4:15 PM	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	5	0
4:30 PM	0	0	3	0	0	0	3	2	0	0	0	0	0	0	0	1	9	0
4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	2	33
5:00 PM	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	3	19
5:15 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0	5	19
5:30 PM	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	4	14
5:45 PM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	16
Count Total	0	3	6	0	0	0	27	8	0	0	0	0	0	3	0	2	49	0
Peak Hour	0	2	3	0	0	0	18	6	0	0	0	0	0	2	0	2	33	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Cutting Blvd				Cutting Blvd				S 2nd St				S 2nd St				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	LT	TH	RT		LT	TH	RT		LT	TH	RT		LT	TH	RT			
4:00 PM	0	3	0		0	2	0		0	0	0		0	0	1		6	0
4:15 PM	0	1	0		0	0	0		0	0	0		0	0	0		1	0
4:30 PM	0	2	0		0	7	0		0	0	0		0	0	0		9	0
4:45 PM	0	1	0		0	1	1		0	0	0		0	0	0		3	19
5:00 PM	0	2	0		0	2	1		0	0	0		0	0	0		5	18
5:15 PM	1	0	0		0	3	0		0	0	0		0	0	0		4	21
5:30 PM	0	0	0		0	5	0		0	0	0		0	0	0		5	17
5:45 PM	0	1	0		0	1	0		0	0	0		0	0	0		2	16
Count Total	1	10	0		0	21	2		0	0	0		0	0	1		35	0
Peak Hour	0	7	0		0	10	1		0	0	0		0	0	1		19	0

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

**Two-Hour Count Summaries**

Interval Start		Cutting Blvd				Cutting Blvd				Hoffman Blvd				I-580 EB Off-Ramp				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM		0	0	11	23	0	5	32	0	0	3	0	0	0	14	17	1	106	0
7:15 AM		0	0	21	35	0	2	40	0	0	5	0	3	0	20	14	1	141	0
7:30 AM		0	0	17	46	0	5	37	0	0	2	0	0	0	26	22	3	158	0
7:45 AM		0	0	17	38	0	6	36	0	0	6	0	0	0	20	20	1	144	549
8:00 AM		0	0	27	42	2	2	57	0	0	4	0	1	0	35	25	3	198	641
8:15 AM		0	0	44	42	0	4	73	0	0	10	0	1	0	14	22	1	211	711
8:30 AM		0	0	30	30	0	8	38	0	0	8	0	4	0	16	25	4	163	716
8:45 AM		0	0	24	25	0	6	41	0	0	12	0	1	0	13	14	11	147	719
Count Total		0	0	191	281	2	38	354	0	0	50	0	10	0	158	159	25	1,268	0
Peak Hour	All	0	0	125	139	2	20	209	0	0	34	0	7	0	78	86	19	719	0
	HV	0	0	8	20	0	0	18	0	0	1	0	1	0	3	9	1	61	0
	HV%	-	-	6%	14%	0%	0%	9%	-	-	3%	-	14%	-	4%	10%	5%	8%	0

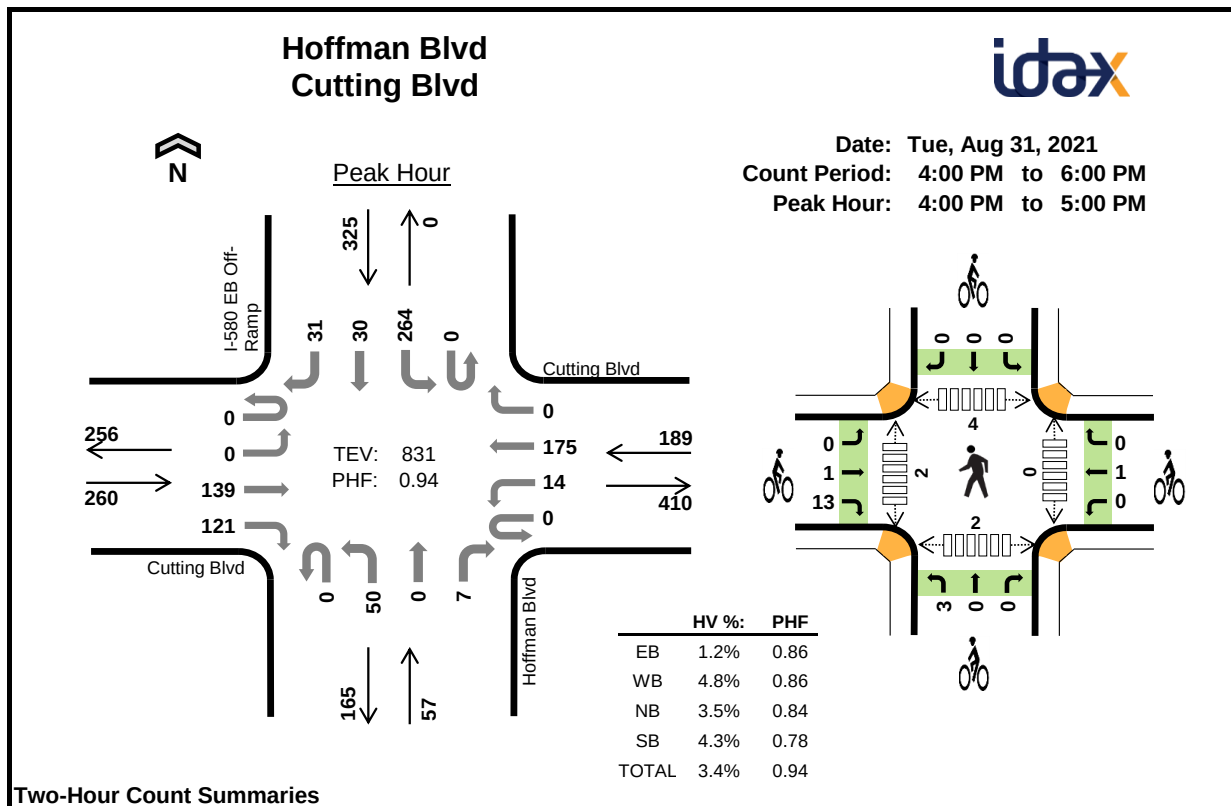
Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	6	6	0	2	14	1	0	1	0	2	0	0	0	0	0
7:15 AM	7	3	0	3	13	4	1	0	0	5	0	0	0	1	1
7:30 AM	5	4	1	5	15	1	0	1	0	2	0	0	0	0	0
7:45 AM	7	6	0	2	15	0	0	0	0	0	0	0	0	0	0
8:00 AM	11	5	1	4	21	1	0	2	0	3	0	0	0	0	0
8:15 AM	8	7	0	3	18	1	1	0	0	2	0	0	0	0	0
8:30 AM	4	2	0	2	8	1	0	1	0	2	0	0	1	0	1
8:45 AM	5	4	1	4	14	1	1	0	0	2	0	1	2	2	5
Count Total	53	37	3	25	118	10	3	5	0	18	0	1	3	3	7
Peak Hour	28	18	2	13	61	4	2	3	0	9	0	1	3	2	6

Two-Hour Count Summaries - Heavy Vehicles																			
Interval Start	Cutting Blvd				Cutting Blvd				Hoffman Blvd				I-580 EB Off-Ramp				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM	0	0	0	6	0	1	5	0	0	0	0	0	0	0	0	2	0	14	0
7:15 AM	0	0	0	7	0	1	2	0	0	0	0	0	0	0	1	2	0	13	0
7:30 AM	0	0	3	2	0	1	3	0	0	1	0	0	0	0	0	5	0	15	0
7:45 AM	0	0	2	5	0	2	4	0	0	0	0	0	0	0	1	1	0	15	57
8:00 AM	0	0	2	9	0	0	5	0	0	0	0	1	0	0	0	4	0	21	64
8:15 AM	0	0	3	5	0	0	7	0	0	0	0	0	0	0	1	1	1	18	69
8:30 AM	0	0	3	1	0	0	2	0	0	0	0	0	0	0	0	2	0	8	62
8:45 AM	0	0	0	5	0	0	4	0	0	1	0	0	0	0	2	2	0	14	61
Count Total	0	0	13	40	0	5	32	0	0	2	0	1	0	0	5	19	1	118	0
Peak Hour	0	0	8	20	0	0	18	0	0	1	0	1	0	0	3	9	1	61	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Cutting Blvd			Cutting Blvd			Hoffman Blvd			I-580 EB Off-Ramp			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	0	1	0	0	0	1	0	0	0	0	0	2	0				
7:15 AM	0	0	4	0	1	0	0	0	0	0	0	0	5	0				
7:30 AM	0	0	1	0	0	0	1	0	0	0	0	0	2	0				
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	9				
8:00 AM	0	0	1	0	0	0	2	0	0	0	0	0	3	10				
8:15 AM	0	0	1	0	1	0	0	0	0	0	0	0	2	7				
8:30 AM	0	0	1	0	0	0	1	0	0	0	0	0	2	7				
8:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	2	9				
Count Total	0	0	10	0	3	0	5	0	0	0	0	0	18	0				
Peak Hour	0	0	4	0	2	0	3	0	0	0	0	0	9	0				

Note: U-Turn volumes for bikes are included in Left-Turn, if any.



Two-Hour Count Summaries

Interval Start		Cutting Blvd				Cutting Blvd				Hoffman Blvd				I-580 EB Off-Ramp				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
	4:00 PM	0	0	42	28	0	2	53	0	0	15	0	2	0	51	6	10	209	0
	4:15 PM	0	0	45	31	0	6	44	0	0	13	0	2	0	57	8	3	209	0
	4:30 PM	0	0	28	37	0	3	37	0	0	11	0	0	0	87	9	8	220	0
	4:45 PM	0	0	24	25	0	3	41	0	0	11	0	3	0	69	7	10	193	831
	5:00 PM	0	0	41	33	0	1	30	0	0	10	0	1	0	59	10	7	192	814
	5:15 PM	0	0	26	20	0	5	42	0	0	6	0	3	0	59	5	11	177	782
	5:30 PM	0	0	10	14	0	5	41	0	0	10	0	3	0	70	7	7	167	729
	5:45 PM	0	0	21	21	0	3	37	0	0	5	0	2	0	61	6	2	158	694
Count Total		0	0	237	209	0	28	325	0	0	81	0	16	0	513	58	58	1,525	0
Peak Hour	All	0	0	139	121	0	14	175	0	0	50	0	7	0	264	30	31	831	0
	HV	0	0	2	1	0	1	8	0	0	1	0	1	0	6	6	2	28	0
	HV%	-	-	1%	1%	-	7%	5%	-	-	2%	-	14%	-	2%	20%	6%	3%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

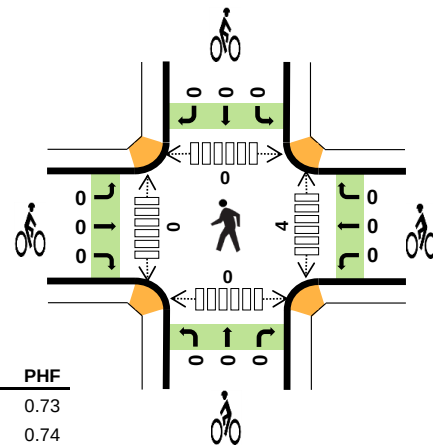
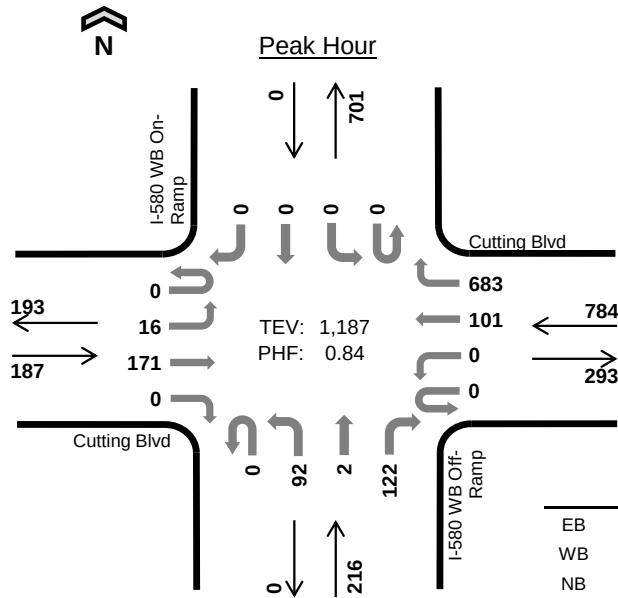
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	0	2	0	3	5	10	0	0	0	10	0	0	1	0	1
4:15 PM	0	1	0	1	2	1	0	1	0	2	0	2	1	0	3
4:30 PM	1	1	0	4	6	0	0	1	0	1	0	0	1	1	2
4:45 PM	2	5	2	6	15	3	1	1	0	5	0	0	1	1	2
5:00 PM	5	1	0	3	9	1	0	0	0	1	0	0	1	0	1
5:15 PM	0	0	0	2	2	3	0	1	0	4	0	0	0	0	0
5:30 PM	0	2	1	2	5	2	0	0	0	2	0	0	0	0	0
5:45 PM	0	1	0	3	4	2	0	0	0	2	0	0	1	0	1
Count Total	8	13	3	24	48	22	1	4	0	27	0	2	6	2	10
Peak Hour	3	9	2	14	28	14	1	3	0	18	0	2	4	2	8

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Cutting Blvd				Cutting Blvd				Hoffman Blvd				I-580 EB Off-Ramp				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	1	1	1	5	0
4:15 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	2	0
4:30 PM	0	0	1	0	0	0	1	0	0	0	0	0	0	1	2	1	6	0
4:45 PM	0	0	1	1	0	1	4	0	0	1	0	1	0	3	3	0	15	28
5:00 PM	0	0	2	3	0	0	1	0	0	0	0	0	0	0	3	0	9	32
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	32
5:30 PM	0	0	0	0	0	0	2	0	0	0	0	1	0	0	2	0	5	31
5:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	2	0	4	20
Count Total	0	0	4	4	0	1	12	0	0	1	0	2	0	8	14	2	48	0
Peak Hour	0	0	2	1	0	1	8	0	0	1	0	1	0	6	6	2	28	0

Two-Hour Count Summaries - Bikes																	
Interval Start	Cutting Blvd			Cutting Blvd			Hoffman Blvd			I-580 EB Off-Ramp			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
4:00 PM	0	0	10	0	0	0	0	0	0	0	0	0	10	0			
4:15 PM	0	1	0	0	0	0	1	0	0	0	0	0	2	0			
4:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	1	0			
4:45 PM	0	0	3	0	1	0	1	0	0	0	0	0	5	18			
5:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	1	9			
5:15 PM	0	0	3	0	0	0	1	0	0	0	0	0	4	11			
5:30 PM	0	0	2	0	0	0	0	0	0	0	0	0	2	12			
5:45 PM	0	0	2	0	0	0	0	0	0	0	0	0	2	9			
Count Total	0	1	21	0	1	0	4	0	0	0	0	0	27	0			
Peak Hour	0	1	13	0	1	0	3	0	0	0	0	0	18	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

I-580 WB Off-Ramp Cutting Blvd



	HV %	PHF
EB	5.3%	0.73
WB	4.3%	0.74
NB	11.6%	0.93
SB	-	-
TOTAL	5.8%	0.84

Two-Hour Count Summaries

Interval Start	Cutting Blvd Eastbound				Cutting Blvd Westbound				I-580 WB Off-Ramp Northbound				I-580 WB On-Ramp Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	5	19	0	0	0	18	183	0	15	0	26	0	0	0	0	266	0
7:15 AM	0	6	38	0	0	0	20	245	0	25	0	20	0	0	0	0	354	0
7:30 AM	0	5	37	0	0	0	21	181	0	23	2	32	0	0	0	0	301	0
7:45 AM	0	4	33	0	0	0	20	129	0	22	0	34	0	0	0	0	242	1,163
8:00 AM	0	1	63	0	0	0	40	128	0	22	0	36	0	0	0	0	290	1,187
8:15 AM	0	0	62	0	0	0	54	91	0	22	0	27	0	0	0	0	256	1,089
8:30 AM	0	0	47	0	0	0	34	49	0	11	0	29	0	0	0	0	170	958
8:45 AM	0	0	41	0	0	0	27	46	0	20	0	27	0	0	0	0	161	877
Count Total	0	21	340	0	0	0	234	1,052	0	160	2	231	0	0	0	0	2,040	0
Peak Hour	All	0	16	171	0	0	0	101	683	0	92	2	122	0	0	0	1,187	0
	HV	0	0	10	0	0	0	4	30	0	13	0	12	0	0	0	69	0
	HV%	-	0%	6%	-	-	-	4%	4%	-	14%	0%	10%	-	-	-	6%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

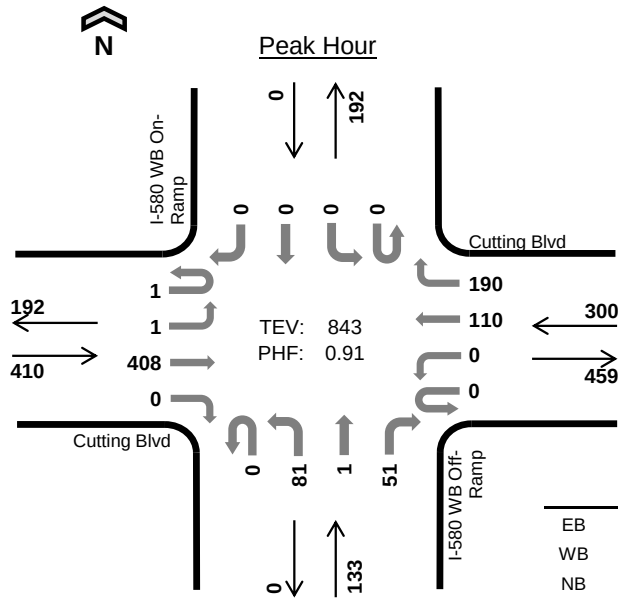
Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	0	9	3	0	12	0	0	0	0	0	0	0	0	0	0
7:15 AM	1	10	4	0	15	0	0	0	0	0	0	0	0	0	0
7:30 AM	4	7	7	0	18	0	0	0	0	0	1	0	0	0	1
7:45 AM	2	11	8	0	21	0	0	0	0	0	2	0	0	0	2
8:00 AM	3	6	6	0	15	0	0	0	0	0	1	0	0	0	1
8:15 AM	4	6	7	0	17	0	0	0	0	0	0	0	0	0	0
8:30 AM	3	4	8	0	15	0	0	0	0	0	0	0	0	0	0
8:45 AM	2	8	10	0	20	0	1	0	0	1	1	0	1	0	2
Count Total	19	61	53	0	133	0	1	0	0	1	5	0	1	0	6
Peak Hour	10	34	25	0	69	0	0	0	0	0	4	0	0	0	4

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Cutting Blvd				Cutting Blvd				I-580 WB Off-Ramp				I-580 WB On-Ramp				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	0	0	0	0	2	7	0	3	0	0	0	0	0	0	12	0
7:15 AM	0	0	1	0	0	0	0	10	0	3	0	1	0	0	0	0	15	0
7:30 AM	0	0	4	0	0	0	1	6	0	3	0	4	0	0	0	0	18	0
7:45 AM	0	0	2	0	0	0	1	10	0	6	0	2	0	0	0	0	21	66
8:00 AM	0	0	3	0	0	0	2	4	0	1	0	5	0	0	0	0	15	69
8:15 AM	0	0	4	0	0	0	2	4	0	6	0	1	0	0	0	0	17	71
8:30 AM	0	0	3	0	0	0	0	4	0	2	0	6	0	0	0	0	15	68
8:45 AM	0	0	2	0	0	0	0	8	0	5	0	5	0	0	0	0	20	67
Count Total	0	0	19	0	0	0	8	53	0	29	0	24	0	0	0	0	133	0
Peak Hour	0	0	10	0	0	0	4	30	0	13	0	12	0	0	0	0	69	0

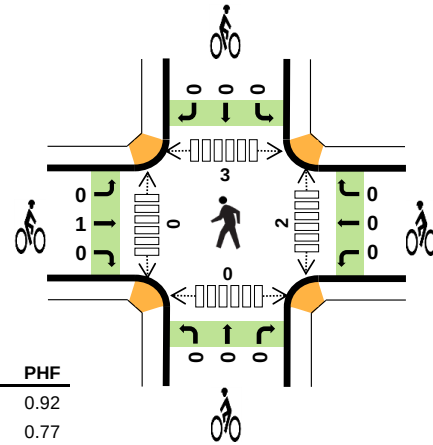
Two-Hour Count Summaries - Bikes																	
Interval Start	Cutting Blvd			Cutting Blvd			I-580 WB Off-Ramp			I-580 WB On-Ramp			15-min Total	Rolling One Hour			
	Eastbound			Westbound			Northbound			Southbound							
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT					
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
8:45 AM	0	0	0	0	1	0	0	0	0	0	0	0	0	0			
Count Total	0	0	0	0	1	0	0	0	0	0	0	0	0	0			
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

I-580 WB Off-Ramp Cutting Blvd



Date: Tue, Aug 31, 2021
Count Period: 4:00 PM to 6:00 PM
Peak Hour: 4:00 PM to 5:00 PM



	HV %:	PHF
EB	2.2%	0.92
WB	4.0%	0.77
NB	12.0%	0.81
SB	-	-
TOTAL	4.4%	0.91

Two-Hour Count Summaries

Interval Start		Cutting Blvd				Cutting Blvd				I-580 WB Off-Ramp				I-580 WB On-Ramp				15-min Total	Rolling One Hour
		Eastbound				Westbound				Northbound				Southbound					
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM		0	0	94	0	0	0	29	69	0	27	0	13	0	0	0	0	232	0
4:15 PM		1	1	101	0	0	0	31	36	0	15	0	9	0	0	0	0	194	0
4:30 PM		0	0	111	0	0	0	28	58	0	18	0	10	0	0	0	0	225	0
4:45 PM		0	0	102	0	0	0	22	27	0	21	1	19	0	0	0	0	192	843
5:00 PM		0	1	95	0	0	0	24	46	0	9	0	14	0	0	0	0	189	800
5:15 PM		0	1	92	0	0	0	30	53	0	12	0	8	0	0	0	0	196	802
5:30 PM		0	0	83	0	0	0	22	46	0	26	1	7	0	0	0	0	185	762
5:45 PM		0	0	84	0	0	0	25	35	0	14	0	12	0	0	0	0	170	740
Count Total		1	3	762	0	0	0	211	370	0	142	2	92	0	0	0	0	1,583	0
Peak Hour	All	1	1	408	0	0	0	110	190	0	81	1	51	0	0	0	0	843	0
	HV	0	0	9	0	0	0	4	8	0	5	1	10	0	0	0	0	37	0
	HV%	0%	0%	2%	-	-	-	4%	4%	-	6%	100%	20%	-	-	-	-	4%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
4:00 PM	1	4	4	0	9	0	0	0	0	0	0	0	2	0	2
4:15 PM	1	0	4	0	5	1	0	0	0	1	1	0	1	0	2
4:30 PM	4	4	1	0	9	0	0	0	0	0	0	0	0	0	0
4:45 PM	3	4	7	0	14	0	0	0	0	0	1	0	0	0	1
5:00 PM	2	2	3	0	7	0	0	0	0	0	0	0	0	0	0
5:15 PM	2	2	1	0	5	0	2	0	0	2	1	0	0	0	1
5:30 PM	0	2	6	0	8	0	0	0	0	0	0	0	0	0	0
5:45 PM	1	0	3	0	4	0	0	0	0	0	0	0	0	0	0
Count Total	14	18	29	0	61	1	2	0	0	3	3	0	3	0	6
Peak Hour	9	12	16	0	37	1	0	0	0	1	2	0	3	0	5

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Cutting Blvd				Cutting Blvd				I-580 WB Off-Ramp				I-580 WB On-Ramp				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	1	0	0	0	0	4	0	2	0	2	0	0	0	0	9	0
4:15 PM	0	0	1	0	0	0	0	0	0	1	0	3	0	0	0	0	5	0
4:30 PM	0	0	4	0	0	0	1	3	0	0	0	1	0	0	0	0	9	0
4:45 PM	0	0	3	0	0	0	3	1	0	2	1	4	0	0	0	0	14	37
5:00 PM	0	0	2	0	0	0	0	2	0	1	0	2	0	0	0	0	7	35
5:15 PM	0	1	1	0	0	0	0	2	0	0	0	1	0	0	0	0	5	35
5:30 PM	0	0	0	0	0	0	0	2	0	3	1	2	0	0	0	0	8	34
5:45 PM	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0	4	24
Count Total	0	1	13	0	0	0	4	14	0	9	2	18	0	0	0	0	61	0
Peak Hour	0	0	9	0	0	0	4	8	0	5	1	10	0	0	0	0	37	0

Two-Hour Count Summaries - Bikes																		
Interval Start	Cutting Blvd			Cutting Blvd			I-580 WB Off-Ramp			I-580 WB On-Ramp						15-min Total	Rolling One Hour	
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT			
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Count Total	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	3	0
Peak Hour	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

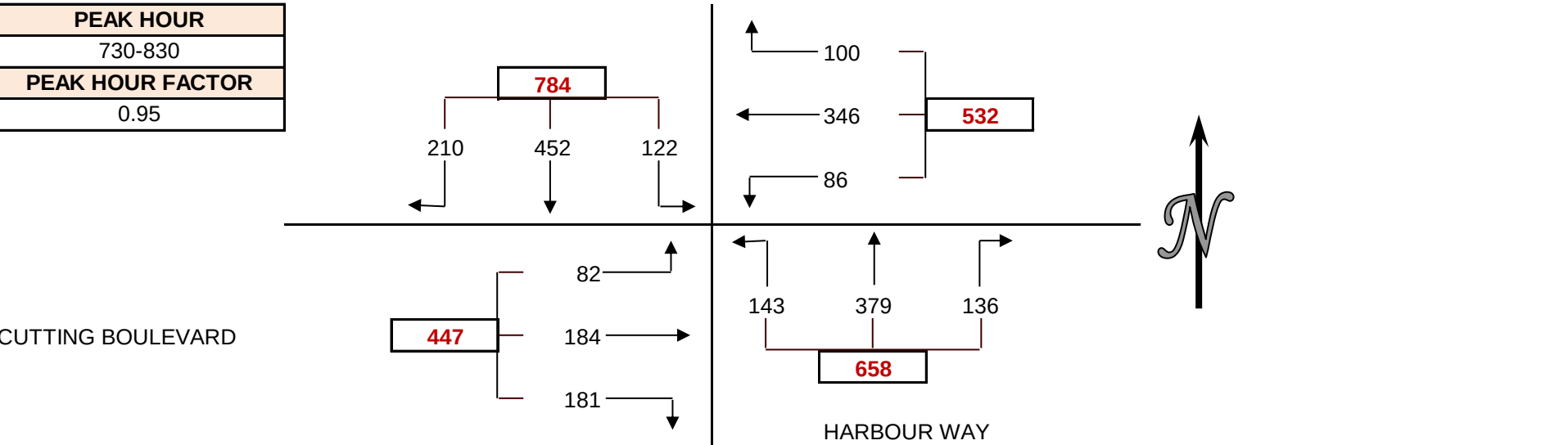
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:
PROJECT:
DATE:
PERIOD:
INTERSECTION:
CITY:

ITERIS
2019 CCCTA CMP MONITORING PROJECT
THURSDAY FEBRUARY 28, 2019
7:00 AM TO 9:00 AM
N/S HARBOUR WAY
E/W CUTTING BOULEVARD
W25

VEHICLE COUNTS													
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	64	121	16	8	105	24	23	68	25	40	33	14	541
715-730	78	114	32	11	103	34	33	59	28	31	36	19	578
730-745	52	107	24	11	93	20	28	85	43	32	41	26	562
745-800	52	131	17	18	89	19	43	95	39	49	50	26	628
800-815	52	119	46	39	68	19	33	113	41	47	41	16	634
815-830	54	95	35	32	96	28	32	86	20	53	52	14	597
830-845	52	98	19	19	70	22	24	88	25	39	53	19	528
845-900	34	55	17	18	89	11	30	73	18	46	39	20	450
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	246	473	89	48	390	97	127	307	135	152	160	85	2309
715-815	234	471	119	79	353	92	137	352	151	159	168	87	2402
730-830	210	452	122	100	346	86	136	379	143	181	184	82	2421
745-845	210	443	117	108	323	88	132	382	125	188	196	75	2387
800-900	192	367	117	108	323	80	119	360	104	185	185	69	2209



PEDESTRIAN COUNTS					
15 MIN COUNTS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
700-715	2	1	1	0	4
715-730	3	2	0	0	5
730-745	3	0	0	0	3
745-800	0	0	1	0	1
800-815	8	6	0	0	14
815-830	5	1	0	0	6
830-845	3	1	0	0	4
845-900	4	0	0	0	4
HOUR TOTALS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
700-800	8	3	2	0	13
715-815	14	8	1	0	23
730-830	16	7	1	0	24
745-845	16	8	1	0	25
800-900	20	8	0	0	28

BICYCLE COUNTS					
15 MIN COUNTS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
700-715	1	0	2	0	3
715-730	0	0	0	0	0
730-745	0	0	0	0	0
745-800	0	0	0	0	0
800-815	0	0	2	0	2
815-830	1	0	1	0	2
830-845	0	0	0	0	0
845-900	0	1	0	0	1
HOUR TOTALS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
700-800	1	0	2	0	3
715-815	0	0	2	0	2
730-830	1	0	3	0	4
745-845	1	0	3	0	4
800-900	1	1	3	0	5

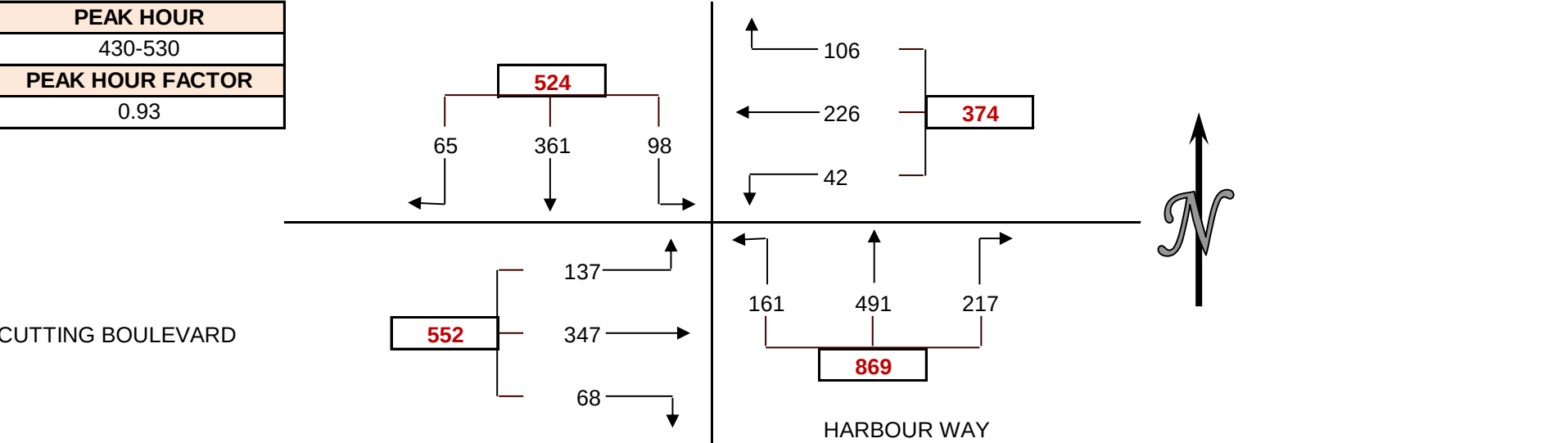
APPROACH SUMMARIES											
	NORTH APRCH			EAST APRCH			SOUTH APRCH			WEST APRCH	
	APRCH	EXIT		APRCH	EXIT		APRCH	EXIT		APRCH	EXIT
700-800	808	440		535	376		569	722		397	771
715-815	824	518		524	424		640	722		414	738
730-830	784	561		532	442		658	719		447	699
745-845	770	565		519	445		639	719		459	658
800-900	676	537		511	421		583	632		439	619

INTERSECTION CAR/PED/BIKE TRAFFIC COUNT RESULTS SUMMARY

CLIENT:
PROJECT:
DATE:
PERIOD:
INTERSECTION:
ID:

ITERIS, INC.
2019 CCCTA CMP MONITORING PROJECT
THURSDAY FEBRUARY 28, 2019
4:00 PM TO 6:00 PM
N/S HARBOUR WAY
E/W CUTTING BOULEVARD
W25

VEHICLE COUNTS													
15 MIN COUNTS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-415	12	70	29	39	62	11	34	130	33	18	96	32	566
415-430	11	79	29	36	55	7	36	101	24	14	86	27	505
430-445	13	103	20	27	59	12	66	129	32	17	112	36	626
445-500	17	86	25	32	58	10	46	129	24	22	73	36	558
500-515	15	89	23	21	46	8	66	124	55	14	80	34	575
515-530	20	83	30	26	63	12	39	109	50	15	82	31	560
530-545	13	91	16	15	56	10	50	105	36	12	69	30	503
545-600	12	56	25	40	40	17	37	124	21	12	57	35	476
HOUR TOTALS	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
400-500	53	338	103	134	234	40	182	489	113	71	367	131	2255
415-515	56	357	97	116	218	37	214	483	135	67	351	133	2264
430-530	65	361	98	106	226	42	217	491	161	68	347	137	2319
445-545	65	349	94	94	223	40	201	467	165	63	304	131	2196
500-600	60	319	94	102	205	47	192	462	162	53	288	130	2114



PEDESTRIAN COUNTS					
15 MIN COUNTS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-415	10	4	0	0	14
415-430	1	1	0	0	2
430-445	3	5	1	1	10
445-500	1	0	0	0	1
500-515	3	0	0	0	3
515-530	2	0	0	0	2
530-545	0	3	0	0	3
545-600	2	0	0	0	2
HOUR TOTALS	NORTH LEG	EAST LEG	SOUTH LEG	WEST LEG	TOTAL
400-500	15	10	1	1	27
415-515	8	6	1	1	16
430-530	9	5	1	1	16
445-545	6	3	0	0	9
500-600	7	3	0	0	10

BICYCLE COUNTS					
15 MIN COUNTS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
400-415	0	0	0	1	1
415-430	0	0	0	0	0
430-445	0	0	0	0	0
445-500	0	0	0	0	0
500-515	0	1	1	0	2
515-530	0	0	0	0	0
530-545	0	0	0	0	0
545-600	0	0	0	1	1
HOUR TOTALS	NORTH APRCH	EAST APRCH	SOUTH APRCH	WEST APRCH	TOTAL
400-500	0	0	0	1	1
415-515	0	1	1	0	2
430-530	0	1	1	0	2
445-545	0	1	1	0	2
500-600	0	1	1	1	3

APPROACH SUMMARIES											
	NORTH APRCH			EAST APRCH			SOUTH APRCH			WEST APRCH	
	APRCH	EXIT		APRCH	EXIT		APRCH	EXIT		APRCH	EXIT
400-500	494	754		408	652		784	449		569	400
415-515	510	732		371	662		832	461		551	409
430-530	524	734		374	662		869	471		552	452
445-545	508	692		357	599		833	452		498	453
500-600	473	694		354	574		816	419		471	427

Appendix B

Level of Service Calculations

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	144	18	54	185	64	10	99	33	203	147	194
Future Volume (veh/h)	181	144	18	54	185	64	10	99	33	203	147	194
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	208	166	21	62	213	74	11	114	38	201	214	223
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	255	697	87	77	491	214	239	354	113	407	427	357
Arrive On Green	0.15	0.23	0.23	0.05	0.15	0.15	0.14	0.14	0.14	0.24	0.24	0.24
Sat Flow, veh/h	1697	3021	376	1697	3385	1474	1697	2513	802	1697	1781	1490
Grp Volume(v), veh/h	208	92	95	62	213	74	11	75	77	201	214	223
Grp Sat Flow(s),veh/h/ln	1697	1692	1705	1697	1692	1474	1697	1692	1622	1697	1781	1490
Q Serve(g_s), s	6.2	2.3	2.4	1.9	3.0	2.4	0.3	2.1	2.2	5.4	5.4	7.0
Cycle Q Clear(g_c), s	6.2	2.3	2.4	1.9	3.0	2.4	0.3	2.1	2.2	5.4	5.4	7.0
Prop In Lane	1.00		0.22	1.00		1.00	1.00		0.49	1.00		1.00
Lane Grp Cap(c), veh/h	255	390	393	77	491	214	239	239	229	407	427	357
V/C Ratio(X)	0.82	0.24	0.24	0.81	0.43	0.35	0.05	0.31	0.34	0.49	0.50	0.62
Avail Cap(c_a), veh/h	307	929	936	201	1710	745	841	839	804	841	883	739
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.6	16.4	16.4	24.8	20.5	20.2	19.5	20.2	20.3	17.2	17.2	17.8
Incr Delay (d2), s/veh	11.3	0.4	0.4	7.2	0.9	1.4	0.1	1.1	1.2	1.3	1.3	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.8	0.8	0.8	1.1	0.8	0.1	0.8	0.8	1.9	2.0	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	16.8	16.9	32.0	21.3	21.5	19.6	21.3	21.5	18.5	18.5	20.4
LnGrp LOS	C	B	B	C	C	C	B	C	C	B	B	C
Approach Vol, veh/h		395			349			163			638	
Approach Delay, s/veh		25.3			23.3			21.3			19.2	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	16.6		11.9	11.4	12.1		17.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.2	28.8		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	3.9	4.4		4.2	8.2	5.0		9.0				
Green Ext Time (p_c), s	0.0	1.3		1.1	0.0	2.0		3.6				
Intersection Summary												
HCM 6th Ctrl Delay				21.9								
HCM 6th LOS				C								
Notes												
User approved volume balancing among the lanes for turning movement.												

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	227	2	6	298	34	2	0	6	120	2	43
Future Vol, veh/h	22	227	2	6	298	34	2	0	6	120	2	43
Conflicting Peds, #/hr	0	0	4	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	25	258	2	7	339	39	2	0	7	136	2	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	378	0	0	264	0	0	498	705	134	552	687	189
Stage 1	-	-	-	-	-	-	313	313	-	373	373	-
Stage 2	-	-	-	-	-	-	185	392	-	179	314	-
Critical Hdwy	4.26	-	-	4.26	-	-	7.66	6.66	7.06	7.66	6.66	7.06
Critical Hdwy Stg 1	-	-	-	-	-	-	6.66	5.66	-	6.66	5.66	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.66	5.66	-	6.66	5.66	-
Follow-up Hdwy	2.28	-	-	2.28	-	-	3.58	4.08	3.38	3.58	4.08	3.38
Pot Cap-1 Maneuver	1135	-	-	1255	-	-	442	348	872	404	356	802
Stage 1	-	-	-	-	-	-	656	641	-	604	602	-
Stage 2	-	-	-	-	-	-	782	590	-	788	640	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1135	-	-	1250	-	-	403	337	869	392	345	802
Mov Cap-2 Maneuver	-	-	-	-	-	-	403	337	-	392	345	-
Stage 1	-	-	-	-	-	-	639	624	-	591	598	-
Stage 2	-	-	-	-	-	-	727	586	-	765	623	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			0.1			10.4			18.5		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	674	1135	-	-	1250	-	-	451
HCM Lane V/C Ratio	0.013	0.022	-	-	0.005	-	-	0.416
HCM Control Delay (s)	10.4	8.2	-	-	7.9	-	-	18.5
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	2

HCM 6th Signalized Intersection Summary

6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	282	0	0	101	683	166	4	194	0	0	0
Future Volume (veh/h)	0	282	0	0	101	683	166	4	194	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	0	336	0	0	120	813	198	5	231			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	0	6	0	0	6	6	6	6	6			
Cap, veh/h	0	1983	0	0	1900	865	383	10	343			
Arrive On Green	0.00	0.58	0.00	0.00	0.58	0.58	0.23	0.23	0.23			
Sat Flow, veh/h	0	3622	0	0	3459	1500	1684	43	1505			
Grp Volume(v), veh/h	0	336	0	0	120	813	203	0	231			
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1648	1500	1727	0	1505			
Q Serve(g_s), s	0.0	2.0	0.0	0.0	0.7	21.7	4.5	0.0	6.1			
Cycle Q Clear(g_c), s	0.0	2.0	0.0	0.0	0.7	21.7	4.5	0.0	6.1			
Prop In Lane	0.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	0	1983	0	0	1900	865	393	0	343			
V/C Ratio(X)	0.00	0.17	0.00	0.00	0.06	0.94	0.52	0.00	0.67			
Avail Cap(c_a), veh/h	0	2443	0	0	2340	1065	824	0	718			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.3	0.0	0.0	4.0	8.5	14.7	0.0	15.3			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	12.6	1.1	0.0	2.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.4	0.0	0.0	0.1	7.0	1.6	0.0	2.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.4	0.0	0.0	4.0	21.1	15.7	0.0	17.6			
LnGrp LOS	A	A	A	A	A	C	B	A	B			
Approach Vol, veh/h		336			933			434				
Approach Delay, s/veh		4.4			18.9			16.7				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			6			8				
Phs Duration (G+Y+Rc), s		29.0			29.0			14.4				
Change Period (Y+Rc), s		4.0			4.0			4.5				
Max Green Setting (Gmax), s		30.8			30.8			20.7				
Max Q Clear Time (g_c+l1), s		4.0			23.7			8.1				
Green Ext Time (p_c), s		3.2			1.3			1.7				
Intersection Summary												
HCM 6th Ctrl Delay					15.5							
HCM 6th LOS					B							

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	111	184	181	86	346	100	143	379	136	122	452	210
Future Volume (veh/h)	111	184	181	86	346	100	143	379	136	122	452	210
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	117	194	191	91	364	105	151	399	143	128	476	221
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	1157	508	115	864	245	182	512	298	140	537	265
Arrive On Green	0.07	0.33	0.33	0.06	0.32	0.32	0.19	0.19	0.19	0.27	0.27	0.27
Sat Flow, veh/h	1767	3526	1549	1767	2687	763	936	2635	1531	519	1990	983
Grp Volume(v), veh/h	117	194	191	91	237	232	292	258	143	451	0	374
Grp Sat Flow(s), veh/h/ln	1767	1763	1549	1767	1763	1688	1809	1763	1531	1830	0	1663
Q Serve(g_s), s	6.9	4.1	9.9	5.3	11.1	11.4	16.3	14.5	8.7	25.1	0.0	22.2
Cycle Q Clear(g_c), s	6.9	4.1	9.9	5.3	11.1	11.4	16.3	14.5	8.7	25.1	0.0	22.2
Prop In Lane	1.00		1.00	1.00		0.45	0.52		1.00	0.28		0.59
Lane Grp Cap(c), veh/h	126	1157	508	115	567	543	352	343	298	494	0	449
V/C Ratio(X)	0.93	0.17	0.38	0.79	0.42	0.43	0.83	0.75	0.48	0.91	0.00	0.83
Avail Cap(c_a), veh/h	126	1157	508	126	567	543	405	395	343	514	0	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.5	25.1	27.0	48.4	27.9	28.0	40.6	39.9	37.6	37.2	0.0	36.1
Incr Delay (d2), s/veh	56.1	0.3	2.1	23.4	2.3	2.5	12.1	6.9	1.2	20.5	0.0	11.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	1.8	3.9	3.1	5.0	4.9	8.3	6.9	3.3	13.8	0.0	10.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	104.6	25.4	29.1	71.8	30.2	30.5	52.8	46.9	38.8	57.6	0.0	48.0
LnGrp LOS	F	C	C	E	C	C	D	D	D	E	A	D
Approach Vol, veh/h	502			560			693			825		
Approach Delay, s/veh	45.3			37.1			47.7			53.3		
Approach LOS	D			D			D			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	38.9			23.9	11.0	38.3		31.8				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	29.5			23.5	7.5	29.5		29.5				
Max Q Clear Time (g_c+I1), s	11.9			18.3	8.9	13.4		27.1				
Green Ext Time (p_c), s	0.0	2.5		1.8	0.0	3.5		1.2				

Intersection Summary

HCM 6th Ctrl Delay	46.7
HCM 6th LOS	D

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕↕		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	103	137	176	57	226	0	0	865	349
Future Volume (vph)	0	0	0	103	137	176	57	226	0	0	865	349
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.5			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.94		1.00	1.00			0.99	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3132		1703	3406			3241	1365
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3132		1703	3406			3241	1365
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	108	144	185	60	238	0	0	911	367
RTOR Reduction (vph)	0	0	0	0	135	0	0	0	0	0	2	109
Lane Group Flow (vph)	0	0	0	0	302	0	60	238	0	0	946	221
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Turn Type				Split	NA		Prot	NA			NA	Perm
Protected Phases				8	8		5	2 7 6			6 7	
Permitted Phases												6 7
Actuated Green, G (s)					11.1		8.3	79.5			67.0	67.0
Effective Green, g (s)					11.1		8.3	74.9			67.0	67.0
Actuated g/C Ratio					0.11		0.08	0.75			0.67	0.67
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					347		141	2551			2171	914
v/s Ratio Prot					c0.10		c0.04	0.07			c0.29	
v/s Ratio Perm												0.16
v/c Ratio					0.87		0.43	0.09			0.44	0.24
Uniform Delay, d1					43.7		43.6	3.4			7.7	6.5
Progression Factor					1.00		0.63	2.08			1.00	1.00
Incremental Delay, d2					19.5		0.7	0.0			0.1	0.1
Delay (s)					63.2		28.1	7.1			7.7	6.5
Level of Service					E		C	A			A	A
Approach Delay (s)		0.0			63.2			11.3			7.4	
Approach LOS		A			E			B			A	
Intersection Summary												
HCM 2000 Control Delay			20.1									
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			62.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	131	87	0	0	0	0	162	182	511	457	0
Future Volume (vph)	121	131	87	0	0	0	0	162	182	511	457	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	4.7	4.7					4.5	4.5	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.95	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1680	1489					3064	1353	1687	3374	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1603	1680	1489					3064	1353	1687	3374	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	127	138	92	0	0	0	0	171	192	538	481	0
RTOR Reduction (vph)	0	0	80	0	0	0	0	50	74	0	0	0
Lane Group Flow (vph)	114	151	12	0	0	0	0	200	39	538	481	0
Confl. Peds. (#/hr)			2							2		
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	7	7						2 8		1	6 8 2	
Permitted Phases			7						2 8			
Actuated Green, G (s)	12.8	12.8	12.8					39.4	39.4	34.4	77.9	
Effective Green, g (s)	12.8	12.8	12.8					34.7	34.7	34.4	73.2	
Actuated g/C Ratio	0.13	0.13	0.13					0.35	0.35	0.34	0.73	
Clearance Time (s)	4.7	4.7	4.7							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	205	215	190					1063	469	580	2469	
v/s Ratio Prot	0.07	c0.09						0.07		c0.32	c0.14	
v/s Ratio Perm			0.01						0.03			
v/c Ratio	0.56	0.70	0.06					0.19	0.08	0.93	0.19	
Uniform Delay, d1	40.9	41.8	38.3					22.8	22.0	31.6	4.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.74	0.82	
Incremental Delay, d2	1.9	8.2	0.1					0.0	0.0	19.5	0.0	
Delay (s)	42.8	50.0	38.4					22.8	22.0	42.9	3.4	
Level of Service	D	D	D					C	C	D	A	
Approach Delay (s)		44.7			0.0			22.6			24.3	
Approach LOS		D			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.1									
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			100.0							18.2		
Intersection Capacity Utilization			62.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑		↖		↖	↖	↑↑	
Traffic Volume (vph)	0	167	186	24	243	0	61	0	10	105	155	34
Future Volume (vph)	0	167	186	24	243	0	61	0	10	105	155	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.91	0.91	
Frpb, ped/bikes		0.99		1.00	1.00		1.00		0.98	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Frt		0.92		1.00	1.00		1.00		0.85	1.00	0.97	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)		3027		1656	3312		1656		1459	1507	3075	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (perm)		3027		1656	3312		1656		1459	1507	3075	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	196	219	28	286	0	72	0	12	124	182	40
RTOR Reduction (vph)	0	155	0	0	0	0	0	0	10	0	17	0
Lane Group Flow (vph)	0	260	0	28	286	0	72	0	2	112	217	0
Confl. Peds. (#/hr)			2			3						2
Confl. Bikes (#/hr)			2			2			2			2
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			
Actuated Green, G (s)		13.6		1.5	19.3		5.9		5.9	7.2	7.2	
Effective Green, g (s)		13.6		1.5	19.3		5.9		5.9	7.2	7.2	
Actuated g/C Ratio		0.29		0.03	0.42		0.13		0.13	0.16	0.16	
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	
Lane Grp Cap (vph)		887		53	1377		210		185	233	477	
v/s Ratio Prot		c0.09		c0.02	0.09		c0.04			c0.07	0.07	
v/s Ratio Perm									0.00			
v/c Ratio		0.29		0.53	0.21		0.34		0.01	0.48	0.46	
Uniform Delay, d1		12.7		22.1	8.7		18.5		17.7	17.9	17.8	
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.1		4.3	0.0		0.4		0.0	0.6	0.3	
Delay (s)		12.8		26.4	8.7		18.8		17.7	18.5	18.1	
Level of Service		B		C	A		B		B	B	B	
Approach Delay (s)		12.8			10.3			18.7			18.2	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			46.4			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			42.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	195	105	18	28	121	102	22	200	36	138	120	120
Future Volume (veh/h)	195	105	18	28	121	102	22	200	36	138	120	120
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796
Adj Flow Rate, veh/h	224	121	21	32	139	117	25	230	41	148	153	138
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	275	762	129	49	515	225	276	468	82	303	319	266
Arrive On Green	0.16	0.26	0.26	0.03	0.15	0.15	0.16	0.16	0.16	0.18	0.18	0.18
Sat Flow, veh/h	1711	2911	493	1711	3413	1492	1711	2896	507	1711	1796	1502
Grp Volume(v), veh/h	224	70	72	32	139	117	25	134	137	148	153	138
Grp Sat Flow(s),veh/h/ln	1711	1706	1698	1711	1706	1492	1711	1706	1697	1711	1796	1502
Q Serve(g_s), s	6.1	1.5	1.6	0.9	1.8	3.5	0.6	3.5	3.6	3.8	3.7	4.0
Cycle Q Clear(g_c), s	6.1	1.5	1.6	0.9	1.8	3.5	0.6	3.5	3.6	3.8	3.7	4.0
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	275	447	445	49	515	225	276	276	274	303	319	266
V/C Ratio(X)	0.82	0.16	0.16	0.65	0.27	0.52	0.09	0.49	0.50	0.49	0.48	0.52
Avail Cap(c_a), veh/h	334	1018	1013	211	1860	813	915	913	908	915	961	803
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	13.8	13.8	23.4	18.3	19.0	17.3	18.5	18.6	18.0	18.0	18.1
Incr Delay (d2), s/veh	10.2	0.2	0.2	5.2	0.4	2.6	0.2	1.9	2.0	1.7	1.6	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.5	0.6	0.4	0.7	1.3	0.2	1.4	1.4	1.5	1.5	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.9	14.0	14.1	28.6	18.7	21.6	17.5	20.4	20.6	19.7	19.6	20.3
LnGrp LOS	C	B	B	C	B	C	B	C	C	B	B	C
Approach Vol, veh/h		366			288			296			439	
Approach Delay, s/veh		23.7			21.0			20.3			19.9	
Approach LOS		C			C			C			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.9	17.2		12.4	11.3	11.8		13.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.0	29.0		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	2.9	3.6		5.6	8.1	5.5		6.0				
Green Ext Time (p_c), s	0.0	1.1		2.2	0.1	1.7		2.6				
Intersection Summary												
HCM 6th Ctrl Delay			21.2									
HCM 6th LOS			C									
Notes												
User approved volume balancing among the lanes for turning movement.												

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	241	2	4	174	131	2	0	6	64	0	24
Future Vol, veh/h	35	241	2	4	174	131	2	0	6	64	0	24
Conflicting Peds, #/hr	0	0	2	0	0	1	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	40	277	2	5	200	151	2	0	7	74	0	28

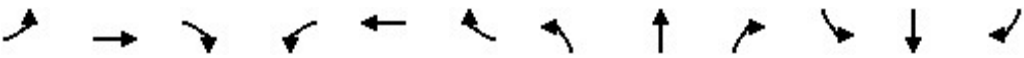
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	352	0	0	281	0	0	470	722	143	507	648	177
Stage 1	-	-	-	-	-	-	360	360	-	287	287	-
Stage 2	-	-	-	-	-	-	110	362	-	220	361	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.62	6.62	7.02	7.62	6.62	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	6.62	5.62	-	6.62	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.62	5.62	-	6.62	5.62	-
Follow-up Hdwy	2.26	-	-	2.26	-	-	3.56	4.06	3.36	3.56	4.06	3.36
Pot Cap-1 Maneuver	1175	-	-	1250	-	-	468	344	866	440	380	823
Stage 1	-	-	-	-	-	-	620	615	-	685	663	-
Stage 2	-	-	-	-	-	-	872	614	-	751	614	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1174	-	-	1248	-	-	439	330	864	423	364	822
Mov Cap-2 Maneuver	-	-	-	-	-	-	439	330	-	423	364	-
Stage 1	-	-	-	-	-	-	598	593	-	661	660	-
Stage 2	-	-	-	-	-	-	839	611	-	719	592	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1			0.1			10.2			14.3		
HCM LOS							B			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	696	1174	-	-	1248	-	-	488
HCM Lane V/C Ratio	0.013	0.034	-	-	0.004	-	-	0.207
HCM Control Delay (s)	10.2	8.2	-	-	7.9	-	-	14.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.8

HCM 6th Signalized Intersection Summary 6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	491	0	0	132	228	97	0	61	0	0	0
Future Volume (veh/h)	0	491	0	0	132	228	97	0	61	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	0	540	0	0	145	251	107	0	67			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	4	0	0	4	4	4	4	4			
Cap, veh/h	0	1809	0	0	1733	788	253	0	224			
Arrive On Green	0.00	0.52	0.00	0.00	0.52	0.52	0.14	0.00	0.14			
Sat Flow, veh/h	0	3681	0	0	3516	1523	1753	0	1555			
Grp Volume(v), veh/h	0	540	0	0	145	251	107	0	67			
Grp Sat Flow(s),veh/h/ln	0	1749	0	0	1675	1523	1753	0	1555			
Q Serve(g_s), s	0.0	2.2	0.0	0.0	0.5	2.4	1.4	0.0	1.0			
Cycle Q Clear(g_c), s	0.0	2.2	0.0	0.0	0.5	2.4	1.4	0.0	1.0			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1809	0	0	1733	788	253	0	224			
V/C Ratio(X)	0.00	0.30	0.00	0.00	0.08	0.32	0.42	0.00	0.30			
Avail Cap(c_a), veh/h	0	8501	0	0	8143	3702	1257	0	1115			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	3.5	0.0	0.0	3.1	3.5	9.8	0.0	9.6			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.1	1.1	0.0	0.7			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.0	0.0	0.2	0.4	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	3.6	0.0	0.0	3.1	3.6	10.9	0.0	10.3			
LnGrp LOS	A	A	A	A	A	A	B	A	B			
Approach Vol, veh/h		540			396			174				
Approach Delay, s/veh		3.6			3.4			10.7				
Approach LOS		A			A			B				
Timer - Assigned Phs		2			6			8				
Phs Duration (G+Y+Rc), s		17.0			17.0			8.1				
Change Period (Y+Rc), s		4.0			4.0			4.5				
Max Green Setting (Gmax), s		61.0			61.0			18.0				
Max Q Clear Time (g_c+l1), s		4.2			4.4			3.4				
Green Ext Time (p_c), s		6.2			0.6			0.6				
Intersection Summary												
HCM 6th Ctrl Delay			4.6									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	347	68	42	226	106	161	492	217	98	361	65
Future Volume (veh/h)	137	347	68	42	226	106	161	492	217	98	361	65
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	147	373	73	45	243	114	173	529	233	105	388	70
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	169	1446	644	58	815	369	186	605	343	128	496	93
Arrive On Green	0.10	0.41	0.41	0.03	0.35	0.35	0.22	0.22	0.22	0.20	0.20	0.20
Sat Flow, veh/h	1767	3526	1571	1767	2347	1064	842	2734	1551	642	2484	468
Grp Volume(v), veh/h	147	373	73	45	180	177	373	329	233	298	0	265
Grp Sat Flow(s), veh/h/ln	1767	1763	1571	1767	1763	1648	1813	1763	1551	1823	0	1770
Q Serve(g_s), s	9.0	7.7	3.2	2.8	8.2	8.6	22.1	19.7	15.1	17.2	0.0	15.5
Cycle Q Clear(g_c), s	9.0	7.7	3.2	2.8	8.2	8.6	22.1	19.7	15.1	17.2	0.0	15.5
Prop In Lane	1.00		1.00	1.00		0.65	0.46		1.00	0.35		0.26
Lane Grp Cap(c), veh/h	169	1446	644	58	612	572	401	390	343	364	0	354
V/C Ratio(X)	0.87	0.26	0.11	0.78	0.29	0.31	0.93	0.84	0.68	0.82	0.00	0.75
Avail Cap(c_a), veh/h	169	1446	644	169	612	572	404	393	345	506	0	491
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.1	21.4	20.1	52.8	26.1	26.3	42.0	41.0	39.2	42.1	0.0	41.4
Incr Delay (d2), s/veh	34.1	0.4	0.3	8.3	1.2	1.4	27.5	15.4	5.2	7.3	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	3.2	1.2	1.4	3.6	3.6	12.9	10.1	6.2	8.4	0.0	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.1	21.8	20.4	61.1	27.3	27.7	69.5	56.4	44.5	49.4	0.0	45.5
LnGrp LOS	F	C	C	E	C	C	E	E	D	D	A	D
Approach Vol, veh/h	593			402			935			563		
Approach Delay, s/veh	36.9			31.3			58.6			47.6		
Approach LOS	D			C			E			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	49.6		27.8	14.0	42.7		25.5				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	10.5	29.5		24.5	10.5	29.5		30.5				
Max Q Clear Time (g_c+I), s	14.8	9.7		24.1	11.0	10.6		19.2				
Green Ext Time (p_c), s	0.0	3.6		0.2	0.0	2.8		2.6				

Intersection Summary

HCM 6th Ctrl Delay	46.5
HCM 6th LOS	D

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	164	5	720	93	898	0	0	406	96
Future Volume (vph)	0	0	0	164	5	720	93	898	0	0	406	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.6			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.88		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3016		1752	3505			3345	1403
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3016		1752	3505			3345	1403
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	173	5	758	98	945	0	0	427	101
RTOR Reduction (vph)	0	0	0	0	126	0	0	0	0	0	1	40
Lane Group Flow (vph)	0	0	0	0	810	0	98	945	0	0	436	51
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type				Perm	NA		Prot	NA			NA	Perm
Protected Phases					8		5	2 7 6			6 7	
Permitted Phases				8								6 7
Actuated Green, G (s)					35.3		10.2	90.4			76.0	76.0
Effective Green, g (s)					35.3		10.2	90.4			76.0	76.0
Actuated g/C Ratio					0.26		0.08	0.67			0.56	0.56
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					788		132	2347			1883	789
v/s Ratio Prot							c0.06	c0.27			0.13	
v/s Ratio Perm					0.27							0.04
v/c Ratio					1.41dr		0.74	0.40			0.23	0.06
Uniform Delay, d1					49.9		61.1	10.1			14.8	13.4
Progression Factor					1.00		0.66	1.00			1.00	1.00
Incremental Delay, d2					39.3		17.4	0.0			0.0	0.0
Delay (s)					89.1		57.6	10.1			14.8	13.4
Level of Service					F		E	B			B	B
Approach Delay (s)		0.0			89.1			14.6			14.6	
Approach LOS		A			F			B			B	
Intersection Summary												
HCM 2000 Control Delay			42.4									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			135.0									Sum of lost time (s) 18.1
Intersection Capacity Utilization			84.2%									ICU Level of Service E
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	724	131	120	0	0	0	0	267	230	312	258	0
Future Volume (vph)	724	131	120	0	0	0	0	267	230	312	258	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6					4.6	4.6	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.97	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1649	1677	1527					3200	1390	1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1649	1677	1527					3200	1390	1736	3471	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	770	139	128	0	0	0	0	284	245	332	274	0
RTOR Reduction (vph)	0	0	90	0	0	0	0	20	95	0	0	0
Lane Group Flow (vph)	454	455	38	0	0	0	0	347	67	332	274	0
Confl. Peds. (#/hr)			2							2		
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						2 8		1	6 8 2	
Permitted Phases	7		7						2 8			
Actuated Green, G (s)	35.4	35.4	35.4					60.4	60.4	25.8	90.4	
Effective Green, g (s)	35.4	35.4	35.4					55.7	55.7	25.8	85.7	
Actuated g/C Ratio	0.26	0.26	0.26					0.41	0.41	0.19	0.63	
Clearance Time (s)	4.6	4.6	4.6							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	432	439	400					1320	573	331	2203	
v/s Ratio Prot								c0.11		c0.19	0.08	
v/s Ratio Perm	c0.28	0.27	0.02						0.05			
v/c Ratio	1.05	1.04	0.09					0.26	0.12	1.00	0.12	
Uniform Delay, d1	49.8	49.8	37.7					26.1	24.5	54.6	9.8	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.72	0.48	
Incremental Delay, d2	57.3	52.7	0.0					0.0	0.0	49.9	0.0	
Delay (s)	107.1	102.5	37.7					26.2	24.5	89.4	4.7	
Level of Service	F	F	D					C	C	F	A	
Approach Delay (s)		96.5			0.0			25.7			51.1	
Approach LOS		F			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			66.6									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			135.0									Sum of lost time (s) 18.1
Intersection Capacity Utilization			84.2%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑		↖		↖	↖	↑↑	
Traffic Volume (vph)	0	166	145	17	212	0	60	0	8	317	36	37
Future Volume (vph)	0	166	145	17	212	0	60	0	8	317	36	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.91	0.91	
Frpb, ped/bikes		0.99		1.00	1.00		1.00		1.00	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Frt		0.93		1.00	1.00		1.00		0.85	1.00	0.98	
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (prot)		3225		1752	3505		1752		1568	1595	3162	
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.97	
Satd. Flow (perm)		3225		1752	3505		1752		1568	1595	3162	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	177	154	18	226	0	64	0	9	337	38	39
RTOR Reduction (vph)	0	110	0	0	0	0	0	0	8	0	15	0
Lane Group Flow (vph)	0	221	0	18	226	0	64	0	1	168	231	0
Confl. Peds. (#/hr)			2			4						2
Confl. Bikes (#/hr)			13			1						
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			
Actuated Green, G (s)		13.7		1.5	19.4		5.9		5.9	8.4	8.4	
Effective Green, g (s)		13.7		1.5	19.4		5.9		5.9	8.4	8.4	
Actuated g/C Ratio		0.29		0.03	0.41		0.12		0.12	0.18	0.18	
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	
Lane Grp Cap (vph)		926		55	1425		216		193	280	556	
v/s Ratio Prot		c0.07		0.01	c0.06		c0.04			c0.11	0.07	
v/s Ratio Perm									0.00			
v/c Ratio		0.24		0.33	0.16		0.30		0.01	0.60	0.42	
Uniform Delay, d1		13.0		22.6	9.0		19.0		18.3	18.1	17.5	
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	
Incremental Delay, d2		0.0		1.3	0.0		0.3		0.0	2.3	0.2	
Delay (s)		13.1		23.9	9.0		19.3		18.3	20.4	17.7	
Level of Service		B		C	A		B		B	C	B	
Approach Delay (s)		13.1			10.1			19.2			18.8	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.0			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			47.7			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			42.4%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	221	184	18	60	204	65	14	192	64	203	178	228
Future Volume (veh/h)	221	184	18	60	204	65	14	192	64	203	178	228
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	254	211	21	69	234	75	16	221	74	233	205	262
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	270	376	37	85	488	212	265	390	127	433	455	377
Arrive On Green	0.16	0.24	0.24	0.05	0.14	0.14	0.16	0.16	0.16	0.26	0.26	0.26
Sat Flow, veh/h	1697	1591	158	1697	3385	1474	1697	2500	812	1697	1781	1477
Grp Volume(v), veh/h	254	0	232	69	234	75	16	147	148	233	205	262
Grp Sat Flow(s),veh/h/ln	1697	0	1749	1697	1692	1474	1697	1692	1620	1697	1781	1477
Q Serve(g_s), s	8.8	0.0	7.0	2.4	3.8	2.7	0.5	4.8	5.0	7.1	5.8	9.6
Cycle Q Clear(g_c), s	8.8	0.0	7.0	2.4	3.8	2.7	0.5	4.8	5.0	7.1	5.8	9.6
Prop In Lane	1.00		0.09	1.00		1.00	1.00		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	270	0	414	85	488	212	265	264	253	433	455	377
V/C Ratio(X)	0.94	0.00	0.56	0.81	0.48	0.35	0.06	0.56	0.58	0.54	0.45	0.70
Avail Cap(c_a), veh/h	270	0	845	177	1505	655	740	738	707	740	777	645
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.8	0.0	20.0	28.0	23.4	23.0	21.4	23.2	23.4	19.2	18.7	20.1
Incr Delay (d2), s/veh	38.1	0.0	1.7	6.6	1.0	1.4	0.1	2.6	3.0	1.5	1.0	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	0.0	2.7	1.0	1.4	0.9	0.2	1.9	1.9	2.6	2.2	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.8	0.0	21.7	34.6	24.5	24.4	21.6	25.9	26.4	20.6	19.7	23.4
LnGrp LOS	E	A	C	C	C	C	C	C	C	C	B	C
Approach Vol, veh/h		486			378			311			700	
Approach Delay, s/veh		43.2			26.3			25.9			21.4	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	18.6		13.8	13.0	13.1		19.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.2	28.8		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	4.4	9.0		7.0	10.8	5.8		11.6				
Green Ext Time (p_c), s	0.0	1.6		2.2	0.0	2.2		3.6				
Intersection Summary												
HCM 6th Ctrl Delay				28.8								
HCM 6th LOS				C								

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	298	2	6	324	34	2	0	6	120	2	43
Future Vol, veh/h	22	298	2	6	324	34	2	0	6	120	2	43
Conflicting Peds, #/hr	0	0	4	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	25	339	2	7	368	39	2	0	7	136	2	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	407	0	0	345	0	0	593	815	344	796	797	204
Stage 1	-	-	-	-	-	-	394	394	-	402	402	-
Stage 2	-	-	-	-	-	-	199	421	-	394	395	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.42	6.62	6.32	7.42	6.62	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.62	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.62	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.276	-	-	2.276	-	-	3.576	4.076	3.376	3.576	4.076	3.376
Pot Cap-1 Maneuver	1113	-	-	1175	-	-	392	302	682	282	310	787
Stage 1	-	-	-	-	-	-	616	592	-	583	587	-
Stage 2	-	-	-	-	-	-	769	575	-	616	591	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1113	-	-	1171	-	-	356	292	679	273	300	787
Mov Cap-2 Maneuver	-	-	-	-	-	-	356	292	-	273	300	-
Stage 1	-	-	-	-	-	-	600	577	-	570	583	-
Stage 2	-	-	-	-	-	-	714	572	-	596	576	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.1			11.6			29.5		
HCM LOS							B			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	553	1113	-	-	1171	-	-	329
HCM Lane V/C Ratio	0.016	0.022	-	-	0.006	-	-	0.57
HCM Control Delay (s)	11.6	8.3	-	-	8.1	-	-	29.5
HCM Lane LOS	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	3.3

HCM 6th Signalized Intersection Summary

6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	322	0	0	117	683	176	4	194	0	0	0
Future Volume (veh/h)	0	322	0	0	117	683	176	4	194	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	0	383	0	0	139	813	210	5	231			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	0	6	0	0	6	6	6	6	6			
Cap, veh/h	0	1983	0	0	1900	865	386	9	344			
Arrive On Green	0.00	0.58	0.00	0.00	0.58	0.58	0.23	0.23	0.23			
Sat Flow, veh/h	0	3622	0	0	3459	1500	1687	40	1506			
Grp Volume(v), veh/h	0	383	0	0	139	813	215	0	231			
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1648	1500	1727	0	1506			
Q Serve(g_s), s	0.0	2.3	0.0	0.0	0.8	21.9	4.8	0.0	6.1			
Cycle Q Clear(g_c), s	0.0	2.3	0.0	0.0	0.8	21.9	4.8	0.0	6.1			
Prop In Lane	0.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	0	1983	0	0	1900	865	395	0	344			
V/C Ratio(X)	0.00	0.19	0.00	0.00	0.07	0.94	0.54	0.00	0.67			
Avail Cap(c_a), veh/h	0	2431	0	0	2329	1060	820	0	715			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.4	0.0	0.0	4.1	8.5	14.8	0.0	15.3			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	12.7	1.2	0.0	2.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.0	0.0	0.2	7.0	1.7	0.0	2.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.5	0.0	0.0	4.1	21.3	16.0	0.0	17.6			
LnGrp LOS	A	A	A	A	A	C	B	A	B			
Approach Vol, veh/h		383			952			446				
Approach Delay, s/veh		4.5			18.8			16.8				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			6			8				
Phs Duration (G+Y+Rc), s		29.1			29.1			14.5				
Change Period (Y+Rc), s		4.0			4.0			4.5				
Max Green Setting (Gmax), s		30.8			30.8			20.7				
Max Q Clear Time (g_c+I1), s		4.3			23.9			8.1				
Green Ext Time (p_c), s		3.7			1.3			1.7				
Intersection Summary												
HCM 6th Ctrl Delay				15.2								
HCM 6th LOS				B								

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021

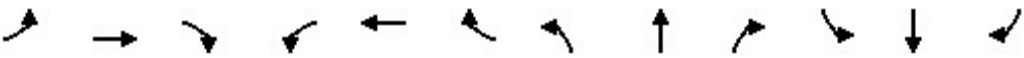


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	204	181	86	354	100	143	379	136	122	452	218
Future Volume (veh/h)	131	204	181	86	354	100	143	379	136	122	452	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	138	215	191	91	373	105	151	399	143	128	476	229
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	1151	506	115	865	240	182	512	298	139	534	274
Arrive On Green	0.07	0.33	0.33	0.06	0.32	0.32	0.19	0.19	0.19	0.27	0.27	0.27
Sat Flow, veh/h	1767	3526	1549	1767	2704	750	936	2635	1531	513	1967	1007
Grp Volume(v), veh/h	138	215	191	91	241	237	292	258	143	456	0	377
Grp Sat Flow(s), veh/h/ln	1767	1763	1549	1767	1763	1690	1809	1763	1531	1830	0	1658
Q Serve(g_s), s	7.5	4.6	9.9	5.3	11.3	11.6	16.3	14.5	8.7	25.4	0.0	22.5
Cycle Q Clear(g_c), s	7.5	4.6	9.9	5.3	11.3	11.6	16.3	14.5	8.7	25.4	0.0	22.5
Prop In Lane	1.00		1.00	1.00		0.44	0.52		1.00	0.28		0.61
Lane Grp Cap(c), veh/h	126	1151	506	115	564	541	352	343	298	497	0	450
V/C Ratio(X)	1.09	0.19	0.38	0.79	0.43	0.44	0.83	0.75	0.48	0.92	0.00	0.84
Avail Cap(c_a), veh/h	126	1151	506	126	564	541	405	395	343	514	0	466
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	25.4	27.2	48.4	28.1	28.2	40.6	39.9	37.6	37.1	0.0	36.1
Incr Delay (d2), s/veh	105.7	0.3	2.1	23.4	2.4	2.6	12.1	6.9	1.2	21.2	0.0	12.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	2.0	3.9	3.1	5.1	5.1	8.3	6.9	3.3	14.1	0.0	10.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	154.4	25.7	29.2	71.8	30.5	30.8	52.8	46.9	38.8	58.4	0.0	48.4
LnGrp LOS	F	C	C	E	C	C	D	D	D	E	A	D
Approach Vol, veh/h	544			569			693			833		
Approach Delay, s/veh	59.6			37.2			47.7			53.9		
Approach LOS	E			D			D			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	38.8			23.9	11.0	38.1		32.0				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	29.5			23.5	7.5	29.5		29.5				
Max Q Clear Time (g_c+I1), s	11.9			18.3	9.5	13.6		27.4				
Green Ext Time (p_c), s	0.0	2.7		1.8	0.0	3.6		1.1				
Intersection Summary												
HCM 6th Ctrl Delay	49.8											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕↕		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	143	137	189	79	263	0	0	882	377
Future Volume (vph)	0	0	0	143	137	189	79	263	0	0	882	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.5			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.94		1.00	1.00			0.99	0.85
Flt Protected					0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3134		1703	3406			3240	1365
Flt Permitted					0.98		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3134		1703	3406			3240	1365
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	151	144	199	83	277	0	0	928	397
RTOR Reduction (vph)	0	0	0	0	115	0	0	0	0	0	3	130
Lane Group Flow (vph)	0	0	0	0	379	0	83	277	0	0	965	227
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Turn Type				Split	NA		Prot	NA			NA	Perm
Protected Phases				8	8		5	2 7 6			6 7	
Permitted Phases												6 7
Actuated Green, G (s)					13.9		9.0	76.7			63.5	63.5
Effective Green, g (s)					13.9		9.0	72.1			63.5	63.5
Actuated g/C Ratio					0.14		0.09	0.72			0.64	0.64
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					435		153	2455			2057	866
v/s Ratio Prot					c0.12		c0.05	0.08			c0.30	
v/s Ratio Perm												0.17
v/c Ratio					0.87		0.54	0.11			0.47	0.26
Uniform Delay, d1					42.2		43.5	4.2			9.5	8.0
Progression Factor					1.00		0.65	2.13			1.00	1.00
Incremental Delay, d2					16.6		2.0	0.0			0.1	0.1
Delay (s)					58.7		30.2	9.0			9.6	8.0
Level of Service					E		C	A			A	A
Approach Delay (s)		0.0			58.7			13.9			9.1	
Approach LOS		A			E			B			A	
Intersection Summary												
HCM 2000 Control Delay			21.2									
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			63.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	131	102	0	0	0	0	210	268	518	507	0
Future Volume (vph)	132	131	102	0	0	0	0	210	268	518	507	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	4.7	4.7					4.5	4.5	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99					0.99	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.95	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1679	1489					3041	1353	1687	3374	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1603	1679	1489					3041	1353	1687	3374	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	139	138	107	0	0	0	0	221	282	545	534	0
RTOR Reduction (vph)	0	0	94	0	0	0	0	69	103	0	0	0
Lane Group Flow (vph)	125	152	13	0	0	0	0	276	55	545	534	0
Confl. Peds. (#/hr)			2						2			
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	7	7						2 8		1	6 8 2	
Permitted Phases			7						2 8			
Actuated Green, G (s)	12.0	12.0	12.0					39.8	39.8	34.8	78.7	
Effective Green, g (s)	12.0	12.0	12.0					35.1	35.1	34.8	74.0	
Actuated g/C Ratio	0.12	0.12	0.12					0.35	0.35	0.35	0.74	
Clearance Time (s)	4.7	4.7	4.7							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	192	201	178					1067	474	587	2496	
v/s Ratio Prot	0.08	c0.09						c0.09		c0.32	0.16	
v/s Ratio Perm			0.01						0.04			
v/c Ratio	0.65	0.76	0.07					0.26	0.12	0.93	0.21	
Uniform Delay, d1	42.0	42.6	39.1					23.2	22.0	31.4	4.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.69	0.76	
Incremental Delay, d2	5.9	13.4	0.1					0.0	0.0	19.2	0.0	
Delay (s)	47.9	56.0	39.1					23.2	22.0	40.9	3.1	
Level of Service	D	E	D					C	C	D	A	
Approach Delay (s)		48.6			0.0			22.8			22.2	
Approach LOS		D			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.5									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			63.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑		↖		↖	↖	↑↑	↖
Traffic Volume (vph)	0	207	217	24	269	0	61	0	10	105	155	34
Future Volume (vph)	0	207	217	24	269	0	61	0	10	105	155	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.99		1.00	1.00		1.00		0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.92		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)		3020		1656	3312		1656		1458	1573	1651	1459
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (perm)		3020		1656	3312		1656		1458	1573	1651	1459
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	244	255	28	316	0	72	0	12	124	182	40
RTOR Reduction (vph)	0	178	0	0	0	0	0	0	11	0	0	32
Lane Group Flow (vph)	0	321	0	28	316	0	72	0	1	112	194	8
Confl. Peds. (#/hr)			2			3						2
Confl. Bikes (#/hr)			2			2			2			2
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		14.6		3.3	22.1		5.8		5.8	9.8	9.8	9.8
Effective Green, g (s)		14.6		3.3	22.1		5.8		5.8	9.8	9.8	9.8
Actuated g/C Ratio		0.28		0.06	0.43		0.11		0.11	0.19	0.19	0.19
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		852		105	1415		185		163	298	312	276
v/s Ratio Prot		c0.11		0.02	c0.10		c0.04			0.07	c0.12	
v/s Ratio Perm									0.00			0.01
v/c Ratio		0.38		0.27	0.22		0.39		0.01	0.38	0.62	0.03
Uniform Delay, d1		14.9		23.0	9.4		21.3		20.4	18.3	19.2	17.1
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1		0.5	0.0		0.5		0.0	0.3	2.8	0.0
Delay (s)		15.0		23.5	9.4		21.8		20.4	18.6	22.0	17.1
Level of Service		B		C	A		C		C	B	C	B
Approach Delay (s)		15.0			10.5			21.6			20.3	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.7			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			51.7			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			44.5%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	219	129	18	55	161	103	24	251	53	138	214	192
Future Volume (veh/h)	219	129	18	55	161	103	24	251	53	138	214	192
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796
Adj Flow Rate, veh/h	252	148	21	63	185	118	28	289	61	159	246	221
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	274	374	53	78	496	217	303	497	103	394	413	343
Arrive On Green	0.16	0.24	0.24	0.05	0.15	0.15	0.18	0.18	0.18	0.23	0.23	0.23
Sat Flow, veh/h	1711	1535	218	1711	3413	1492	1711	2806	583	1711	1796	1489
Grp Volume(v), veh/h	252	0	169	63	185	118	28	174	176	159	246	221
Grp Sat Flow(s),veh/h/ln	1711	0	1753	1711	1706	1492	1711	1706	1682	1711	1796	1489
Q Serve(g_s), s	8.6	0.0	4.8	2.2	2.9	4.3	0.8	5.5	5.7	4.7	7.2	7.9
Cycle Q Clear(g_c), s	8.6	0.0	4.8	2.2	2.9	4.3	0.8	5.5	5.7	4.7	7.2	7.9
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	274	0	427	78	496	217	303	302	298	394	413	343
V/C Ratio(X)	0.92	0.00	0.40	0.81	0.37	0.54	0.09	0.58	0.59	0.40	0.60	0.64
Avail Cap(c_a), veh/h	274	0	858	173	1527	668	751	749	739	751	789	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.5	0.0	18.8	28.0	22.9	23.5	20.4	22.3	22.4	19.3	20.3	20.6
Incr Delay (d2), s/veh	33.0	0.0	0.8	7.3	0.7	3.0	0.2	2.5	2.7	1.0	1.9	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	1.9	1.0	1.1	1.6	0.3	2.3	2.3	1.8	3.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.5	0.0	19.6	35.3	23.5	26.5	20.6	24.8	25.1	20.3	22.3	23.5
LnGrp LOS	E	A	B	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		421			366			378			626	
Approach Delay, s/veh		42.3			26.5			24.6			22.2	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.2	18.9		15.0	13.0	13.1		18.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.0	29.0		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	4.2	6.8		7.7	10.6	6.3		9.9				
Green Ext Time (p_c), s	0.0	1.3		2.8	0.0	2.1		3.7				
Intersection Summary												
HCM 6th Ctrl Delay				28.3								
HCM 6th LOS				C								

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	282	2	4	242	131	2	0	6	64	0	24
Future Vol, veh/h	35	282	2	4	242	131	2	0	6	64	0	24
Conflicting Peds, #/hr	0	0	2	0	0	1	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	40	324	2	5	278	151	2	0	7	74	0	28

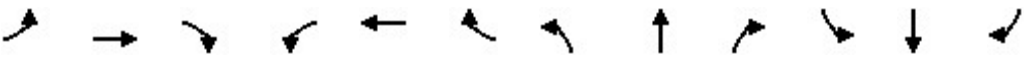
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	430	0	0	328	0	0	556	847	328	775	773	216
Stage 1	-	-	-	-	-	-	407	407	-	365	365	-
Stage 2	-	-	-	-	-	-	149	440	-	410	408	-
Critical Hdwy	4.19	-	-	4.19	-	-	7.39	6.59	6.29	7.39	6.59	6.99
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.59	-	6.59	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.59	5.59	-	6.19	5.59	-
Follow-up Hdwy	2.257	-	-	2.257	-	-	3.557	4.057	3.357	3.557	4.057	3.357
Pot Cap-1 Maneuver	1103	-	-	1205	-	-	420	292	702	295	323	778
Stage 1	-	-	-	-	-	-	611	588	-	618	614	-
Stage 2	-	-	-	-	-	-	829	568	-	608	587	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1102	-	-	1203	-	-	392	279	700	283	309	777
Mov Cap-2 Maneuver	-	-	-	-	-	-	392	279	-	283	309	-
Stage 1	-	-	-	-	-	-	588	566	-	595	611	-
Stage 2	-	-	-	-	-	-	796	565	-	580	565	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.1			11.3			19.9		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	585	1102	-	-	1203	-	-	342
HCM Lane V/C Ratio	0.016	0.037	-	-	0.004	-	-	0.296
HCM Control Delay (s)	11.3	8.4	-	-	8	-	-	19.9
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	1.2

HCM 6th Signalized Intersection Summary 6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	511	0	0	170	228	127	0	61	0	0	0
Future Volume (veh/h)	0	511	0	0	170	228	127	0	61	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	0	562	0	0	187	251	140	0	67			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	4	0	0	4	4	4	4	4			
Cap, veh/h	0	1786	0	0	1711	778	272	0	241			
Arrive On Green	0.00	0.51	0.00	0.00	0.51	0.51	0.16	0.00	0.16			
Sat Flow, veh/h	0	3681	0	0	3516	1523	1753	0	1555			
Grp Volume(v), veh/h	0	562	0	0	187	251	140	0	67			
Grp Sat Flow(s),veh/h/ln	0	1749	0	0	1675	1523	1753	0	1555			
Q Serve(g_s), s	0.0	2.4	0.0	0.0	0.7	2.5	1.9	0.0	1.0			
Cycle Q Clear(g_c), s	0.0	2.4	0.0	0.0	0.7	2.5	1.9	0.0	1.0			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1786	0	0	1711	778	272	0	241			
V/C Ratio(X)	0.00	0.31	0.00	0.00	0.11	0.32	0.52	0.00	0.28			
Avail Cap(c_a), veh/h	0	8389	0	0	8035	3653	1241	0	1101			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	3.6	0.0	0.0	3.2	3.6	9.9	0.0	9.5			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	0.1	1.5	0.0	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.0	0.0	0.1	0.2	0.6	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	3.8	0.0	0.0	3.2	3.7	11.4	0.0	10.1			
LnGrp LOS	A	A	A	A	A	A	B	A	B			
Approach Vol, veh/h		562			438			207				
Approach Delay, s/veh		3.8			3.5			11.0				
Approach LOS		A			A			B				
Timer - Assigned Phs		2			6			8				
Phs Duration (G+Y+Rc), s		17.0			17.0			8.4				
Change Period (Y+Rc), s		4.0			4.0			4.5				
Max Green Setting (Gmax), s		61.0			61.0			18.0				
Max Q Clear Time (g_c+l1), s		4.4			4.5			3.9				
Green Ext Time (p_c), s		6.5			0.6			0.8				
Intersection Summary												
HCM 6th Ctrl Delay			4.9									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	357	68	42	246	106	161	492	217	98	361	83
Future Volume (veh/h)	147	357	68	42	246	106	161	492	217	98	361	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	158	384	73	45	265	114	173	529	233	105	388	89
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	169	1424	635	58	823	344	186	605	343	127	491	118
Arrive On Green	0.10	0.40	0.40	0.03	0.34	0.34	0.22	0.22	0.22	0.21	0.21	0.21
Sat Flow, veh/h	1767	3526	1571	1767	2413	1008	842	2734	1551	619	2385	573
Grp Volume(v), veh/h	158	384	73	45	191	188	373	329	233	310	0	272
Grp Sat Flow(s), veh/h/ln	1767	1763	1571	1767	1763	1658	1813	1763	1551	1825	0	1752
Q Serve(g_s), s	9.8	8.0	3.2	2.8	8.8	9.2	22.1	19.7	15.1	17.9	0.0	16.1
Cycle Q Clear(g_c), s	9.8	8.0	3.2	2.8	8.8	9.2	22.1	19.7	15.1	17.9	0.0	16.1
Prop In Lane	1.00		1.00	1.00		0.61	0.46		1.00	0.34		0.33
Lane Grp Cap(c), veh/h	169	1424	635	58	601	566	401	390	343	375	0	360
V/C Ratio(X)	0.94	0.27	0.11	0.78	0.32	0.33	0.93	0.84	0.68	0.83	0.00	0.76
Avail Cap(c_a), veh/h	169	1424	635	169	601	566	404	393	345	506	0	486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.4	21.9	20.5	52.8	26.8	26.9	42.0	41.0	39.2	41.8	0.0	41.1
Incr Delay (d2), s/veh	49.4	0.5	0.4	8.3	1.4	1.6	27.5	15.4	5.2	8.0	0.0	4.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	6.6	3.4	1.2	1.4	3.9	3.9	12.9	10.1	6.2	8.8	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	98.9	22.4	20.8	61.1	28.2	28.5	69.5	56.4	44.5	49.8	0.0	45.7
LnGrp LOS	F	C	C	E	C	C	E	E	D	D	A	D
Approach Vol, veh/h	615			424			935			582		
Approach Delay, s/veh	41.8			31.8			58.6			47.9		
Approach LOS	D			C			E			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	48.9		27.8	14.0	42.0		26.1				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	10.5	29.5		24.5	10.5	29.5		30.5				
Max Q Clear Time (g_c+I), s	14.8	10.0		24.1	11.8	11.2		19.9				
Green Ext Time (p_c), s	0.0	3.7		0.2	0.0	2.9		2.7				

Intersection Summary

HCM 6th Ctrl Delay	47.7
HCM 6th LOS	D

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	261	5	728	104	919	0	0	449	125
Future Volume (vph)	0	0	0	261	5	728	104	919	0	0	449	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.6			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.89		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3047		1752	3505			3342	1403
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3047		1752	3505			3342	1403
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	275	5	766	109	967	0	0	473	132
RTOR Reduction (vph)	0	0	0	0	121	0	0	0	0	0	1	53
Lane Group Flow (vph)	0	0	0	0	925	0	109	967	0	0	485	66
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type				Perm	NA		Prot	NA			NA	Perm
Protected Phases					8		5	2 7 6			6 7	
Permitted Phases				8								6 7
Actuated Green, G (s)					35.3		10.8	90.4			75.4	75.4
Effective Green, g (s)					35.3		10.8	90.4			75.4	75.4
Actuated g/C Ratio					0.26		0.08	0.67			0.56	0.56
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					796		140	2347			1866	783
v/s Ratio Prot							c0.06	c0.28			0.15	
v/s Ratio Perm					0.30							0.05
v/c Ratio					1.44dr		0.78	0.41			0.26	0.08
Uniform Delay, d1					49.9		60.9	10.2			15.4	13.8
Progression Factor					1.00		0.65	1.02			1.00	1.00
Incremental Delay, d2					86.5		21.1	0.0			0.0	0.0
Delay (s)					136.4		60.9	10.4			15.4	13.8
Level of Service					F		E	B			B	B
Approach Delay (s)		0.0			136.4			15.5			15.1	
Approach LOS		A			F			B			B	
Intersection Summary												
HCM 2000 Control Delay			61.8									
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			135.0									
Intersection Capacity Utilization			88.5%									
Analysis Period (min)			15									
HCM 2000 Level of Service E Sum of lost time (s) 18.1 ICU Level of Service E												
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	730	131	163	0	0	0	0	293	280	329	381	0
Future Volume (vph)	730	131	163	0	0	0	0	293	280	329	381	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6					4.6	4.6	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.96	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1649	1677	1527					3181	1390	1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1649	1677	1527					3181	1390	1736	3471	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	777	139	173	0	0	0	0	312	298	350	405	0
RTOR Reduction (vph)	0	0	111	0	0	0	0	26	110	0	0	0
Lane Group Flow (vph)	458	458	62	0	0	0	0	396	78	350	405	0
Confl. Peds. (#/hr)			2							2		
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						2 8		1	6 8 2	
Permitted Phases	7		7						2 8			
Actuated Green, G (s)	35.4	35.4	35.4					60.7	60.7	25.5	90.4	
Effective Green, g (s)	35.4	35.4	35.4					56.0	56.0	25.5	85.7	
Actuated g/C Ratio	0.26	0.26	0.26					0.41	0.41	0.19	0.63	
Clearance Time (s)	4.6	4.6	4.6							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	432	439	400					1319	576	327	2203	
v/s Ratio Prot								c0.12		c0.20	0.12	
v/s Ratio Perm	c0.28	0.27	0.04						0.06			
v/c Ratio	1.06	1.04	0.16					0.30	0.14	1.07	0.18	
Uniform Delay, d1	49.8	49.8	38.3					26.4	24.5	54.8	10.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.72	0.42	
Incremental Delay, d2	60.1	54.7	0.1					0.6	0.5	69.2	0.0	
Delay (s)	109.9	104.5	38.4					27.0	25.0	108.4	4.3	
Level of Service	F	F	D					C	C	F	A	
Approach Delay (s)		96.3			0.0			26.4			52.5	
Approach LOS		F			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			65.4									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			135.0									Sum of lost time (s) 18.1
Intersection Capacity Utilization			88.5%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑		↑		↑	↑	↑	↑
Traffic Volume (vph)	0	186	166	17	280	0	60	0	8	317	36	37
Future Volume (vph)	0	186	166	17	280	0	60	0	8	317	36	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.98		1.00	1.00		1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.93		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (prot)		3198		1752	3505		1752		1568	1665	1685	1548
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (perm)		3198		1752	3505		1752		1568	1665	1685	1548
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	198	177	18	298	0	64	0	9	337	38	39
RTOR Reduction (vph)	0	127	0	0	0	0	0	0	8	0	0	32
Lane Group Flow (vph)	0	248	0	18	298	0	64	0	1	185	190	7
Confl. Peds. (#/hr)			2			4						2
Confl. Bikes (#/hr)			13			1						
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		13.7		1.5	19.4		5.9		5.9	8.8	8.8	8.8
Effective Green, g (s)		13.7		1.5	19.4		5.9		5.9	8.8	8.8	8.8
Actuated g/C Ratio		0.28		0.03	0.40		0.12		0.12	0.18	0.18	0.18
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		910		54	1413		214		192	304	308	283
v/s Ratio Prot		c0.08		0.01	c0.09		c0.04			0.11	c0.11	
v/s Ratio Perm									0.00			0.00
v/c Ratio		0.27		0.33	0.21		0.30		0.01	0.61	0.62	0.03
Uniform Delay, d1		13.3		22.8	9.4		19.2		18.5	18.1	18.1	16.1
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1		1.3	0.0		0.3		0.0	2.4	2.6	0.0
Delay (s)		13.4		24.1	9.4		19.5		18.5	20.4	20.7	16.1
Level of Service		B		C	A		B		B	C	C	B
Approach Delay (s)		13.4			10.2			19.4			20.1	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			15.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			48.1			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			43.8%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	221	184	18	61	204	117	14	193	64	35	212	178
Future Volume (veh/h)	221	184	18	61	204	117	14	193	64	35	212	178
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781		1781	1781
Adj Flow Rate, veh/h	254	211	21	70	234	134	16	222	74		244	205
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87		0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8		8	8
Cap, veh/h	261	400	40	87	558	244	261	386	125		428	450
Arrive On Green	0.15	0.25	0.25	0.05	0.16	0.16	0.15	0.15	0.15		0.25	0.25
Sat Flow, veh/h	1697	1591	158	1697	3385	1476	1697	2503	810		1697	1781
Grp Volume(v), veh/h	254	0	232	70	234	134	16	148	148		244	205
Grp Sat Flow(s),veh/h/ln	1697	0	1749	1697	1692	1476	1697	1692	1621		1697	1781
Q Serve(g_s), s	9.2	0.0	7.1	2.5	3.8	5.2	0.5	5.0	5.3		7.8	6.0
Cycle Q Clear(g_c), s	9.2	0.0	7.1	2.5	3.8	5.2	0.5	5.0	5.3		7.8	6.0
Prop In Lane	1.00		0.09	1.00		1.00	1.00		0.50		1.00	
Lane Grp Cap(c), veh/h	261	0	439	87	558	244	261	261	250		428	450
V/C Ratio(X)	0.97	0.00	0.53	0.80	0.42	0.55	0.06	0.57	0.59		0.57	0.46
Avail Cap(c_a), veh/h	261	0	815	170	1451	633	713	712	682		713	749
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	26.0	0.0	20.0	29.0	23.2	23.7	22.3	24.2	24.4		20.2	19.5
Incr Delay (d2), s/veh	48.3	0.0	1.4	6.4	0.7	2.7	0.1	2.7	3.2		1.7	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	0.0	2.7	1.1	1.4	1.8	0.2	2.0	2.0		2.9	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.3	0.0	21.4	35.4	23.9	26.5	22.5	27.0	27.5		21.9	20.6
LnGrp LOS	E	A	C	D	C	C	C	C	C		C	C
Approach Vol, veh/h		486			438			312				711
Approach Delay, s/veh		49.0			26.5			27.0				22.4
Approach LOS		D			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	20.0		14.0	13.0	14.7		20.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.2	28.8		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	4.5	9.1		7.3	11.2	7.2		12.0				
Green Ext Time (p_c), s	0.0	1.6		2.2	0.0	2.5		3.6				
Intersection Summary												
HCM 6th Ctrl Delay				30.7								
HCM 6th LOS				C								
Notes												
User approved ignoring U-Turning movement.												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	228
Future Volume (veh/h)	228
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1781
Adj Flow Rate, veh/h	262
Peak Hour Factor	0.87
Percent Heavy Veh, %	8
Cap, veh/h	373
Arrive On Green	0.25
Sat Flow, veh/h	1477
Grp Volume(v), veh/h	262
Grp Sat Flow(s),veh/h/ln	1477
Q Serve(g_s), s	10.0
Cycle Q Clear(g_c), s	10.0
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	373
V/C Ratio(X)	0.70
Avail Cap(c_a), veh/h	621
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	21.0
Incr Delay (d2), s/veh	3.4
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.4
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	24.4
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	6.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	301	2	6	389	34	2	0	6	120	2	43
Future Vol, veh/h	22	301	2	6	389	34	2	0	6	120	2	43
Conflicting Peds, #/hr	0	0	4	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	25	342	2	7	442	39	2	0	7	136	2	49

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	481	0	0	348	0	0	633	892	347	873	874	241
Stage 1	-	-	-	-	-	-	397	397	-	476	476	-
Stage 2	-	-	-	-	-	-	236	495	-	397	398	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.42	6.62	6.32	7.42	6.62	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.62	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.62	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.276	-	-	2.276	-	-	3.576	4.076	3.376	3.576	4.076	3.376
Pot Cap-1 Maneuver	1044	-	-	1172	-	-	368	272	679	249	279	745
Stage 1	-	-	-	-	-	-	614	590	-	526	543	-
Stage 2	-	-	-	-	-	-	732	533	-	614	589	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1044	-	-	1168	-	-	333	263	676	241	270	745
Mov Cap-2 Maneuver	-	-	-	-	-	-	333	263	-	241	270	-
Stage 1	-	-	-	-	-	-	597	573	-	513	540	-
Stage 2	-	-	-	-	-	-	677	530	-	593	573	-

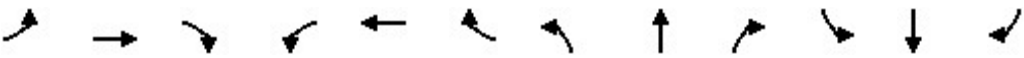
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.1			11.8			36.8		
HCM LOS							B			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	538	1044	-	-	1168	-	-	293
HCM Lane V/C Ratio	0.017	0.024	-	-	0.006	-	-	0.64
HCM Control Delay (s)	11.8	8.5	-	-	8.1	-	-	36.8
HCM Lane LOS	B	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	4.1

HCM 6th Signalized Intersection Summary

6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	329	0	0	154	683	204	4	194	0	0	0
Future Volume (veh/h)	0	329	0	0	154	683	204	4	194	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	0	392	0	0	183	813	243	5	231			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	0	6	0	0	6	6	6	6	6			
Cap, veh/h	0	1983	0	0	1899	864	391	8	348			
Arrive On Green	0.00	0.58	0.00	0.00	0.58	0.58	0.23	0.23	0.23			
Sat Flow, veh/h	0	3622	0	0	3459	1500	1692	35	1506			
Grp Volume(v), veh/h	0	392	0	0	183	813	248	0	231			
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1648	1500	1726	0	1506			
Q Serve(g_s), s	0.0	2.4	0.0	0.0	1.1	22.1	5.7	0.0	6.2			
Cycle Q Clear(g_c), s	0.0	2.4	0.0	0.0	1.1	22.1	5.7	0.0	6.2			
Prop In Lane	0.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	0	1983	0	0	1899	864	400	0	348			
V/C Ratio(X)	0.00	0.20	0.00	0.00	0.10	0.94	0.62	0.00	0.66			
Avail Cap(c_a), veh/h	0	2399	0	0	2298	1046	809	0	706			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.5	0.0	0.0	4.2	8.7	15.2	0.0	15.4			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	13.1	1.6	0.0	2.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.0	0.0	0.2	7.3	2.1	0.0	2.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.5	0.0	0.0	4.2	21.7	16.8	0.0	17.6			
LnGrp LOS	A	A	A	A	A	C	B	A	B			
Approach Vol, veh/h		392			996			479				
Approach Delay, s/veh		4.5			18.5			17.2				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			6			8				
Phs Duration (G+Y+Rc), s		29.4			29.4			14.7				
Change Period (Y+Rc), s		4.0			4.0			4.5				
Max Green Setting (Gmax), s		30.8			30.8			20.7				
Max Q Clear Time (g_c+l1), s		4.4			24.1			8.2				
Green Ext Time (p_c), s		3.8			1.3			1.9				
Intersection Summary												
HCM 6th Ctrl Delay			15.2									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	211	181	86	382	100	143	379	136	122	452	227
Future Volume (veh/h)	131	211	181	86	382	100	143	379	136	122	452	227
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		0.97	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	138	222	191	91	402	105	151	399	143	128	476	239
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	1144	503	115	875	226	182	512	298	139	530	284
Arrive On Green	0.07	0.32	0.32	0.06	0.32	0.32	0.19	0.19	0.19	0.27	0.27	0.27
Sat Flow, veh/h	1767	3526	1549	1767	2752	710	936	2635	1531	507	1938	1038
Grp Volume(v), veh/h	138	222	191	91	256	251	292	258	143	462	0	381
Grp Sat Flow(s), veh/h/ln	1767	1763	1549	1767	1763	1699	1809	1763	1531	1830	0	1652
Q Serve(g_s), s	7.5	4.8	10.0	5.3	12.2	12.4	16.3	14.5	8.7	25.8	0.0	22.8
Cycle Q Clear(g_c), s	7.5	4.8	10.0	5.3	12.2	12.4	16.3	14.5	8.7	25.8	0.0	22.8
Prop In Lane	1.00		1.00	1.00		0.42	0.52		1.00	0.28		0.63
Lane Grp Cap(c), veh/h	126	1144	503	115	560	540	352	343	298	501	0	452
V/C Ratio(X)	1.09	0.19	0.38	0.79	0.46	0.47	0.83	0.75	0.48	0.92	0.00	0.84
Avail Cap(c_a), veh/h	126	1144	503	126	560	540	405	395	343	514	0	464
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.96	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	25.6	27.3	48.4	28.6	28.7	40.6	39.9	37.6	37.1	0.0	36.0
Incr Delay (d2), s/veh	105.7	0.4	2.1	23.4	2.7	2.9	12.1	6.9	1.2	22.3	0.0	12.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	2.0	4.0	3.1	5.5	5.4	8.3	6.9	3.3	14.4	0.0	10.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	154.4	25.9	29.4	71.8	31.2	31.5	52.8	46.9	38.8	59.4	0.0	48.9
LnGrp LOS	F	C	C	E	C	C	D	D	D	E	A	D
Approach Vol, veh/h	551			598			693			843		
Approach Delay, s/veh	59.3			37.5			47.7			54.6		
Approach LOS	E			D			D			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	38.6			23.9	11.0	37.9		32.2				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	29.5			23.5	7.5	29.5		29.5				
Max Q Clear Time (g_c+I1), s	12.0			18.3	9.5	14.4		27.8				
Green Ext Time (p_c), s	0.0	2.7		1.8	0.0	3.7		0.9				
Intersection Summary												
HCM 6th Ctrl Delay	50.0											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	143	137	189	84	269	0	0	904	377
Future Volume (vph)	0	0	0	143	137	189	84	269	0	0	904	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.5			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.94		1.00	1.00			0.99	0.85
Flt Protected					0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3134		1703	3406			3241	1365
Flt Permitted					0.98		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3134		1703	3406			3241	1365
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	151	144	199	88	283	0	0	952	397
RTOR Reduction (vph)	0	0	0	0	115	0	0	0	0	0	3	131
Lane Group Flow (vph)	0	0	0	0	379	0	88	283	0	0	989	226
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Turn Type				Split	NA		Prot	NA			NA	Perm
Protected Phases				8	8		5	2 7 6			6 7	
Permitted Phases												6 7
Actuated Green, G (s)					14.1		9.1	76.5			63.2	63.2
Effective Green, g (s)					14.1		9.1	71.9			63.2	63.2
Actuated g/C Ratio					0.14		0.09	0.72			0.63	0.63
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					441		154	2448			2048	862
v/s Ratio Prot					c0.12		c0.05	0.08			c0.31	
v/s Ratio Perm												0.17
v/c Ratio					0.86		0.57	0.12			0.48	0.26
Uniform Delay, d1					42.0		43.6	4.3			9.7	8.1
Progression Factor					1.00		0.64	2.14			1.00	1.00
Incremental Delay, d2					14.7		3.0	0.0			0.1	0.1
Delay (s)					56.7		30.9	9.2			9.8	8.2
Level of Service					E		C	A			A	A
Approach Delay (s)		0.0			56.7			14.4			9.4	
Approach LOS		A			E			B			A	
Intersection Summary												
HCM 2000 Control Delay			20.8									
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			63.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	132	131	124	0	0	0	0	221	279	518	529	0
Future Volume (vph)	132	131	124	0	0	0	0	221	279	518	529	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	4.7	4.7					4.5	4.5	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99					0.99	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.95	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1679	1489					3042	1353	1687	3374	
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1603	1679	1489					3042	1353	1687	3374	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	139	138	131	0	0	0	0	233	294	545	557	0
RTOR Reduction (vph)	0	0	115	0	0	0	0	67	107	0	0	0
Lane Group Flow (vph)	125	152	16	0	0	0	0	295	58	545	557	0
Confl. Peds. (#/hr)			2						2			
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	7	7						2 8		1	6 8 2	
Permitted Phases			7						2 8			
Actuated Green, G (s)	12.0	12.0	12.0					40.0	40.0	34.6	78.7	
Effective Green, g (s)	12.0	12.0	12.0					35.3	35.3	34.6	74.0	
Actuated g/C Ratio	0.12	0.12	0.12					0.35	0.35	0.35	0.74	
Clearance Time (s)	4.7	4.7	4.7							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	192	201	178					1073	477	583	2496	
v/s Ratio Prot	0.08	c0.09						c0.10		c0.32	0.17	
v/s Ratio Perm			0.01						0.04			
v/c Ratio	0.65	0.76	0.09					0.27	0.12	0.93	0.22	
Uniform Delay, d1	42.0	42.6	39.1					23.2	21.9	31.6	4.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.68	0.77	
Incremental Delay, d2	5.9	13.4	0.1					0.1	0.0	20.4	0.0	
Delay (s)	47.9	56.0	39.2					23.2	21.9	42.0	3.1	
Level of Service	D	E	D					C	C	D	A	
Approach Delay (s)		48.1			0.0			22.8			22.3	
Approach LOS		D			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.6									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			63.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑		↑		↑	↑	↑↑	↑
Traffic Volume (vph)	0	210	217	24	334	0	61	0	10	109	155	34
Future Volume (vph)	0	210	217	24	334	0	61	0	10	109	155	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.99		1.00	1.00		1.00		0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.92		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)		3022		1656	3312		1656		1458	1573	1650	1459
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (perm)		3022		1656	3312		1656		1458	1573	1650	1459
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	247	255	28	393	0	72	0	12	128	182	40
RTOR Reduction (vph)	0	174	0	0	0	0	0	0	11	0	0	32
Lane Group Flow (vph)	0	328	0	28	393	0	72	0	1	115	195	8
Confl. Peds. (#/hr)			2			3						2
Confl. Bikes (#/hr)			2			2			2			2
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		14.6		3.3	22.1		5.8		5.8	9.8	9.8	9.8
Effective Green, g (s)		14.6		3.3	22.1		5.8		5.8	9.8	9.8	9.8
Actuated g/C Ratio		0.28		0.06	0.43		0.11		0.11	0.19	0.19	0.19
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		853		105	1415		185		163	298	312	276
v/s Ratio Prot		c0.11		0.02	c0.12		c0.04			0.07	c0.12	
v/s Ratio Perm									0.00			0.01
v/c Ratio		0.38		0.27	0.28		0.39		0.01	0.39	0.62	0.03
Uniform Delay, d1		14.9		23.0	9.6		21.3		20.4	18.3	19.3	17.1
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1		0.5	0.0		0.5		0.0	0.3	2.8	0.0
Delay (s)		15.0		23.5	9.7		21.8		20.4	18.6	22.1	17.1
Level of Service		B		C	A		C		C	B	C	B
Approach Delay (s)		15.0			10.6			21.6			20.4	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			15.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			51.7			Sum of lost time (s)				18.2		
Intersection Capacity Utilization			44.5%			ICU Level of Service				A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	219	129	18	55	161	135	24	251	53	22	144	214
Future Volume (veh/h)	219	129	18	55	161	135	24	251	53	22	144	214
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1796	1796	1796		1796	1796
Adj Flow Rate, veh/h	252	148	21	63	185	155	28	289	61		166	246
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87		0.87	0.87
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7		7	7
Cap, veh/h	264	400	57	78	573	251	298	489	101		389	408
Arrive On Green	0.15	0.26	0.26	0.05	0.17	0.17	0.17	0.17	0.17		0.23	0.23
Sat Flow, veh/h	1711	1535	218	1711	3413	1493	1711	2806	583		1711	1796
Grp Volume(v), veh/h	252	0	169	63	185	155	28	174	176		166	246
Grp Sat Flow(s),veh/h/ln	1711	0	1753	1711	1706	1493	1711	1706	1682		1711	1796
Q Serve(g_s), s	9.0	0.0	4.9	2.2	2.9	5.9	0.8	5.8	5.9		5.1	7.5
Cycle Q Clear(g_c), s	9.0	0.0	4.9	2.2	2.9	5.9	0.8	5.8	5.9		5.1	7.5
Prop In Lane	1.00		0.12	1.00		1.00	1.00		0.35		1.00	
Lane Grp Cap(c), veh/h	264	0	457	78	573	251	298	297	293		389	408
V/C Ratio(X)	0.95	0.00	0.37	0.81	0.32	0.62	0.09	0.59	0.60		0.43	0.60
Avail Cap(c_a), veh/h	264	0	827	167	1470	643	723	721	711		723	759
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	25.8	0.0	18.6	29.1	22.5	23.8	21.3	23.4	23.4		20.3	21.3
Incr Delay (d2), s/veh	42.3	0.0	0.7	7.2	0.5	3.5	0.2	2.6	2.8		1.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	6.5	0.0	1.9	1.0	1.1	2.2	0.3	2.4	2.4		2.0	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.1	0.0	19.3	36.3	23.0	27.3	21.5	26.0	26.2		21.4	23.3
LnGrp LOS	E	A	B	D	C	C	C	C	C		C	C
Approach Vol, veh/h		421			403			378				633
Approach Delay, s/veh		48.5			26.7			25.8				23.3
Approach LOS		D			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	20.5		15.2	13.0	14.8		18.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.0	29.0		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	4.2	6.9		7.9	11.0	7.9		10.3				
Green Ext Time (p_c), s	0.0	1.3		2.8	0.0	2.3		3.7				
Intersection Summary												
HCM 6th Ctrl Delay				30.3								
HCM 6th LOS				C								
Notes												
User approved ignoring U-Turning movement.												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	192
Future Volume (veh/h)	192
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1796
Adj Flow Rate, veh/h	221
Peak Hour Factor	0.87
Percent Heavy Veh, %	7
Cap, veh/h	338
Arrive On Green	0.23
Sat Flow, veh/h	1489
Grp Volume(v), veh/h	221
Grp Sat Flow(s),veh/h/ln	1489
Q Serve(g_s), s	8.3
Cycle Q Clear(g_c), s	8.3
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	338
V/C Ratio(X)	0.65
Avail Cap(c_a), veh/h	630
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	21.6
Incr Delay (d2), s/veh	3.0
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.0
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	24.6
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	2.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	296	2	4	282	131	2	0	6	64	0	24
Future Vol, veh/h	35	296	2	4	282	131	2	0	6	64	0	24
Conflicting Peds, #/hr	0	0	2	0	0	1	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	40	340	2	5	324	151	2	0	7	74	0	28

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	476	0	0	344	0	0	595	909	344	837	835	239
Stage 1	-	-	-	-	-	-	423	423	-	411	411	-
Stage 2	-	-	-	-	-	-	172	486	-	426	424	-
Critical Hdwy	4.19	-	-	4.19	-	-	7.39	6.59	6.29	7.39	6.59	6.99
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.59	-	6.59	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.59	5.59	-	6.19	5.59	-
Follow-up Hdwy	2.257	-	-	2.257	-	-	3.557	4.057	3.357	3.557	4.057	3.357
Pot Cap-1 Maneuver	1060	-	-	1188	-	-	395	269	687	267	297	752
Stage 1	-	-	-	-	-	-	598	578	-	580	586	-
Stage 2	-	-	-	-	-	-	803	542	-	596	578	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1059	-	-	1186	-	-	368	257	685	255	284	751
Mov Cap-2 Maneuver	-	-	-	-	-	-	368	257	-	255	284	-
Stage 1	-	-	-	-	-	-	574	555	-	557	583	-
Stage 2	-	-	-	-	-	-	770	539	-	567	555	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.9			0.1			11.5			22.1		
HCM LOS							B			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	564	1059	-	-	1186	-	-	311
HCM Lane V/C Ratio	0.016	0.038	-	-	0.004	-	-	0.325
HCM Control Delay (s)	11.5	8.5	-	-	8	-	-	22.1
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	1.4

HCM 6th Signalized Intersection Summary

6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	540	0	0	193	228	144	0	61	0	0	0
Future Volume (veh/h)	0	540	0	0	193	228	144	0	61	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	0	593	0	0	212	251	158	0	67			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	4	0	0	4	4	4	4	4			
Cap, veh/h	0	1776	0	0	1701	773	281	0	249			
Arrive On Green	0.00	0.51	0.00	0.00	0.51	0.51	0.16	0.00	0.16			
Sat Flow, veh/h	0	3681	0	0	3516	1523	1753	0	1555			
Grp Volume(v), veh/h	0	593	0	0	212	251	158	0	67			
Grp Sat Flow(s),veh/h/ln	0	1749	0	0	1675	1523	1753	0	1555			
Q Serve(g_s), s	0.0	2.6	0.0	0.0	0.9	2.5	2.1	0.0	1.0			
Cycle Q Clear(g_c), s	0.0	2.6	0.0	0.0	0.9	2.5	2.1	0.0	1.0			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1776	0	0	1701	773	281	0	249			
V/C Ratio(X)	0.00	0.33	0.00	0.00	0.12	0.32	0.56	0.00	0.27			
Avail Cap(c_a), veh/h	0	8336	0	0	7985	3630	1233	0	1094			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	3.7	0.0	0.0	3.3	3.7	9.9	0.0	9.4			
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	0.1	1.8	0.0	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.0	0.0	0.1	0.2	0.7	0.0	0.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	3.9	0.0	0.0	3.3	3.8	11.7	0.0	10.0			
LnGrp LOS	A	A	A	A	A	A	B	A	B			
Approach Vol, veh/h		593			463			225				
Approach Delay, s/veh		3.9			3.6			11.2				
Approach LOS		A			A			B				
Timer - Assigned Phs		2			6			8				
Phs Duration (G+Y+Rc), s		17.0			17.0			8.6				
Change Period (Y+Rc), s		4.0			4.0			4.5				
Max Green Setting (Gmax), s		61.0			61.0			18.0				
Max Q Clear Time (g_c+l1), s		4.6			4.5			4.1				
Green Ext Time (p_c), s		6.9			0.7			0.9				
Intersection Summary												
HCM 6th Ctrl Delay			5.1									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	147	386	68	42	263	106	161	492	217	98	361	89
Future Volume (veh/h)	147	386	68	42	263	106	161	492	217	98	361	89
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	158	415	73	45	283	114	173	529	233	105	388	96
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	169	1417	631	58	835	328	186	605	343	127	489	127
Arrive On Green	0.10	0.40	0.40	0.03	0.34	0.34	0.22	0.22	0.22	0.21	0.21	0.21
Sat Flow, veh/h	1767	3526	1571	1767	2462	967	842	2734	1551	610	2351	609
Grp Volume(v), veh/h	158	415	73	45	200	197	373	329	233	314	0	275
Grp Sat Flow(s), veh/h/ln	1767	1763	1571	1767	1763	1666	1813	1763	1551	1825	0	1745
Q Serve(g_s), s	9.8	8.8	3.2	2.8	9.3	9.7	22.1	19.7	15.1	18.1	0.0	16.3
Cycle Q Clear(g_c), s	9.8	8.8	3.2	2.8	9.3	9.7	22.1	19.7	15.1	18.1	0.0	16.3
Prop In Lane	1.00		1.00	1.00		0.58	0.46		1.00	0.33		0.35
Lane Grp Cap(c), veh/h	169	1417	631	58	597	565	401	390	343	379	0	363
V/C Ratio(X)	0.94	0.29	0.12	0.78	0.34	0.35	0.93	0.84	0.68	0.83	0.00	0.76
Avail Cap(c_a), veh/h	169	1417	631	169	597	565	404	393	345	506	0	484
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.4	22.3	20.6	52.8	27.1	27.3	42.0	41.0	39.2	41.7	0.0	41.0
Incr Delay (d2), s/veh	49.4	0.5	0.4	8.3	1.5	1.7	27.5	15.4	5.2	8.3	0.0	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	3.7	1.2	1.4	4.2	4.1	12.9	10.1	6.2	9.0	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	98.9	22.8	21.0	61.1	28.6	28.9	69.5	56.4	44.5	50.0	0.0	45.8
LnGrp LOS	F	C	C	E	C	C	E	E	D	D	A	D
Approach Vol, veh/h	646			442			935			589		
Approach Delay, s/veh	41.2			32.1			58.6			48.0		
Approach LOS	D			C			E			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	48.7		27.8	14.0	41.8		26.4				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	10.5	29.5		24.5	10.5	29.5		30.5				
Max Q Clear Time (g_c+I), s	14.8	10.8		24.1	11.8	11.7		20.1				
Green Ext Time (p_c), s	0.0	3.9		0.2	0.0	3.1		2.7				

Intersection Summary

HCM 6th Ctrl Delay	47.4
HCM 6th LOS	D

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	261	5	728	127	952	0	0	463	125
Future Volume (vph)	0	0	0	261	5	728	127	952	0	0	463	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.6			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.89		1.00	1.00			1.00	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3047		1752	3505			3343	1403
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3047		1752	3505			3343	1403
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	275	5	766	134	1002	0	0	487	132
RTOR Reduction (vph)	0	0	0	0	112	0	0	0	0	0	1	54
Lane Group Flow (vph)	0	0	0	0	934	0	134	1002	0	0	499	65
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type				Perm	NA		Prot	NA			NA	Perm
Protected Phases					8		5	2 7 6			6 7	
Permitted Phases				8								6 7
Actuated Green, G (s)					35.3		12.3	90.4			73.9	73.9
Effective Green, g (s)					35.3		12.3	90.4			73.9	73.9
Actuated g/C Ratio					0.26		0.09	0.67			0.55	0.55
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					796		159	2347			1829	768
v/s Ratio Prot							c0.08	c0.29			0.15	
v/s Ratio Perm					0.31							0.05
v/c Ratio					1.46dr		0.84	0.43			0.27	0.08
Uniform Delay, d1					49.9		60.4	10.3			16.3	14.5
Progression Factor					1.00		0.64	1.06			1.00	1.00
Incremental Delay, d2					91.0		29.3	0.0			0.0	0.0
Delay (s)					140.8		67.7	10.9			16.3	14.5
Level of Service					F		E	B			B	B
Approach Delay (s)		0.0			140.8			17.6			15.9	
Approach LOS		A			F			B			B	
Intersection Summary												
HCM 2000 Control Delay			63.3									
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			135.0									
Intersection Capacity Utilization			88.9%									
Analysis Period (min)			15									
HCM 2000 Level of Service E Sum of lost time (s) 18.1 ICU Level of Service E												
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

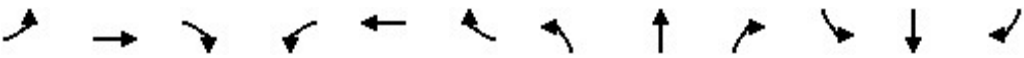
09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	730	131	177	0	0	0	0	349	325	329	395	0
Future Volume (vph)	730	131	177	0	0	0	0	349	325	329	395	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6					4.6	4.6	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.96	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1649	1677	1527					3186	1390	1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1649	1677	1527					3186	1390	1736	3471	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	777	139	188	0	0	0	0	371	346	350	420	0
RTOR Reduction (vph)	0	0	120	0	0	0	0	24	129	0	0	0
Lane Group Flow (vph)	458	458	68	0	0	0	0	472	92	350	420	0
Confl. Peds. (#/hr)			2						2			
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						2 8		1	6 8 2	
Permitted Phases	7		7						2 8			
Actuated Green, G (s)	35.4	35.4	35.4					61.1	61.1	25.1	90.4	
Effective Green, g (s)	35.4	35.4	35.4					56.4	56.4	25.1	85.7	
Actuated g/C Ratio	0.26	0.26	0.26					0.42	0.42	0.19	0.63	
Clearance Time (s)	4.6	4.6	4.6							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	432	439	400					1331	580	322	2203	
v/s Ratio Prot								c0.15		c0.20	0.12	
v/s Ratio Perm	c0.28	0.27	0.04						0.07			
v/c Ratio	1.06	1.04	0.17					0.35	0.16	1.09	0.19	
Uniform Delay, d1	49.8	49.8	38.4					26.9	24.5	55.0	10.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.70	0.43	
Incremental Delay, d2	60.1	54.7	0.1					0.7	0.6	74.9	0.0	
Delay (s)	109.9	104.5	38.5					27.6	25.1	113.5	4.4	
Level of Service	F	F	D					C	C	F	A	
Approach Delay (s)		95.5			0.0			26.8			54.0	
Approach LOS		F			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			64.2									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			135.0									Sum of lost time (s) 18.1
Intersection Capacity Utilization			88.9%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑		↑		↑	↑	↑	↑
Traffic Volume (vph)	0	200	166	17	320	0	60	0	8	332	36	37
Future Volume (vph)	0	200	166	17	320	0	60	0	8	332	36	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.98		1.00	1.00		1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.93		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (prot)		3209		1752	3505		1752		1568	1665	1684	1548
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (perm)		3209		1752	3505		1752		1568	1665	1684	1548
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	213	177	18	340	0	64	0	9	353	38	39
RTOR Reduction (vph)	0	127	0	0	0	0	0	0	8	0	0	32
Lane Group Flow (vph)	0	263	0	18	340	0	64	0	1	194	197	7
Confl. Peds. (#/hr)			2			4						2
Confl. Bikes (#/hr)			13			1						
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		13.7		1.5	19.4		5.9		5.9	9.1	9.1	9.1
Effective Green, g (s)		13.7		1.5	19.4		5.9		5.9	9.1	9.1	9.1
Actuated g/C Ratio		0.28		0.03	0.40		0.12		0.12	0.19	0.19	0.19
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		908		54	1404		213		191	313	316	291
v/s Ratio Prot		c0.08		0.01	c0.10		c0.04			0.12	c0.12	
v/s Ratio Perm									0.00			0.00
v/c Ratio		0.29		0.33	0.24		0.30		0.01	0.62	0.62	0.03
Uniform Delay, d1		13.6		23.0	9.6		19.4		18.7	18.1	18.1	16.0
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1		1.3	0.0		0.3		0.0	2.6	2.7	0.0
Delay (s)		13.6		24.3	9.7		19.7		18.7	20.6	20.8	16.0
Level of Service		B		C	A		B		B	C	C	B
Approach Delay (s)		13.6			10.4			19.5			20.3	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			15.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			48.4			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			44.6%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	221	209	18	69	232	68	14	192	64	269	178	228
Future Volume (veh/h)	221	209	18	69	232	68	14	192	64	269	178	228
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781	1781
Adj Flow Rate, veh/h	254	240	21	79	267	78	16	221	74	309	205	262
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8	8	8	8
Cap, veh/h	302	409	36	100	508	221	254	374	121	451	473	392
Arrive On Green	0.18	0.25	0.25	0.06	0.15	0.15	0.15	0.15	0.15	0.27	0.27	0.27
Sat Flow, veh/h	1697	1612	141	1697	3385	1475	1697	2500	812	1697	1781	1477
Grp Volume(v), veh/h	254	0	261	79	267	78	16	147	148	309	205	262
Grp Sat Flow(s),veh/h/ln	1697	0	1753	1697	1692	1475	1697	1692	1620	1697	1781	1477
Q Serve(g_s), s	9.6	0.0	8.6	3.0	4.8	3.1	0.5	5.4	5.6	10.8	6.3	10.5
Cycle Q Clear(g_c), s	9.6	0.0	8.6	3.0	4.8	3.1	0.5	5.4	5.6	10.8	6.3	10.5
Prop In Lane	1.00		0.08	1.00		1.00	1.00		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	302	0	445	100	508	221	254	253	242	451	473	392
V/C Ratio(X)	0.84	0.00	0.59	0.79	0.53	0.35	0.06	0.58	0.61	0.69	0.43	0.67
Avail Cap(c_a), veh/h	756	0	1118	341	1381	602	667	665	637	910	956	793
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	21.6	30.7	26.0	25.2	24.2	26.2	26.3	21.8	20.2	21.7
Incr Delay (d2), s/veh	2.4	0.0	1.7	5.2	1.2	1.4	0.1	3.0	3.5	2.6	0.9	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.7	0.0	3.4	1.3	1.9	1.1	0.2	2.2	2.2	4.2	2.5	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.7	0.0	23.4	35.9	27.2	26.6	24.3	29.2	29.8	24.5	21.1	24.5
LnGrp LOS	C	A	C	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		515			424			311			776	
Approach Delay, s/veh		26.0			28.7			29.3			23.6	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	21.3		14.4	15.3	14.4		22.1				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	13.3	42.2		26.0	29.5	27.0		35.5				
Max Q Clear Time (g_c+I1), s	5.0	10.6		7.6	11.6	6.8		12.8				
Green Ext Time (p_c), s	0.0	2.2		2.1	0.3	2.5		4.8				
Intersection Summary												
HCM 6th Ctrl Delay				26.1								
HCM 6th LOS				C								

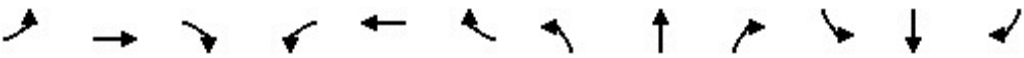
HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	9.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	337	2	7	356	40	2	0	7	138	2	49
Future Vol, veh/h	25	337	2	7	356	40	2	0	7	138	2	49
Conflicting Peds, #/hr	0	0	4	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	28	383	2	8	405	45	2	0	8	157	2	56
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	450	0	0	389	0	0	664	910	388	888	889	225
Stage 1	-	-	-	-	-	-	444	444	-	444	444	-
Stage 2	-	-	-	-	-	-	220	466	-	444	445	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.42	6.62	6.32	7.42	6.62	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.62	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.62	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.276	-	-	2.276	-	-	3.576	4.076	3.376	3.576	4.076	3.376
Pot Cap-1 Maneuver	1072	-	-	1131	-	-	350	265	644	243	273	763
Stage 1	-	-	-	-	-	-	578	562	-	550	562	-
Stage 2	-	-	-	-	-	-	748	549	-	578	561	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1072	-	-	1127	-	-	313	255	642	234	263	763
Mov Cap-2 Maneuver	-	-	-	-	-	-	313	255	-	234	263	-
Stage 1	-	-	-	-	-	-	561	545	-	536	558	-
Stage 2	-	-	-	-	-	-	686	545	-	556	544	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.1			12.1			47.5		
HCM LOS							B			E		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	520	1072	-	-	1127	-	-	286				
HCM Lane V/C Ratio	0.02	0.027	-	-	0.007	-	-	0.751				
HCM Control Delay (s)	12.1	8.4	-	-	8.2	-	-	47.5				
HCM Lane LOS	B	A	-	-	A	-	-	E				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	5.6				

HCM 6th Signalized Intersection Summary 6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	435	0	0	166	761	176	4	195	0	0	0
Future Volume (veh/h)	0	435	0	0	166	761	176	4	195	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	0	518	0	0	198	906	210	5	232			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	0	6	0	0	6	6	6	6	6			
Cap, veh/h	0	2107	0	0	2019	919	369	9	329			
Arrive On Green	0.00	0.61	0.00	0.00	0.61	0.61	0.22	0.22	0.22			
Sat Flow, veh/h	0	3622	0	0	3459	1500	1687	40	1505			
Grp Volume(v), veh/h	0	518	0	0	198	906	215	0	232			
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1648	1500	1727	0	1505			
Q Serve(g_s), s	0.0	3.5	0.0	0.0	1.2	29.7	5.6	0.0	7.2			
Cycle Q Clear(g_c), s	0.0	3.5	0.0	0.0	1.2	29.7	5.6	0.0	7.2			
Prop In Lane	0.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	0	2107	0	0	2019	919	377	0	329			
V/C Ratio(X)	0.00	0.25	0.00	0.00	0.10	0.99	0.57	0.00	0.71			
Avail Cap(c_a), veh/h	0	2107	0	0	2019	919	711	0	619			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.4	0.0	0.0	4.0	9.5	17.5	0.0	18.2			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	26.1	1.4	0.0	2.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.8	0.0	0.0	0.3	12.4	2.1	0.0	2.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.5	0.0	0.0	4.0	35.7	18.9	0.0	20.9			
LnGrp LOS	A	A	A	A	A	D	B	A	C			
Approach Vol, veh/h		518			1104			447				
Approach Delay, s/veh		4.5			30.0			19.9				
Approach LOS		A			C			B				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		34.8				34.8		15.5				
Change Period (Y+Rc), s		4.0				4.0		4.5				
Max Green Setting (Gmax), s		30.8				30.8		20.7				
Max Q Clear Time (g_c+I1), s		5.5				31.7		9.2				
Green Ext Time (p_c), s		5.1				0.0		1.7				
Intersection Summary												
HCM 6th Ctrl Delay				21.4								
HCM 6th LOS				C								

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021

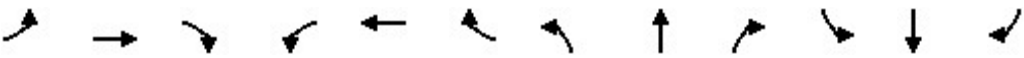


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	283	216	107	441	124	169	458	171	149	452	234
Future Volume (veh/h)	131	283	216	107	441	124	169	458	171	149	452	234
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	138	298	227	113	464	131	178	482	180	157	476	246
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	1024	450	126	783	219	199	572	331	166	520	286
Arrive On Green	0.07	0.29	0.29	0.07	0.29	0.29	0.22	0.22	0.22	0.28	0.28	0.28
Sat Flow, veh/h	1767	3526	1549	1767	2696	754	920	2652	1533	595	1861	1024
Grp Volume(v), veh/h	138	298	227	113	302	293	350	310	180	482	0	397
Grp Sat Flow(s), veh/h/ln	1767	1763	1549	1767	1763	1687	1810	1763	1533	1826	0	1655
Q Serve(g_s), s	7.5	6.9	12.8	6.7	15.4	15.7	19.7	17.6	11.0	27.1	0.0	23.9
Cycle Q Clear(g_c), s	7.5	6.9	12.8	6.7	15.4	15.7	19.7	17.6	11.0	27.1	0.0	23.9
Prop In Lane	1.00		1.00	1.00		0.45	0.51		1.00	0.33		0.62
Lane Grp Cap(c), veh/h	126	1024	450	126	512	490	390	380	331	510	0	462
V/C Ratio(X)	1.09	0.29	0.50	0.90	0.59	0.60	0.90	0.82	0.54	0.94	0.00	0.86
Avail Cap(c_a), veh/h	126	1024	450	126	512	490	405	395	343	513	0	465
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	28.9	31.0	48.4	31.9	32.0	40.0	39.2	36.6	37.0	0.0	35.9
Incr Delay (d2), s/veh	104.9	0.7	3.8	48.5	4.9	5.3	21.5	12.1	1.6	26.3	0.0	14.9
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ln	7.0	3.0	5.2	4.6	7.2	7.0	11.0	8.8	4.2	15.6	0.0	11.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	153.6	29.5	34.7	96.8	36.8	37.3	61.5	51.3	38.2	63.3	0.0	50.8
LnGrp LOS	F	C	C	F	D	D	E	D	D	E	A	D
Approach Vol, veh/h	663			708			840			879		
Approach Delay, s/veh	57.1			46.6			52.8			57.7		
Approach LOS	E			D			D			E		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	1.0	35.0		26.2	11.0	35.0		32.8				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	7.5	29.5		23.5	7.5	29.5		29.5				
Max Q Clear Time (g_c+I), s	14.8	14.8		21.7	9.5	17.7		29.1				
Green Ext Time (p_c), s	0.0	3.3		0.9	0.0	3.9		0.2				
Intersection Summary												
HCM 6th Ctrl Delay	53.7											
HCM 6th LOS	D											

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕↕		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	143	140	192	97	267	0	0	1017	377
Future Volume (vph)	0	0	0	143	140	192	97	267	0	0	1017	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.5			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.94		1.00	1.00			0.99	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3134		1703	3406			3243	1365
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3134		1703	3406			3243	1365
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	151	147	202	102	281	0	0	1071	397
RTOR Reduction (vph)	0	0	0	0	118	0	0	0	0	0	2	116
Lane Group Flow (vph)	0	0	0	0	382	0	102	281	0	0	1109	241
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Turn Type				Split	NA		Prot	NA			NA	Perm
Protected Phases				8	8		5	2 7 6			6 7	
Permitted Phases												6 7
Actuated Green, G (s)					13.5		9.7	77.1			63.2	63.2
Effective Green, g (s)					13.5		9.7	72.5			63.2	63.2
Actuated g/C Ratio					0.14		0.10	0.72			0.63	0.63
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					423		165	2469			2049	862
v/s Ratio Prot					c0.12		c0.06	0.08			c0.34	
v/s Ratio Perm												0.18
v/c Ratio					0.90		0.62	0.11			0.54	0.28
Uniform Delay, d1					42.6		43.4	4.1			10.3	8.2
Progression Factor					1.00		0.63	2.25			1.00	1.00
Incremental Delay, d2					21.8		4.3	0.0			0.2	0.1
Delay (s)					64.4		31.7	9.3			10.4	8.3
Level of Service					E		C	A			B	A
Approach Delay (s)		0.0			64.4			15.2			9.9	
Approach LOS		A			E			B			A	
Intersection Summary												
HCM 2000 Control Delay			22.4									
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			67.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	131	102	0	0	0	0	213	268	587	573	0
Future Volume (vph)	151	131	102	0	0	0	0	213	268	587	573	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	4.7	4.7					4.5	4.5	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99					0.99	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.95	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1678	1489					3042	1353	1687	3374	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1603	1678	1489					3042	1353	1687	3374	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	138	107	0	0	0	0	224	282	618	603	0
RTOR Reduction (vph)	0	0	94	0	0	0	0	72	106	0	0	0
Lane Group Flow (vph)	143	154	13	0	0	0	0	276	52	618	603	0
Confl. Peds. (#/hr)			2						2			
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	7	7						2 8		1	6 8 2	
Permitted Phases			7						2 8			
Actuated Green, G (s)	11.7	11.7	11.7					35.8	35.8	39.1	79.0	
Effective Green, g (s)	11.7	11.7	11.7					31.1	31.1	39.1	74.3	
Actuated g/C Ratio	0.12	0.12	0.12					0.31	0.31	0.39	0.74	
Clearance Time (s)	4.7	4.7	4.7							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	187	196	174					946	420	659	2506	
v/s Ratio Prot	0.09	c0.09						c0.09		c0.37	c0.18	
v/s Ratio Perm			0.01						0.04			
v/c Ratio	0.76	0.79	0.07					0.29	0.12	0.94	0.24	
Uniform Delay, d1	42.8	42.9	39.3					26.1	24.7	29.3	4.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.63	0.77	
Incremental Delay, d2	15.3	17.2	0.1					0.1	0.0	18.5	0.0	
Delay (s)	58.1	60.1	39.4					26.2	24.7	37.1	3.1	
Level of Service	E	E	D					C	C	D	A	
Approach Delay (s)		53.9			0.0			25.7			20.3	
Approach LOS		D			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.0									
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			100.0							18.2		
Intersection Capacity Utilization			67.7%							C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑		↖		↖	↖	↖	↖
Traffic Volume (vph)	0	261	221	34	308	0	61	0	10	164	184	34
Future Volume (vph)	0	261	221	34	308	0	61	0	10	164	184	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.99		1.00	1.00		1.00		0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.93		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)		3050		1656	3312		1656		1458	1573	1649	1459
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (perm)		3050		1656	3312		1656		1458	1573	1649	1459
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	307	260	40	362	0	72	0	12	193	216	40
RTOR Reduction (vph)	0	142	0	0	0	0	0	0	11	0	0	31
Lane Group Flow (vph)	0	425	0	40	362	0	72	0	1	174	235	9
Confl. Peds. (#/hr)			2			3						2
Confl. Bikes (#/hr)			2			2			2			2
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		15.9		3.3	23.4		5.7		5.7	12.0	12.0	12.0
Effective Green, g (s)		15.9		3.3	23.4		5.7		5.7	12.0	12.0	12.0
Actuated g/C Ratio		0.29		0.06	0.42		0.10		0.10	0.22	0.22	0.22
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		880		99	1406		171		150	342	359	317
v/s Ratio Prot		c0.14		c0.02	0.11		c0.04			0.11	c0.14	
v/s Ratio Perm									0.00			0.01
v/c Ratio		0.48		0.40	0.26		0.42		0.01	0.51	0.65	0.03
Uniform Delay, d1		16.2		25.0	10.2		23.2		22.2	19.0	19.7	17.0
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2		1.0	0.0		0.6		0.0	0.4	3.3	0.0
Delay (s)		16.4		25.9	10.3		23.8		22.2	19.4	22.9	17.0
Level of Service		B		C	B		C		C	B	C	B
Approach Delay (s)		16.4			11.8			23.5			21.0	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			16.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			55.1			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			53.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	219	133	25	55	265	138	31	251	53	138	214	192
Future Volume (veh/h)	219	133	25	55	265	138	31	251	53	138	214	192
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99	1.00		0.98
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796	1796
Adj Flow Rate, veh/h	252	153	29	63	305	159	36	289	61	159	246	221
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7	7	7	7
Cap, veh/h	257	399	76	78	628	275	295	484	101	383	403	334
Arrive On Green	0.15	0.27	0.27	0.05	0.18	0.18	0.17	0.17	0.17	0.22	0.22	0.22
Sat Flow, veh/h	1711	1464	277	1711	3413	1494	1711	2806	583	1711	1796	1489
Grp Volume(v), veh/h	252	0	182	63	305	159	36	174	176	159	246	221
Grp Sat Flow(s),veh/h/ln	1711	0	1741	1711	1706	1494	1711	1706	1682	1711	1796	1489
Q Serve(g_s), s	9.3	0.0	5.4	2.3	5.1	6.1	1.1	5.9	6.1	5.0	7.8	8.5
Cycle Q Clear(g_c), s	9.3	0.0	5.4	2.3	5.1	6.1	1.1	5.9	6.1	5.0	7.8	8.5
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.35	1.00		1.00
Lane Grp Cap(c), veh/h	257	0	475	78	628	275	295	295	290	383	403	334
V/C Ratio(X)	0.98	0.00	0.38	0.81	0.49	0.58	0.12	0.59	0.61	0.41	0.61	0.66
Avail Cap(c_a), veh/h	257	0	779	181	1430	626	703	702	692	703	739	612
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.8	0.0	18.7	29.9	23.1	23.6	22.1	24.1	24.2	21.0	22.0	22.3
Incr Delay (d2), s/veh	50.3	0.0	0.7	7.1	0.8	2.7	0.3	2.7	2.9	1.0	2.1	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	0.0	2.1	1.1	2.0	2.2	0.5	2.5	2.5	2.0	3.3	3.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	77.1	0.0	19.4	37.0	23.9	26.3	22.4	26.8	27.1	22.0	24.2	25.5
LnGrp LOS	E	A	B	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		434			527			386			626	
Approach Delay, s/veh		52.9			26.2			26.5			24.1	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	21.7		15.4	13.0	16.1		18.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.7	28.3		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	4.3	7.4		8.1	11.3	8.1		10.5				
Green Ext Time (p_c), s	0.0	1.3		2.8	0.0	3.4		3.6				
Intersection Summary												
HCM 6th Ctrl Delay				31.5								
HCM 6th LOS				C								

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	3.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	282	2	5	351	150	2	0	6	74	0	28
Future Vol, veh/h	40	282	2	5	351	150	2	0	6	74	0	28
Conflicting Peds, #/hr	0	0	2	0	0	1	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	46	324	2	6	403	172	2	0	7	85	0	32

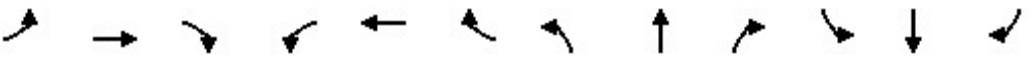
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	576	0	0	328	0	0	633	1007	328	924	922	289
Stage 1	-	-	-	-	-	-	419	419	-	502	502	-
Stage 2	-	-	-	-	-	-	214	588	-	422	420	-
Critical Hdwy	4.19	-	-	4.19	-	-	7.39	6.59	6.29	7.39	6.59	6.99
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.59	-	6.59	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.59	5.59	-	6.19	5.59	-
Follow-up Hdwy	2.257	-	-	2.257	-	-	3.557	4.057	3.357	3.557	4.057	3.357
Pot Cap-1 Maneuver	972	-	-	1205	-	-	371	235	702	232	264	698
Stage 1	-	-	-	-	-	-	601	581	-	512	533	-
Stage 2	-	-	-	-	-	-	759	487	-	599	580	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	971	-	-	1203	-	-	339	222	700	220	249	697
Mov Cap-2 Maneuver	-	-	-	-	-	-	339	222	-	220	249	-
Stage 1	-	-	-	-	-	-	572	553	-	487	530	-
Stage 2	-	-	-	-	-	-	720	484	-	564	552	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.1			11.6			28		
HCM LOS							B			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	553	971	-	-	1203	-	-	271
HCM Lane V/C Ratio	0.017	0.047	-	-	0.005	-	-	0.433
HCM Control Delay (s)	11.6	8.9	-	-	8	-	-	28
HCM Lane LOS	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	2.1

HCM 6th Signalized Intersection Summary 6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	728	0	0	207	725	221	0	64	0	0	0
Future Volume (veh/h)	0	728	0	0	207	725	221	0	64	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	0	800	0	0	227	797	243	0	70			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	4	0	0	4	4	4	4	4			
Cap, veh/h	0	2000	0	0	1916	871	363	0	322			
Arrive On Green	0.00	0.57	0.00	0.00	0.57	0.57	0.21	0.00	0.21			
Sat Flow, veh/h	0	3681	0	0	3516	1524	1753	0	1555			
Grp Volume(v), veh/h	0	800	0	0	227	797	243	0	70			
Grp Sat Flow(s),veh/h/ln	0	1749	0	0	1675	1524	1753	0	1555			
Q Serve(g_s), s	0.0	4.9	0.0	0.0	1.2	18.0	4.9	0.0	1.4			
Cycle Q Clear(g_c), s	0.0	4.9	0.0	0.0	1.2	18.0	4.9	0.0	1.4			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	2000	0	0	1916	871	363	0	322			
V/C Ratio(X)	0.00	0.40	0.00	0.00	0.12	0.91	0.67	0.00	0.22			
Avail Cap(c_a), veh/h	0	5551	0	0	5317	2418	821	0	728			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.6	0.0	0.0	3.8	7.4	14.0	0.0	12.7			
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	1.7	2.1	0.0	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.9	0.0	0.0	0.2	3.2	1.8	0.0	0.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.8	0.0	0.0	3.8	9.1	16.2	0.0	13.0			
LnGrp LOS	A	A	A	A	A	A	B	A	B			
Approach Vol, veh/h		800			1024			313				
Approach Delay, s/veh		4.8			7.9			15.5				
Approach LOS		A			A			B				
Timer - Assigned Phs		2			6			8				
Phs Duration (G+Y+Rc), s		26.0			26.0			12.5				
Change Period (Y+Rc), s		4.0			4.0			4.5				
Max Green Setting (Gmax), s		61.0			61.0			18.0				
Max Q Clear Time (g_c+l1), s		6.9			20.0			6.9				
Green Ext Time (p_c), s		10.2			1.8			1.2				
Intersection Summary												
HCM 6th Ctrl Delay			7.8									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	183	512	97	76	686	151	222	492	258	138	455	117
Future Volume (veh/h)	183	512	97	76	686	151	222	492	258	138	455	117
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	197	551	104	82	738	162	239	529	277	148	489	126
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	169	1162	518	104	840	184	236	558	346	167	577	156
Arrive On Green	0.10	0.33	0.33	0.06	0.29	0.29	0.22	0.22	0.22	0.25	0.25	0.25
Sat Flow, veh/h	1767	3526	1571	1767	2865	629	1060	2505	1551	662	2286	618
Grp Volume(v), veh/h	197	551	104	82	454	446	406	362	277	408	0	355
Grp Sat Flow(s), veh/h/ln	1767	1763	1571	1767	1763	1731	1803	1763	1551	1822	0	1743
Q Serve(g_s), s	10.5	13.7	5.2	5.0	27.0	27.0	24.5	22.1	18.6	23.7	0.0	21.1
Cycle Q Clear(g_c), s	10.5	13.7	5.2	5.0	27.0	27.0	24.5	22.1	18.6	23.7	0.0	21.1
Prop In Lane	1.00		1.00	1.00		0.36	0.59		1.00	0.36		0.35
Lane Grp Cap(c), veh/h	169	1162	518	104	517	507	401	393	346	460	0	440
V/C Ratio(X)	1.17	0.47	0.20	0.79	0.88	0.88	1.01	0.92	0.80	0.89	0.00	0.81
Avail Cap(c_a), veh/h	169	1162	518	169	517	507	401	393	346	505	0	483
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.89	0.89	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.8	29.3	26.5	51.1	37.0	37.0	42.8	41.8	40.5	39.6	0.0	38.6
Incr Delay (d2), s/veh	117.9	1.2	0.8	4.9	18.8	19.1	48.0	26.7	12.7	16.1	0.0	9.1
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%), veh/ft	0.1	5.9	2.1	2.4	14.1	13.9	16.1	12.4	8.3	12.5	0.0	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	167.6	30.5	27.3	56.0	55.8	56.2	90.8	68.5	53.2	55.7	0.0	47.7
LnGrp LOS	F	C	C	E	E	E	F	E	D	E	A	D
Approach Vol, veh/h	852			982			1045			763		
Approach Delay, s/veh	61.8			56.0			73.1			52.0		
Approach LOS	E			E			E			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	40.7			28.0	14.0	36.7		31.3				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	29.5			24.5	10.5	29.5		30.5				
Max Q Clear Time (g_c+11), s	15.7			26.5	12.5	29.0		25.7				
Green Ext Time (p_c), s	0.0	4.6		0.0	0.0	0.3		2.1				
Intersection Summary												
HCM 6th Ctrl Delay	61.4											
HCM 6th LOS	E											

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔		↗	↗↗			↗↗	↗
Traffic Volume (vph)	0	0	0	261	136	1131	258	931	0	0	469	261
Future Volume (vph)	0	0	0	261	136	1131	258	931	0	0	469	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.6			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.89		1.00	1.00			0.99	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3056		1752	3505			3312	1403
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3056		1752	3505			3312	1403
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	275	143	1191	272	980	0	0	494	275
RTOR Reduction (vph)	0	0	0	0	76	0	0	0	0	0	4	132
Lane Group Flow (vph)	0	0	0	0	1533	0	272	980	0	0	534	99
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type				Perm	NA		Prot	NA			NA	Perm
Protected Phases					8		5	2 7 6			6 7	
Permitted Phases				8								6 7
Actuated Green, G (s)					51.3		21.8	84.4			58.4	58.4
Effective Green, g (s)					51.3		21.8	84.4			58.4	58.4
Actuated g/C Ratio					0.35		0.15	0.58			0.40	0.40
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					1081		263	2040			1333	565
v/s Ratio Prot							c0.16	c0.28			0.16	
v/s Ratio Perm					0.50							0.07
v/c Ratio					1.88dr		1.03	0.48			0.40	0.18
Uniform Delay, d1					46.9		61.6	17.6			30.8	27.8
Progression Factor					1.00		0.73	1.29			1.00	1.00
Incremental Delay, d2					193.5		64.2	0.0			0.1	0.1
Delay (s)					240.4		108.9	22.6			30.9	27.9
Level of Service					F		F	C			C	C
Approach Delay (s)		0.0			240.4			41.4			30.0	
Approach LOS		A			F			D			C	
Intersection Summary												
HCM 2000 Control Delay			127.2									F
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			145.0								18.1	
Intersection Capacity Utilization			111.9%								H	
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

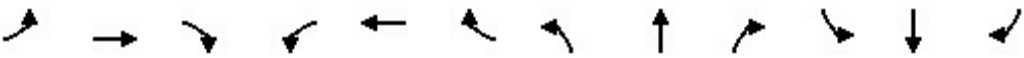
09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	871	166	163	0	0	0	0	318	290	349	381	0
Future Volume (vph)	871	166	163	0	0	0	0	318	290	349	381	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6					4.6	4.6	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.96	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1649	1678	1527					3188	1389	1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1649	1678	1527					3188	1389	1736	3471	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	927	177	173	0	0	0	0	338	309	371	405	0
RTOR Reduction (vph)	0	0	85	0	0	0	0	21	99	0	0	0
Lane Group Flow (vph)	547	557	88	0	0	0	0	428	99	371	405	0
Confl. Peds. (#/hr)			2						2			
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						2 8		1	6 8 2	
Permitted Phases	7		7						2 8			
Actuated Green, G (s)	33.4	33.4	33.4					77.4	77.4	20.8	102.4	
Effective Green, g (s)	33.4	33.4	33.4					72.7	72.7	20.8	97.7	
Actuated g/C Ratio	0.23	0.23	0.23					0.50	0.50	0.14	0.67	
Clearance Time (s)	4.6	4.6	4.6							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	379	386	351					1598	696	249	2338	
v/s Ratio Prot								c0.13		c0.21	0.12	
v/s Ratio Perm	0.33	0.33	0.06						0.07			
v/c Ratio	1.44	1.44	0.25					0.27	0.14	1.49	0.17	
Uniform Delay, d1	55.8	55.8	45.6					20.8	19.4	62.1	8.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.72	0.59	
Incremental Delay, d2	213.9	213.5	0.1					0.4	0.4	239.5	0.0	
Delay (s)	269.7	269.3	45.7					21.2	19.8	284.1	5.1	
Level of Service	F	F	D					C	B	F	A	
Approach Delay (s)		239.2			0.0			20.8			138.5	
Approach LOS		F			A			C			F	
Intersection Summary												
HCM 2000 Control Delay			157.9		HCM 2000 Level of Service					F		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			145.0		Sum of lost time (s)					18.1		
Intersection Capacity Utilization			111.9%		ICU Level of Service					H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑		↑		↑	↑	↑	↑
Traffic Volume (vph)	0	188	174	26	402	0	60	0	8	532	41	44
Future Volume (vph)	0	188	174	26	402	0	60	0	8	532	41	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.98		1.00	1.00		1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.93		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (prot)		3189		1752	3505		1752		1568	1665	1681	1547
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (perm)		3189		1752	3505		1752		1568	1665	1681	1547
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	200	185	28	428	0	64	0	9	566	44	47
RTOR Reduction (vph)	0	138	0	0	0	0	0	0	8	0	0	35
Lane Group Flow (vph)	0	247	0	28	428	0	64	0	1	306	304	12
Confl. Peds. (#/hr)			2			4						2
Confl. Bikes (#/hr)			13			1						
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		14.3		3.4	21.9		5.7		5.7	14.3	14.3	14.3
Effective Green, g (s)		14.3		3.4	21.9		5.7		5.7	14.3	14.3	14.3
Actuated g/C Ratio		0.26		0.06	0.39		0.10		0.10	0.26	0.26	0.26
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		815		106	1373		178		159	425	430	395
v/s Ratio Prot		0.08		0.02	c0.12		c0.04			c0.18	0.18	
v/s Ratio Perm									0.00			0.01
v/c Ratio		0.30		0.26	0.31		0.36		0.01	0.72	0.71	0.03
Uniform Delay, d1		16.8		25.1	11.8		23.4		22.6	19.0	18.9	15.6
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1		0.5	0.0		0.5		0.0	4.8	4.3	0.0
Delay (s)		16.9		25.5	11.8		23.9		22.6	23.8	23.2	15.6
Level of Service		B		C	B		C		C	C	C	B
Approach Delay (s)		16.9			12.7			23.7			22.9	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			18.5			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			55.9			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			52.8%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	221	209	18	70	232	120	14	193	64	35	278	178
Future Volume (veh/h)	221	209	18	70	232	120	14	193	64	35	278	178
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.98		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1781	1781	1781	1781	1781	1781	1781	1781	1781		1781	1781
Adj Flow Rate, veh/h	254	240	21	80	267	138	16	222	74		320	205
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87		0.87	0.87
Percent Heavy Veh, %	8	8	8	8	8	8	8	8	8		8	8
Cap, veh/h	298	428	37	101	553	241	249	367	119		461	484
Arrive On Green	0.18	0.27	0.27	0.06	0.16	0.16	0.15	0.15	0.15		0.27	0.27
Sat Flow, veh/h	1697	1612	141	1697	3385	1476	1697	2503	810		1697	1781
Grp Volume(v), veh/h	254	0	261	80	267	138	16	148	148		320	205
Grp Sat Flow(s),veh/h/ln	1697	0	1753	1697	1692	1476	1697	1692	1621		1697	1781
Q Serve(g_s), s	10.2	0.0	9.0	3.3	5.0	6.0	0.6	5.7	6.0		11.9	6.6
Cycle Q Clear(g_c), s	10.2	0.0	9.0	3.3	5.0	6.0	0.6	5.7	6.0		11.9	6.6
Prop In Lane	1.00		0.08	1.00		1.00	1.00		0.50		1.00	
Lane Grp Cap(c), veh/h	298	0	465	101	553	241	249	248	238		461	484
V/C Ratio(X)	0.85	0.00	0.56	0.79	0.48	0.57	0.06	0.60	0.62		0.69	0.42
Avail Cap(c_a), veh/h	477	0	916	240	1344	586	630	628	602		1078	1132
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	22.2	32.5	26.6	27.0	25.7	27.9	28.1		22.9	21.0
Incr Delay (d2), s/veh	4.6	0.0	1.5	5.1	0.9	3.0	0.2	3.2	3.8		2.7	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	3.6	1.4	1.9	2.2	0.2	2.4	2.4		4.6	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.5	0.0	23.7	37.6	27.5	30.1	25.9	31.2	31.8		25.6	21.8
LnGrp LOS	C	A	C	D	C	C	C	C	C		C	C
Approach Vol, veh/h		515			485			312				787
Approach Delay, s/veh		28.1			29.9			31.2				24.5
Approach LOS		C			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.7	23.1		14.8	15.8	15.9		23.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	9.9	36.6		26.0	19.7	27.8		44.5				
Max Q Clear Time (g_c+I1), s	5.3	11.0		8.0	12.2	8.0		13.9				
Green Ext Time (p_c), s	0.0	2.1		2.1	0.2	2.8		5.2				
Intersection Summary												
HCM 6th Ctrl Delay				27.6								
HCM 6th LOS				C								
Notes												
User approved ignoring U-Turning movement.												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	228
Future Volume (veh/h)	228
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1781
Adj Flow Rate, veh/h	262
Peak Hour Factor	0.87
Percent Heavy Veh, %	8
Cap, veh/h	401
Arrive On Green	0.27
Sat Flow, veh/h	1477
Grp Volume(v), veh/h	262
Grp Sat Flow(s),veh/h/ln	1477
Q Serve(g_s), s	11.0
Cycle Q Clear(g_c), s	11.0
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	401
V/C Ratio(X)	0.65
Avail Cap(c_a), veh/h	939
HCM Platoon Ratio	1.00
Upstream Filter(l)	1.00
Uniform Delay (d), s/veh	22.6
Incr Delay (d2), s/veh	2.6
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.7
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	25.1
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	12.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	340	2	7	421	40	2	0	7	138	2	49
Future Vol, veh/h	25	340	2	7	421	40	2	0	7	138	2	49
Conflicting Peds, #/hr	0	0	4	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	8	8	8	8	8	8	8	8	8	8	8	8
Mvmt Flow	28	386	2	8	478	45	2	0	8	157	2	56
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	523	0	0	392	0	0	703	986	391	964	965	262
Stage 1	-	-	-	-	-	-	447	447	-	517	517	-
Stage 2	-	-	-	-	-	-	256	539	-	447	448	-
Critical Hdwy	4.22	-	-	4.22	-	-	7.42	6.62	6.32	7.42	6.62	7.02
Critical Hdwy Stg 1	-	-	-	-	-	-	6.22	5.62	-	6.62	5.62	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.62	5.62	-	6.22	5.62	-
Follow-up Hdwy	2.276	-	-	2.276	-	-	3.576	4.076	3.376	3.576	4.076	3.376
Pot Cap-1 Maneuver	1006	-	-	1128	-	-	328	239	641	215	246	722
Stage 1	-	-	-	-	-	-	576	560	-	497	521	-
Stage 2	-	-	-	-	-	-	712	509	-	576	560	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1006	-	-	1124	-	-	291	230	639	207	236	722
Mov Cap-2 Maneuver	-	-	-	-	-	-	291	230	-	207	236	-
Stage 1	-	-	-	-	-	-	558	542	-	483	517	-
Stage 2	-	-	-	-	-	-	650	505	-	553	542	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			0.1			12.3			65.7		
HCM LOS							B			F		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	505	1006	-	-	1124	-	-	254				
HCM Lane V/C Ratio	0.02	0.028	-	-	0.007	-	-	0.846				
HCM Control Delay (s)	12.3	8.7	-	-	8.2	-	-	65.7				
HCM Lane LOS	B	A	-	-	A	-	-	F				
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	6.9				

HCM 6th Signalized Intersection Summary

6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	442	0	0	203	761	204	4	195	0	0	0
Future Volume (veh/h)	0	442	0	0	203	761	204	4	195	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.98			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1811	1811	1811	1811	1811			
Adj Flow Rate, veh/h	0	526	0	0	242	906	243	5	232			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84			
Percent Heavy Veh, %	0	6	0	0	6	6	6	6	6			
Cap, veh/h	0	2100	0	0	2011	916	375	8	333			
Arrive On Green	0.00	0.61	0.00	0.00	0.61	0.61	0.22	0.22	0.22			
Sat Flow, veh/h	0	3622	0	0	3459	1500	1692	35	1505			
Grp Volume(v), veh/h	0	526	0	0	242	906	248	0	232			
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1648	1500	1726	0	1505			
Q Serve(g_s), s	0.0	3.6	0.0	0.0	1.6	30.0	6.6	0.0	7.2			
Cycle Q Clear(g_c), s	0.0	3.6	0.0	0.0	1.6	30.0	6.6	0.0	7.2			
Prop In Lane	0.00		0.00	0.00		1.00	0.98		1.00			
Lane Grp Cap(c), veh/h	0	2100	0	0	2011	916	382	0	333			
V/C Ratio(X)	0.00	0.25	0.00	0.00	0.12	0.99	0.65	0.00	0.70			
Avail Cap(c_a), veh/h	0	2100	0	0	2011	916	708	0	617			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(l)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.5	0.0	0.0	4.1	9.7	17.9	0.0	18.1			
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.0	27.1	1.9	0.0	2.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	0.8	0.0	0.0	0.3	12.8	2.5	0.0	2.4			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.6	0.0	0.0	4.1	36.7	19.7	0.0	20.7			
LnGrp LOS	A	A	A	A	A	D	B	A	C			
Approach Vol, veh/h		526			1148			480				
Approach Delay, s/veh		4.6			29.9			20.2				
Approach LOS		A			C			C				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		34.8				34.8		15.7				
Change Period (Y+Rc), s		4.0				4.0		4.5				
Max Green Setting (Gmax), s		30.8				30.8		20.7				
Max Q Clear Time (g_c+l1), s		5.6				32.0		9.2				
Green Ext Time (p_c), s		5.2				0.0		1.8				
Intersection Summary												
HCM 6th Ctrl Delay					21.5							
HCM 6th LOS					C							

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	131	290	216	107	469	124	169	458	171	149	452	243
Future Volume (veh/h)	131	290	216	107	469	124	169	458	171	149	452	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.96	1.00		0.98	1.00		0.99
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	138	305	227	113	494	131	178	482	180	157	476	256
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	126	1019	448	126	791	208	199	572	331	165	516	296
Arrive On Green	0.07	0.29	0.29	0.07	0.29	0.29	0.22	0.22	0.22	0.28	0.28	0.28
Sat Flow, veh/h	1767	3526	1549	1767	2737	721	920	2652	1533	588	1835	1052
Grp Volume(v), veh/h	138	305	227	113	317	308	350	310	180	488	0	401
Grp Sat Flow(s), veh/h/ln	1767	1763	1549	1767	1763	1695	1810	1763	1533	1826	0	1649
Q Serve(g_s), s	7.5	7.1	12.8	6.7	16.4	16.6	19.7	17.6	11.0	27.5	0.0	24.3
Cycle Q Clear(g_c), s	7.5	7.1	12.8	6.7	16.4	16.6	19.7	17.6	11.0	27.5	0.0	24.3
Prop In Lane	1.00		1.00	1.00		0.43	0.51		1.00	0.32		0.64
Lane Grp Cap(c), veh/h	126	1019	448	126	510	490	390	380	331	513	0	463
V/C Ratio(X)	1.09	0.30	0.51	0.90	0.62	0.63	0.90	0.82	0.54	0.95	0.00	0.87
Avail Cap(c_a), veh/h	126	1019	448	126	510	490	405	395	343	513	0	463
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.94	0.94	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	48.8	29.0	31.1	48.4	32.4	32.4	40.0	39.2	36.6	37.0	0.0	35.9
Incr Delay (d2), s/veh	104.9	0.7	3.8	48.5	5.6	6.0	21.5	12.1	1.6	27.8	0.0	15.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	3.1	5.2	4.6	7.7	7.5	11.0	8.8	4.2	16.0	0.0	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	153.6	29.8	34.9	96.8	38.0	38.4	61.5	51.3	38.2	64.8	0.0	51.6
LnGrp LOS	F	C	C	F	D	D	E	D	D	E	A	D
Approach Vol, veh/h	670			738			840			889		
Approach Delay, s/veh	57.0			47.2			52.8			58.8		
Approach LOS	E			D			D			E		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	1.0	34.8		26.2	11.0	34.8		33.0				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	7.5	29.5		23.5	7.5	29.5		29.5				
Max Q Clear Time (g_c+I), s	14.8	14.8		21.7	9.5	18.6		29.5				
Green Ext Time (p_c), s	0.0	3.4		0.9	0.0	3.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	54.1
HCM 6th LOS	D

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔↔		↗	↗↗			↗↗	↗
Traffic Volume (vph)	0	0	0	143	140	192	102	273	0	0	1039	377
Future Volume (vph)	0	0	0	143	140	192	102	273	0	0	1039	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.5			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.94		1.00	1.00			0.99	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3134		1703	3406			3243	1365
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3134		1703	3406			3243	1365
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	151	147	202	107	287	0	0	1094	397
RTOR Reduction (vph)	0	0	0	0	118	0	0	0	0	0	2	114
Lane Group Flow (vph)	0	0	0	0	382	0	107	287	0	0	1132	243
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Turn Type				Split	NA		Prot	NA			NA	Perm
Protected Phases				8	8		5	2 7 6			6 7	
Permitted Phases												6 7
Actuated Green, G (s)					13.5		9.9	77.1			63.0	63.0
Effective Green, g (s)					13.5		9.9	72.5			63.0	63.0
Actuated g/C Ratio					0.14		0.10	0.72			0.63	0.63
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					423		168	2469			2043	859
v/s Ratio Prot					c0.12		c0.06	0.08			c0.35	
v/s Ratio Perm												0.18
v/c Ratio					0.90		0.64	0.12			0.55	0.28
Uniform Delay, d1					42.6		43.3	4.1			10.5	8.3
Progression Factor					1.00		0.63	2.26			1.00	1.00
Incremental Delay, d2					21.8		5.1	0.0			0.2	0.1
Delay (s)					64.4		32.2	9.4			10.7	8.4
Level of Service					E		C	A			B	A
Approach Delay (s)		0.0			64.4			15.6			10.1	
Approach LOS		A			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			22.4									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			67.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	151	131	124	0	0	0	0	224	279	587	595	0
Future Volume (vph)	151	131	124	0	0	0	0	224	279	587	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.7	4.7	4.7					4.5	4.5	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99					0.99	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.95	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1603	1678	1489					3044	1353	1687	3374	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1603	1678	1489					3044	1353	1687	3374	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	138	131	0	0	0	0	236	294	618	626	0
RTOR Reduction (vph)	0	0	116	0	0	0	0	70	105	0	0	0
Lane Group Flow (vph)	143	154	15	0	0	0	0	295	60	618	626	0
Confl. Peds. (#/hr)			2							2		
Heavy Vehicles (%)	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA	
Protected Phases	7	7						2 8		1	6 8 2	
Permitted Phases			7						2 8			
Actuated Green, G (s)	11.7	11.7	11.7					36.2	36.2	38.7	79.0	
Effective Green, g (s)	11.7	11.7	11.7					31.5	31.5	38.7	74.3	
Actuated g/C Ratio	0.12	0.12	0.12					0.32	0.32	0.39	0.74	
Clearance Time (s)	4.7	4.7	4.7							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	187	196	174					958	426	652	2506	
v/s Ratio Prot	0.09	c0.09						c0.10		c0.37	c0.19	
v/s Ratio Perm			0.01						0.04			
v/c Ratio	0.76	0.79	0.09					0.31	0.14	0.95	0.25	
Uniform Delay, d1	42.8	42.9	39.4					26.0	24.5	29.7	4.1	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.63	0.78	
Incremental Delay, d2	15.3	17.2	0.1					0.1	0.1	20.3	0.0	
Delay (s)	58.1	60.1	39.5					26.0	24.6	38.9	3.2	
Level of Service	E	E	D					C	C	D	A	
Approach Delay (s)		53.1			0.0			25.6			20.9	
Approach LOS		D			A			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.3									
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			100.0									
Intersection Capacity Utilization			67.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	264	221	34	373	0	61	0	10	168	184	34
Future Volume (vph)	0	264	221	34	373	0	61	0	10	168	184	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.99		1.00	1.00		1.00		0.98	1.00	1.00	0.98
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.93		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)		3051		1656	3312		1656		1457	1573	1649	1459
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	1.00	1.00
Satd. Flow (perm)		3051		1656	3312		1656		1457	1573	1649	1459
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	0	311	260	40	439	0	72	0	12	198	216	40
RTOR Reduction (vph)	0	140	0	0	0	0	0	0	11	0	0	32
Lane Group Flow (vph)	0	431	0	40	439	0	72	0	1	178	236	8
Confl. Peds. (#/hr)			2			3						2
Confl. Bikes (#/hr)			2			2			2			2
Heavy Vehicles (%)	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		16.4		5.5	26.1		5.5		5.5	12.1	12.1	12.1
Effective Green, g (s)		16.4		5.5	26.1		5.5		5.5	12.1	12.1	12.1
Actuated g/C Ratio		0.28		0.10	0.45		0.10		0.10	0.21	0.21	0.21
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		867		157	1498		157		138	329	345	305
v/s Ratio Prot		c0.14		0.02	c0.13		c0.04			0.11	c0.14	
v/s Ratio Perm									0.00			0.01
v/c Ratio		0.50		0.25	0.29		0.46		0.01	0.54	0.68	0.03
Uniform Delay, d1		17.2		24.2	10.0		24.7		23.6	20.3	21.0	18.1
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2		0.3	0.0		0.8		0.0	1.0	4.4	0.0
Delay (s)		17.4		24.5	10.0		25.5		23.6	21.3	25.5	18.1
Level of Service		B		C	B		C		C	C	C	B
Approach Delay (s)		17.4			11.2			25.2			23.2	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			17.6			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			57.7			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			53.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (veh/h)	219	133	25	55	265	170	31	251	53	22	144	214
Future Volume (veh/h)	219	133	25	55	265	170	31	251	53	22	144	214
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0		0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		0.98	1.00		0.99		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Work Zone On Approach		No			No			No				No
Adj Sat Flow, veh/h/ln	1796	1796	1796	1796	1796	1796	1796	1796	1796		1796	1796
Adj Flow Rate, veh/h	252	153	29	63	305	195	36	289	61		166	246
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87		0.87	0.87
Percent Heavy Veh, %	7	7	7	7	7	7	7	7	7		7	7
Cap, veh/h	248	422	80	78	697	305	291	477	99		379	398
Arrive On Green	0.14	0.29	0.29	0.05	0.20	0.20	0.17	0.17	0.17		0.22	0.22
Sat Flow, veh/h	1711	1464	277	1711	3413	1495	1711	2806	583		1711	1796
Grp Volume(v), veh/h	252	0	182	63	305	195	36	174	176		166	246
Grp Sat Flow(s),veh/h/ln	1711	0	1741	1711	1706	1495	1711	1706	1682		1711	1796
Q Serve(g_s), s	9.5	0.0	5.4	2.4	5.1	7.8	1.2	6.2	6.4		5.5	8.1
Cycle Q Clear(g_c), s	9.5	0.0	5.4	2.4	5.1	7.8	1.2	6.2	6.4		5.5	8.1
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.35		1.00	
Lane Grp Cap(c), veh/h	248	0	501	78	697	305	291	290	286		379	398
V/C Ratio(X)	1.02	0.00	0.36	0.80	0.44	0.64	0.12	0.60	0.62		0.44	0.62
Avail Cap(c_a), veh/h	248	0	752	175	1380	605	679	677	667		679	713
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00
Uniform Delay (d), s/veh	28.0	0.0	18.6	31.0	22.8	23.9	23.1	25.1	25.2		22.0	23.0
Incr Delay (d2), s/veh	61.4	0.0	0.6	7.0	0.6	3.2	0.3	2.8	3.0		1.1	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	2.1	1.1	2.0	2.9	0.5	2.6	2.6		2.2	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.4	0.0	19.2	38.0	23.4	27.0	23.3	27.9	28.3		23.1	25.2
LnGrp LOS	F	A	B	D	C	C	C	C	C		C	C
Approach Vol, veh/h		434			563			386				633
Approach Delay, s/veh		59.9			26.3			27.7				25.2
Approach LOS		E			C			C				C
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	23.4		15.6	13.0	17.9		19.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	3.5	4.5		4.5				
Max Green Setting (Gmax), s	6.7	28.3		26.0	9.5	26.5		26.0				
Max Q Clear Time (g_c+I1), s	4.4	7.4		8.4	11.5	9.8		10.9				
Green Ext Time (p_c), s	0.0	1.3		2.8	0.0	3.4		3.6				
Intersection Summary												
HCM 6th Ctrl Delay			33.4									
HCM 6th LOS			C									
Notes												
User approved ignoring U-Turning movement.												

HCM 6th Signalized Intersection Summary

3: Canal Boulevard & Cutting Boulevard

09/21/2021

Movement	SBR
Lane Configurations	
Traffic Volume (veh/h)	192
Future Volume (veh/h)	192
Initial Q (Qb), veh	0
Ped-Bike Adj(A_pbT)	0.98
Parking Bus, Adj	1.00
Work Zone On Approach	
Adj Sat Flow, veh/h/ln	1796
Adj Flow Rate, veh/h	221
Peak Hour Factor	0.87
Percent Heavy Veh, %	7
Cap, veh/h	330
Arrive On Green	0.22
Sat Flow, veh/h	1489
Grp Volume(v), veh/h	221
Grp Sat Flow(s),veh/h/ln	1489
Q Serve(g_s), s	8.9
Cycle Q Clear(g_c), s	8.9
Prop In Lane	1.00
Lane Grp Cap(c), veh/h	330
V/C Ratio(X)	0.67
Avail Cap(c_a), veh/h	591
HCM Platoon Ratio	1.00
Upstream Filter(I)	1.00
Uniform Delay (d), s/veh	23.3
Incr Delay (d2), s/veh	3.3
Initial Q Delay(d3),s/veh	0.0
%ile BackOfQ(50%),veh/ln	3.2
Unsig. Movement Delay, s/veh	
LnGrp Delay(d),s/veh	26.7
LnGrp LOS	C
Approach Vol, veh/h	
Approach Delay, s/veh	
Approach LOS	
Timer - Assigned Phs	

HCM 6th TWSC
4: 2nd Street & Cutting Boulevard

09/21/2021

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	296	2	5	391	150	2	0	6	74	0	28
Future Vol, veh/h	40	296	2	5	391	150	2	0	6	74	0	28
Conflicting Peds, #/hr	0	0	2	0	0	1	0	0	1	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	220	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	6	6	6	6	6	6	6	6	6	6	6	6
Mvmt Flow	46	340	2	6	449	172	2	0	7	85	0	32

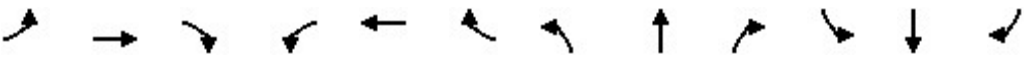
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	622	0	0	344	0	0	672	1069	344	986	984	312
Stage 1	-	-	-	-	-	-	435	435	-	548	548	-
Stage 2	-	-	-	-	-	-	237	634	-	438	436	-
Critical Hdwy	4.19	-	-	4.19	-	-	7.39	6.59	6.29	7.39	6.59	6.99
Critical Hdwy Stg 1	-	-	-	-	-	-	6.19	5.59	-	6.59	5.59	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.59	5.59	-	6.19	5.59	-
Follow-up Hdwy	2.257	-	-	2.257	-	-	3.557	4.057	3.357	3.557	4.057	3.357
Pot Cap-1 Maneuver	934	-	-	1188	-	-	349	216	687	209	242	674
Stage 1	-	-	-	-	-	-	589	571	-	481	508	-
Stage 2	-	-	-	-	-	-	736	464	-	587	571	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	933	-	-	1186	-	-	318	204	685	198	228	673
Mov Cap-2 Maneuver	-	-	-	-	-	-	318	204	-	198	228	-
Stage 1	-	-	-	-	-	-	559	542	-	457	505	-
Stage 2	-	-	-	-	-	-	697	461	-	552	542	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.1			0.1			11.9			32.3		
HCM LOS							B			D		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	532	933	-	-	1186	-	-	246
HCM Lane V/C Ratio	0.017	0.049	-	-	0.005	-	-	0.477
HCM Control Delay (s)	11.9	9.1	-	-	8.1	-	-	32.3
HCM Lane LOS	B	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	2.4

HCM 6th Signalized Intersection Summary 6: I-580 On Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑↑			↑	↑			
Traffic Volume (veh/h)	0	757	0	0	230	725	238	0	64	0	0	0
Future Volume (veh/h)	0	757	0	0	230	725	238	0	64	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1841	0	0	1841	1841	1841	1841	1841			
Adj Flow Rate, veh/h	0	832	0	0	253	797	262	0	70			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	4	0	0	4	4	4	4	4			
Cap, veh/h	0	1995	0	0	1911	869	380	0	338			
Arrive On Green	0.00	0.57	0.00	0.00	0.57	0.57	0.22	0.00	0.22			
Sat Flow, veh/h	0	3681	0	0	3516	1524	1753	0	1556			
Grp Volume(v), veh/h	0	832	0	0	253	797	262	0	70			
Grp Sat Flow(s),veh/h/ln	0	1749	0	0	1675	1524	1753	0	1556			
Q Serve(g_s), s	0.0	5.4	0.0	0.0	1.4	18.8	5.5	0.0	1.5			
Cycle Q Clear(g_c), s	0.0	5.4	0.0	0.0	1.4	18.8	5.5	0.0	1.5			
Prop In Lane	0.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	0	1995	0	0	1911	869	380	0	338			
V/C Ratio(X)	0.00	0.42	0.00	0.00	0.13	0.92	0.69	0.00	0.21			
Avail Cap(c_a), veh/h	0	5337	0	0	5112	2325	789	0	700			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	0.0	4.8	0.0	0.0	4.0	7.7	14.4	0.0	12.8			
Incr Delay (d2), s/veh	0.0	0.2	0.0	0.0	0.0	1.8	2.2	0.0	0.3			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.0	0.0	0.3	3.6	2.0	0.0	0.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	5.0	0.0	0.0	4.0	9.5	16.6	0.0	13.1			
LnGrp LOS	A	A	A	A	A	A	B	A	B			
Approach Vol, veh/h		832			1050			332				
Approach Delay, s/veh		5.0			8.2			15.9				
Approach LOS		A			A			B				
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		26.8				26.8		13.2				
Change Period (Y+Rc), s		4.0				4.0		4.5				
Max Green Setting (Gmax), s		61.0				61.0		18.0				
Max Q Clear Time (g_c+I1), s		7.4				20.8		7.5				
Green Ext Time (p_c), s		10.8				1.9		1.3				
Intersection Summary												
HCM 6th Ctrl Delay			8.1									
HCM 6th LOS			A									

HCM 6th Signalized Intersection Summary

7: Harbour Way & Cutting Boulevard

09/21/2021



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	183	541	97	76	703	151	222	492	258	138	455	123
Future Volume (veh/h)	183	541	97	76	703	151	222	492	258	138	455	123
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	197	582	104	82	756	162	239	529	277	148	489	132
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	169	1157	515	104	839	180	236	558	346	167	575	163
Arrive On Green	0.10	0.33	0.33	0.06	0.29	0.29	0.22	0.22	0.22	0.25	0.25	0.25
Sat Flow, veh/h	1767	3526	1571	1767	2879	617	1060	2505	1551	656	2264	642
Grp Volume(v), veh/h	197	582	104	82	463	455	406	362	277	411	0	358
Grp Sat Flow(s),veh/h/ln	1767	1763	1571	1767	1763	1733	1803	1763	1551	1823	0	1739
Q Serve(g_s), s	10.5	14.6	5.2	5.0	27.7	27.8	24.5	22.1	18.6	23.9	0.0	21.3
Cycle Q Clear(g_c), s	10.5	14.6	5.2	5.0	27.7	27.8	24.5	22.1	18.6	23.9	0.0	21.3
Prop In Lane	1.00		1.00	1.00		0.36	0.59		1.00	0.36		0.37
Lane Grp Cap(c), veh/h	169	1157	515	104	514	505	401	393	346	463	0	442
V/C Ratio(X)	1.17	0.50	0.20	0.79	0.90	0.90	1.01	0.92	0.80	0.89	0.00	0.81
Avail Cap(c_a), veh/h	169	1157	515	169	514	505	401	393	346	505	0	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.87	0.87	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	49.8	29.7	26.6	51.1	37.4	37.4	42.8	41.8	40.5	39.5	0.0	38.5
Incr Delay (d2), s/veh	117.2	1.4	0.8	4.9	21.4	21.7	48.0	26.7	12.7	16.5	0.0	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ft	0.1	6.4	2.1	2.4	14.8	14.6	16.1	12.4	8.3	12.7	0.0	10.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	166.9	31.1	27.4	56.0	58.9	59.2	90.8	68.5	53.2	56.1	0.0	47.9
LnGrp LOS	F	C	C	E	E	E	F	E	D	E	A	D
Approach Vol, veh/h	883			1000			1045			769		
Approach Delay, s/veh	61.0			58.8			73.1			52.3		
Approach LOS	E			E			E			D		
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	40.6			28.0	14.0	36.6		31.4				
Change Period (Y+Rc), s	3.5	4.5		3.5	3.5	4.5		3.5				
Max Green Setting (Gmax), s	29.5			24.5	10.5	29.5		30.5				
Max Q Clear Time (g_c+1/3), s	16.6			26.5	12.5	29.8		25.9				
Green Ext Time (p_c), s	0.0	4.7		0.0	0.0	0.0		2.0				
Intersection Summary												
HCM 6th Ctrl Delay	62.0											
HCM 6th LOS	E											

HCM Signalized Intersection Capacity Analysis

1: Canal Blvd & I-580 WB Ramp

09/21/2021

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕↕		↗	↕↕			↕↕	↗
Traffic Volume (vph)	0	0	0	261	136	1131	281	964	0	0	483	261
Future Volume (vph)	0	0	0	261	136	1131	281	964	0	0	483	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.7		4.2	4.6			4.6	4.6
Lane Util. Factor					0.95		1.00	0.95			0.91	0.91
Frpb, ped/bikes					0.99		1.00	1.00			1.00	0.98
Flpb, ped/bikes					1.00		1.00	1.00			1.00	1.00
Frt					0.89		1.00	1.00			0.99	0.85
Flt Protected					0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3056		1752	3505			3317	1403
Flt Permitted					0.99		0.95	1.00			1.00	1.00
Satd. Flow (perm)					3056		1752	3505			3317	1403
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	275	143	1191	296	1015	0	0	508	275
RTOR Reduction (vph)	0	0	0	0	70	0	0	0	0	0	4	130
Lane Group Flow (vph)	0	0	0	0	1539	0	296	1015	0	0	543	106
Confl. Peds. (#/hr)						2						2
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type				Perm	NA		Prot	NA			NA	Perm
Protected Phases					8		5	2 7 6			6 7	
Permitted Phases				8								6 7
Actuated Green, G (s)					51.3		21.8	84.4			58.4	58.4
Effective Green, g (s)					51.3		21.8	84.4			58.4	58.4
Actuated g/C Ratio					0.35		0.15	0.58			0.40	0.40
Clearance Time (s)					4.7		4.2					
Vehicle Extension (s)					0.2		0.2					
Lane Grp Cap (vph)					1081		263	2040			1335	565
v/s Ratio Prot							c0.17	c0.29			0.16	
v/s Ratio Perm					0.50							0.08
v/c Ratio					1.90dr		1.13	0.50			0.41	0.19
Uniform Delay, d1					46.9		61.6	17.8			30.9	28.0
Progression Factor					1.00		0.72	1.30			1.00	1.00
Incremental Delay, d2					196.2		92.8	0.0			0.1	0.1
Delay (s)					243.0		136.9	23.1			31.0	28.0
Level of Service					F		F	C			C	C
Approach Delay (s)		0.0			243.0			48.8			30.1	
Approach LOS		A			F			D			C	
Intersection Summary												
HCM 2000 Control Delay			129.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			145.0			Sum of lost time (s)			18.1			
Intersection Capacity Utilization			112.3%			ICU Level of Service			H			
Analysis Period (min)			15									
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Canal Boulevard/Canal Blvd & I-580 EB Ramp

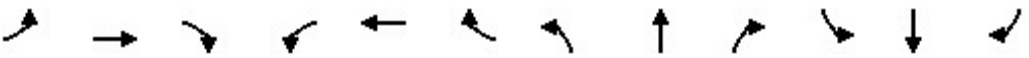
09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	871	166	177	0	0	0	0	374	335	349	395	0
Future Volume (vph)	871	166	177	0	0	0	0	374	335	349	395	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.6	4.6	4.6					4.6	4.6	4.2	4.6	
Lane Util. Factor	0.95	0.95	1.00					0.91	0.91	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98					1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85					0.96	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1649	1678	1527					3193	1389	1736	3471	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1649	1678	1527					3193	1389	1736	3471	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	927	177	188	0	0	0	0	398	356	371	420	0
RTOR Reduction (vph)	0	0	92	0	0	0	0	20	115	0	0	0
Lane Group Flow (vph)	547	557	96	0	0	0	0	503	116	371	420	0
Confl. Peds. (#/hr)			2						2			
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		7						2 8		1	6 8 2	
Permitted Phases	7		7						2 8			
Actuated Green, G (s)	33.4	33.4	33.4					77.4	77.4	20.8	102.4	
Effective Green, g (s)	33.4	33.4	33.4					72.7	72.7	20.8	97.7	
Actuated g/C Ratio	0.23	0.23	0.23					0.50	0.50	0.14	0.67	
Clearance Time (s)	4.6	4.6	4.6							4.2		
Vehicle Extension (s)	0.2	0.2	0.2							0.2		
Lane Grp Cap (vph)	379	386	351					1600	696	249	2338	
v/s Ratio Prot								c0.16		c0.21	0.12	
v/s Ratio Perm	0.33	0.33	0.06						0.08			
v/c Ratio	1.44	1.44	0.27					0.31	0.17	1.49	0.18	
Uniform Delay, d1	55.8	55.8	45.8					21.4	19.7	62.1	8.8	
Progression Factor	1.00	1.00	1.00					1.00	1.00	0.74	0.63	
Incremental Delay, d2	213.9	213.5	0.2					0.5	0.5	239.4	0.0	
Delay (s)	269.7	269.3	46.0					21.9	20.2	285.2	5.6	
Level of Service	F	F	D					C	C	F	A	
Approach Delay (s)		237.0			0.0			21.4			136.7	
Approach LOS		F			A			C			F	
Intersection Summary												
HCM 2000 Control Delay			151.7									HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio			0.80									F
Actuated Cycle Length (s)			145.0									Sum of lost time (s)
Intersection Capacity Utilization			112.3%									18.1
Analysis Period (min)			15									ICU Level of Service
c Critical Lane Group												H

HCM Signalized Intersection Capacity Analysis

5: Hoffman Boulevard/I-580 Off Ramp & Cutting Boulevard

09/21/2021

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↑	↑↑		↑		↑	↑	↑↑	↑
Traffic Volume (vph)	0	202	174	26	442	0	60	0	8	547	41	44
Future Volume (vph)	0	202	174	26	442	0	60	0	8	547	41	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Lane Util. Factor		0.95		1.00	0.95		1.00		1.00	0.95	0.95	1.00
Frpb, ped/bikes		0.98		1.00	1.00		1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Frt		0.93		1.00	1.00		1.00		0.85	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (prot)		3200		1752	3505		1752		1568	1665	1680	1547
Flt Permitted		1.00		0.95	1.00		0.95		1.00	0.95	0.96	1.00
Satd. Flow (perm)		3200		1752	3505		1752		1568	1665	1680	1547
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	215	185	28	470	0	64	0	9	582	44	47
RTOR Reduction (vph)	0	138	0	0	0	0	0	0	8	0	0	35
Lane Group Flow (vph)	0	262	0	28	470	0	64	0	1	314	312	12
Confl. Peds. (#/hr)			2			4						2
Confl. Bikes (#/hr)			13			1						
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Turn Type		NA		Prot	NA		Prot		Perm	Split	NA	Perm
Protected Phases		6		5	2		7			8	8	
Permitted Phases									7			8
Actuated Green, G (s)		14.4		3.4	22.0		5.7		5.7	14.9	14.9	14.9
Effective Green, g (s)		14.4		3.4	22.0		5.7		5.7	14.9	14.9	14.9
Actuated g/C Ratio		0.25		0.06	0.39		0.10		0.10	0.26	0.26	0.26
Clearance Time (s)		5.1		4.2	5.1		4.2		4.2	4.7	4.7	4.7
Vehicle Extension (s)		0.2		0.2	0.2		0.2		0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		814		105	1362		176		157	438	442	407
v/s Ratio Prot		0.08		0.02	c0.13		c0.04			c0.19	0.19	
v/s Ratio Perm									0.00			0.01
v/c Ratio		0.32		0.27	0.35		0.36		0.01	0.72	0.71	0.03
Uniform Delay, d1		17.1		25.4	12.2		23.8		22.9	18.9	18.9	15.5
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1		0.5	0.1		0.5		0.0	4.6	4.2	0.0
Delay (s)		17.2		25.9	12.3		24.2		22.9	23.6	23.0	15.5
Level of Service		B		C	B		C		C	C	C	B
Approach Delay (s)		17.2			13.0			24.1			22.8	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			18.5			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			56.6			Sum of lost time (s)			18.2			
Intersection Capacity Utilization			53.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Appendix C

Signal Warrant Analysis

S. 2nd Street and Cutting Boulevard

TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: JW date: 9/16/21

Major Street: Cutting Boulevard
 Minor Street: S. 2nd Street

Critical Approach Speed* (mph) 40Critical Approach Speed* (mph) 25

*Posted Speed.

Critical speed of major street traffic > 50 mph (64 km/h).....

☐

In built up area of isolated community of < 10,000 population.....

☐

} Rural (R)

☒

Urban (U)

AM PEAK PERIOD**Warrant 3 - Peak Hour**

The need for a traffic control signal should be considered if an engineering study finds that the criteria in either of the following two categories (Parts A and B) are met:

PART A

(All parts 1, 2, and 3 below must be satisfied)

	AM PEAK PERIOD							
	Existing	Existing+Proj	Background	Background + Proj	Cumulative	Cumulative+ Proj		
Minor Street Approach Direction w/ Highest Delay	SB	SB	SB	SB	SB	SB		
Highest Minor Street Average Delay (sec/veh)	18.7	18.7	18.7	18.7	18.7	18.7		
Corresponding Minor Street Approach Volume (veh/hr)	165	165	165	165	189	189		
Minor Street Total Delay (veh-hrs)	0.9	0.9	0.9	0.9	1.0	1.0		
Total Entering Volume (veh/hr)	762	830	859	927	965	1033		
1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u>	No	No	No	No	No	No		
2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u>	Yes	Yes	Yes	Yes	Yes	Yes		
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches.	Yes	Yes	Yes	Yes	Yes	Yes		
Signal Warranted based on Part A?	No	No	No	No	No	No		

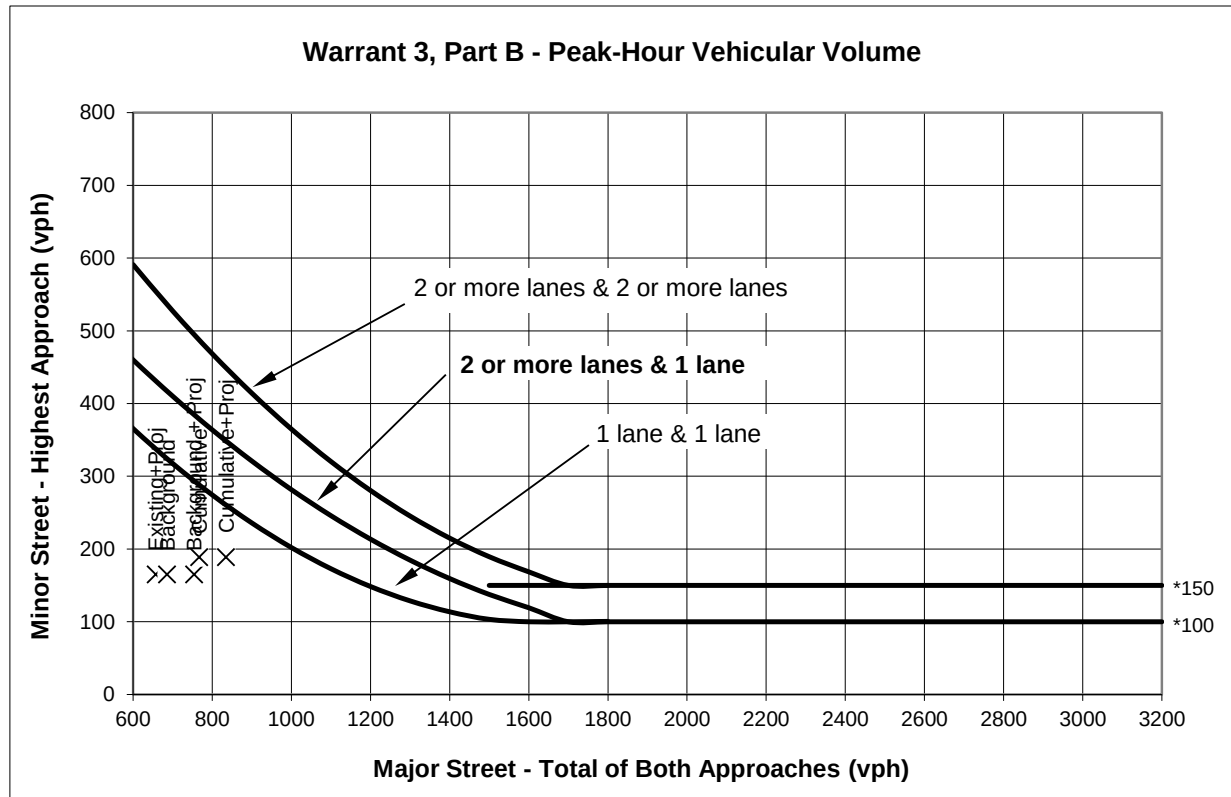
PART B

				AM PEAK PERIOD							
				Existing	Existing+Proj	Background	Background + Proj	Cumulative	Cumulative+ Proj		
		Approach Lanes									
		One	2 or More								
Major Street - Both Approaches	Cutting Boulevard		X	589	657	686	754	767	835		
Minor Street - Highest Approach	S. 2nd Street	X		165	165	165	165	189	189		
Signal Warranted based on Part B?				No	No	No	No	No	No		

The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)

S. 2nd Street and Cutting Boulevard

S. 2nd Street and Cutting Boulevard**AM PEAK PERIOD**

Source: Figure 4C-3 California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Part B - Peak-Hour Vehicular Volume

				AM PEAK PERIOD							
		Approach Lanes		Existing	Existing+Proj	Background	Background + Proj	Cumulative	Cumulative + Proj		
		One	More								
Major Street - Both Approaches	Cutting Boulevard		X	589	657	686	754	767	835		
Minor Street - Highest Approach	S. 2nd Street	X		165	165	165	165	189	189		
Signal Warranted Based on Part B - Peak-Hour Volumes?				No	No	No	No	No	No		

*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

Note 1: Right turn volume was removed from the minor WB approach.

S. 2nd Street and Cutting Boulevard

TRAFFIC SIGNAL WARRANTS WORKSHEET

Analyst: JW date: 9/16/21

Major Street: Cutting Boulevard
 Minor Street: S. 2nd Street

Critical Approach Speed* (mph) 40Critical Approach Speed* (mph) 25

*Posted Speed.

Critical speed of major street traffic > 50 mph (64 km/h).....

☐

In built up area of isolated community of < 10,000 population.....

☐

Rural (R)

☒

Urban (U)

PM PEAK HOUR**Warrant 3 - Peak Hour**

The need for a traffic control signal should be considered if an engineering study finds that the criteria in either of the following two categories (Parts A and B) are met:

PART A

(All parts 1, 2, and 3 below must be satisfied)

PM PEAK HOUR

	Existing	Existing+Proj	Background	Background + Proj	Cumulative	Cumulative+ Proj		
Minor Street Approach Direction w/ Highest Delay	SB	SB	SB	SB	SB	SB		
Highest Minor Street Average Delay (sec/veh)	14.4	14.4	14.4	14.4	14.4	14.4		
Corresponding Minor Street Approach Volume (veh/hr)	88	88	88	88	102	102		
Minor Street Total Delay (veh-hrs)	0.4	0.4	0.4	0.4	0.4	0.4		
Total Entering Volume (veh/hr)	683	737	792	846	940	994		

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds 4 vehicle-hours for a 1-lane approach and 5 vehicle-hours for a 2-lane approach; <u>AND</u>	No	No	No	No	No	No		
2. The volume on the same minor street approach equals or exceeds 100 vph for 1 moving lane of traffic or 150 vph for 2 moving lanes; <u>AND</u>	No	No	No	No	Yes	Yes		
3. The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with 4 or more approaches or 650 vph for intersections with 3 approaches.	Yes	Yes	Yes	Yes	Yes	Yes		
Signal Warranted based on Part A?	No	No	No	No	No	No		

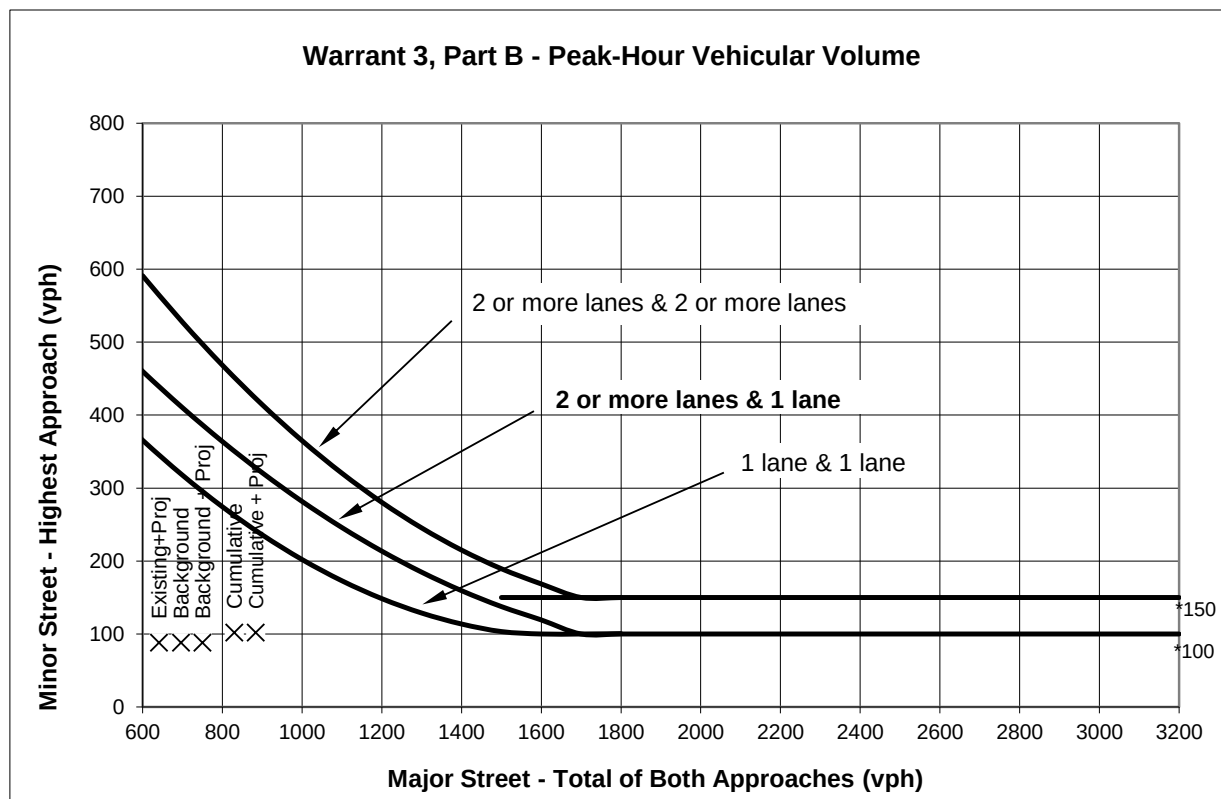
PART B**PM PEAK HOUR**

		Approach Lanes	Existing	Existing+Proj	Background	Background + Proj	Cumulative	Cumulative+ Proj		
		One	2 or More							
Major Street - Both Approaches	Cutting Boulevard		X	587	641	696	750	830	884	
Minor Street - Highest Approach	S. 2nd Street	X		88	88	88	88	102	102	
Signal Warranted based on Part B?				No	No	No	No	No	No	

The Warrant is satisfied if the plotted point for vehicles per hour on the major street (both approaches) and the corresponding per hour higher vehicle volume minor street approach (one direction only) for one hour (any four consecutive 15-minute periods) fall above the applicable curves in California MUTCD Figure 4C-3 or 4C-4.

Source: California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California)

S. 2nd Street and Cutting Boulevard

S. 2nd Street and Cutting Boulevard**PM PEAK HOUR**

Source: Figure 4C-3 California Manual on Uniform Traffic Control Devices for Streets and Highways (FHWA's MUTCD 2010 Edition, as amended for use in California).

* Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

Warrant 3, Part B - Peak-Hour Vehicular Volume

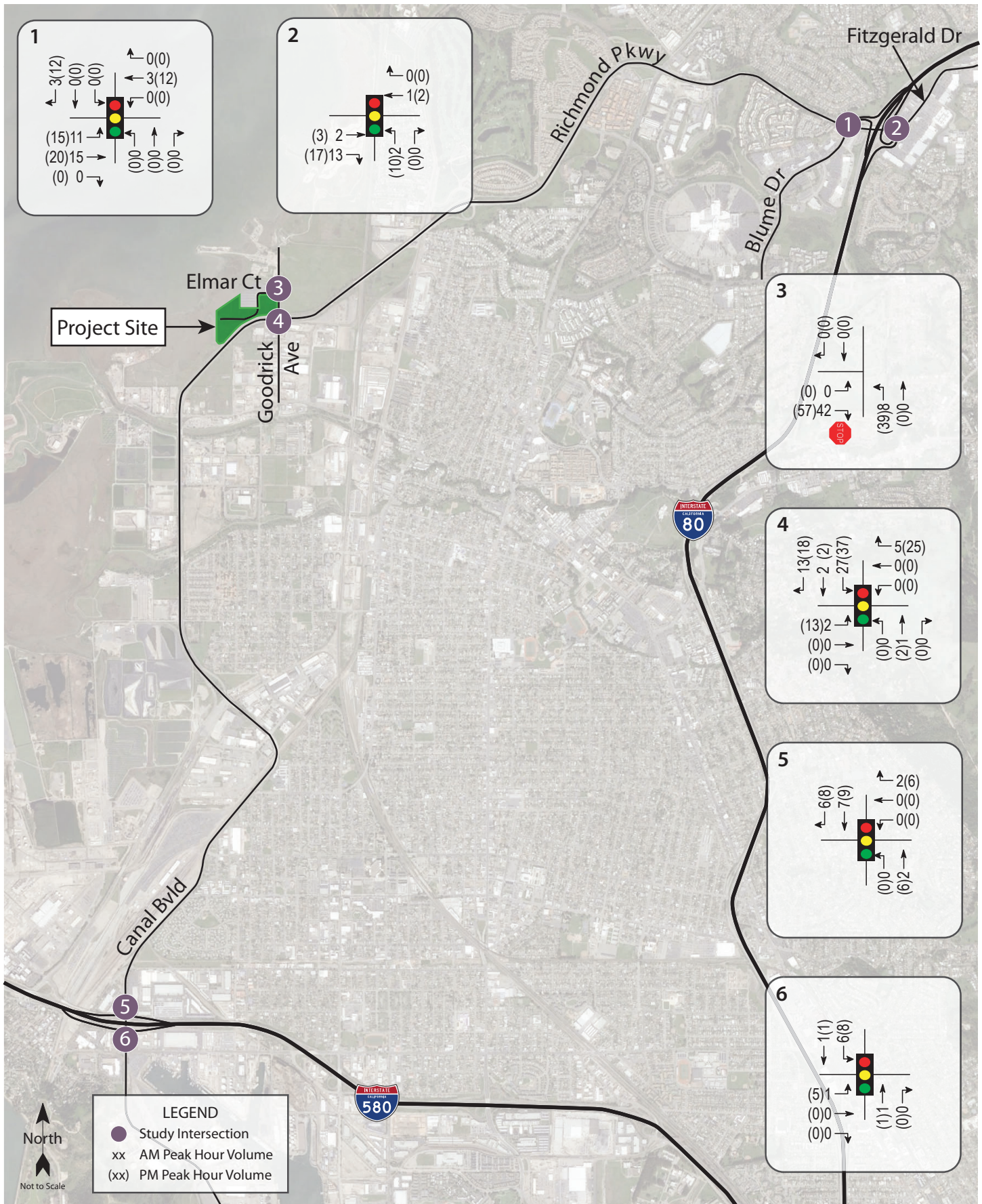
		PM PEAK HOUR									
		Approach Lanes		Existing	Existing+Proj	Background	Background + Proj	Cumulative	Cumulative+ Proj		
		One	Two or More								
Major Street - Both Approaches	Cutting Boulevard		X	587	641	696	750	830	884		
Minor Street - Highest Approach	S. 2nd Street	X		88	88	88	88	102	102		
Signal Warranted Based on Part B - Peak-Hour Volumes?				No	No	No	No	No	No		

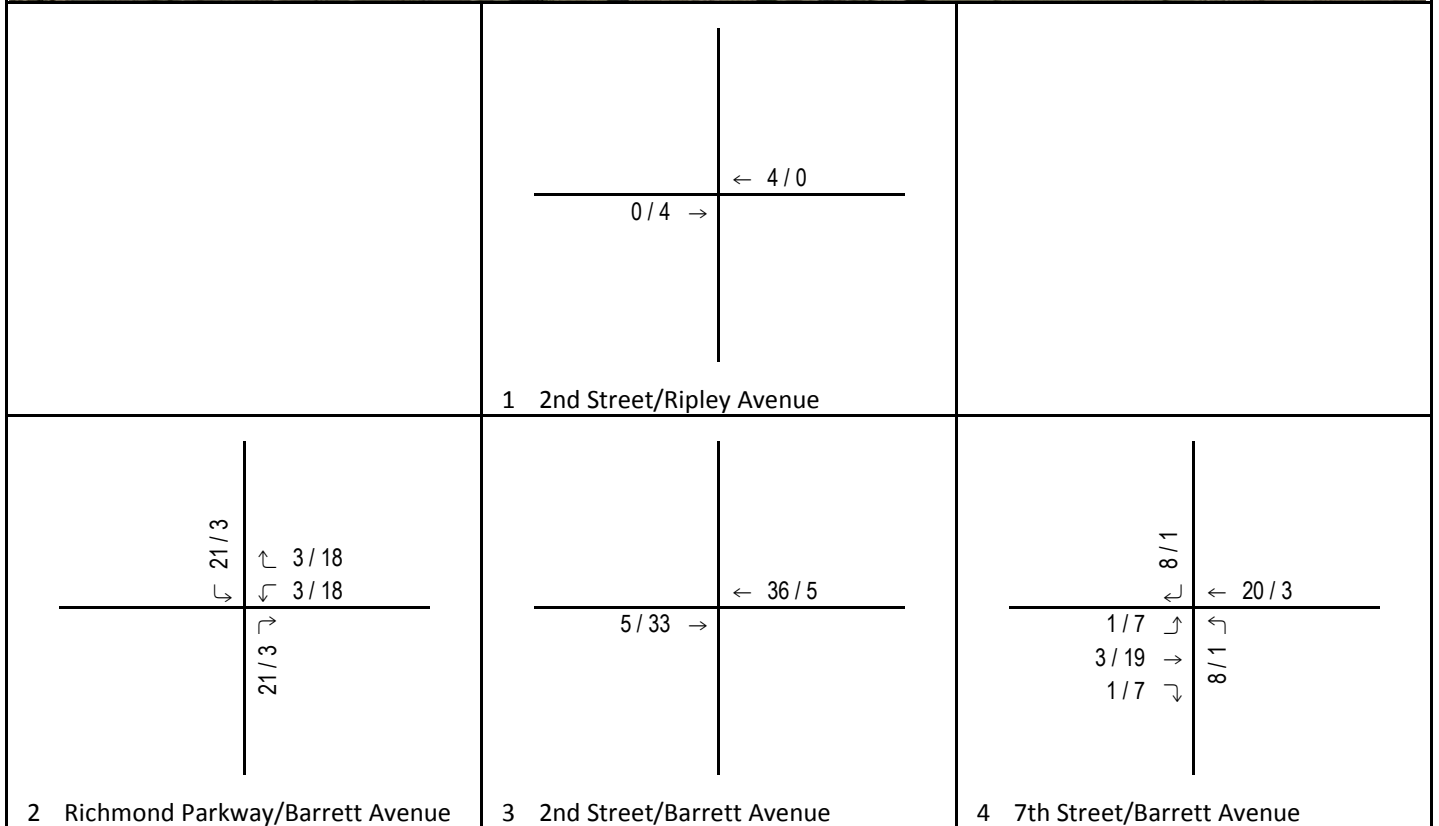
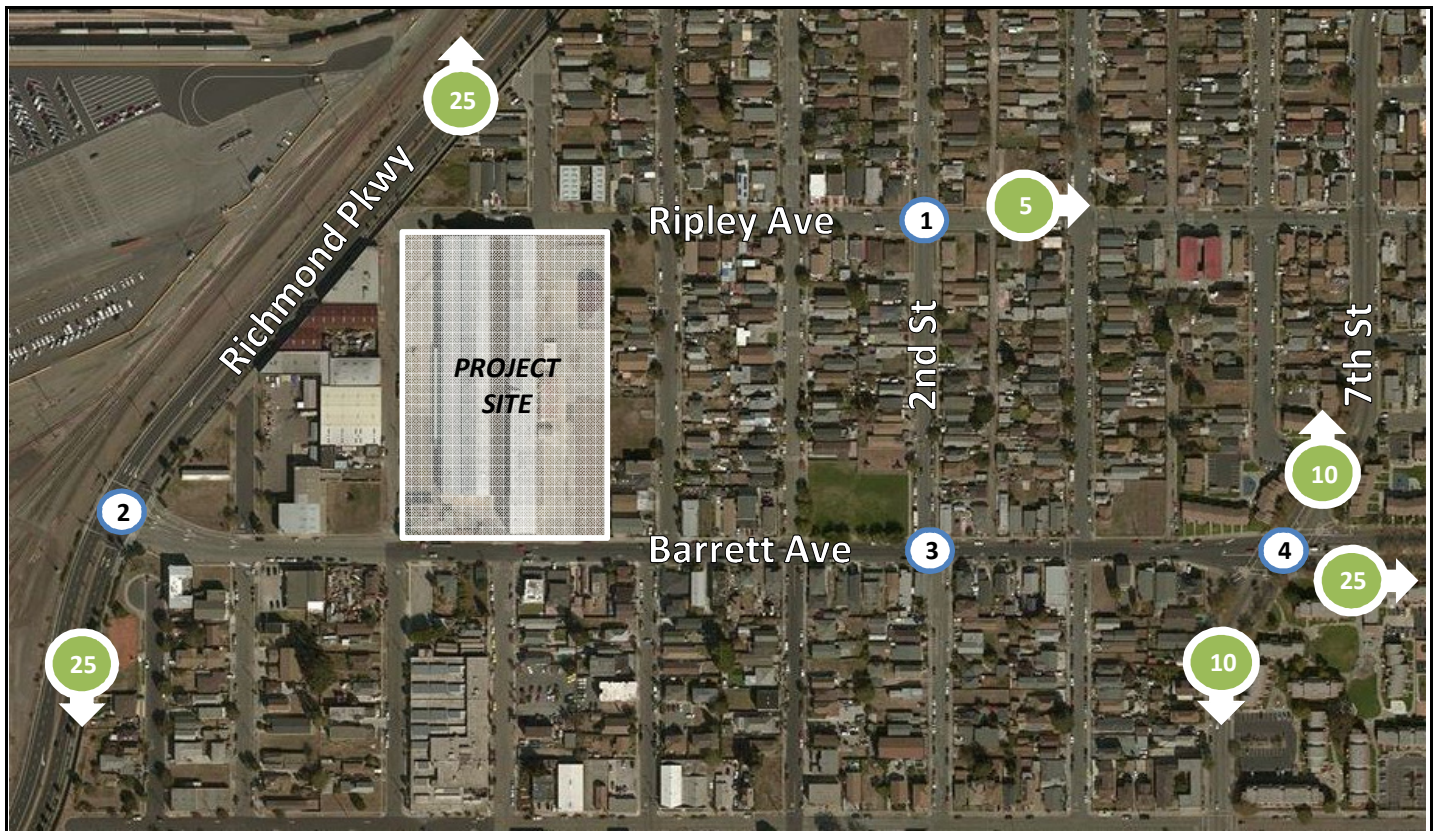
*Warrant is satisfied if plotted points fall above the appropriate curve in graph above.

Note 1: Right turn volume was removed from the minor WB approach.

Appendix D

Approved Projects Trips





LSA

LEGEND
 XXX / YYY AM / PM Volume
 # Regional Trip Distribution Percentage

FIGURE 2

West Barrett Avenue
 Project Trip Distribution and Assignment



1. I-580 WB Ramps/Canal Blvd.	2. I-580 EB Ramps/Canal Blvd.	3. W. Cutting Blvd./Canal Blvd.	4. Seaclyff Dr./Canal Blvd.
5. Seaclyff Dr./Sandpiper Spit	6. Brickyard Cove Rd/Dornan Dr.	7. Western Dr./Dornan Dr.	8. E. Richmond Ave/S. Garrard Blvd.
9. W. Cutting Blvd./S. Garrard Blvd.	10. E. Standard Street/Castro Street	11. Brickyard Cove Rd/Shoreline Drive	



SOURCE: Fehr & Peers, 2017

Quarry Residential Project . 161035

Figure 4.14-7
Project Trip Assignment

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