
Appendix N

Final Traffic Impact Analysis Report

SMP 39 & 40 Development

Livermore, California

February 15, 2023

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EXECUTIVE SUMMARY

This report summarizes the results of the Traffic Impact Analysis (TIA) for the proposed warehouse and office developments in Livermore California. The project includes two developments, SMP 39 located on the south side of West Jack London Boulevard, and SMP 40 located south of Discovery Drive.

This report provides the intersection level of service (LOS) and Vehicle Miles Traveled (VMT) related to the project. Additionally, the report also includes evaluations and recommendations concerning project site access and on-site circulation for vehicles, bicycles, and pedestrians.

To evaluate the impacts on the transportation infrastructure due to the addition of traffic from the proposed project, 16 study intersections were evaluated during the weekday morning (a.m.) peak hour and evening (p.m.) peak hour under nine study scenarios. The study intersections were evaluated under Existing Conditions, and *No Project* and *Plus Project* scenarios for Background and Cumulative Conditions. For the purpose of this analysis, potential traffic operational effects from the proposed projects are identified based on established operational thresholds described in the report.

Project Trip Generation

The proposed SMP 39 project is expected to generate 3,596 daily trips, including 515 a.m. peak hour trips (391 inbound trips, 124 outbound trips) and 560 p.m. peak hour trips (174 inbound trips, 386 outbound trips). The proposed SMP 40 project is expected to generate 1,062 daily trips, including 61 a.m. peak hour trips (47 inbound trips, 14 outbound trips) and 76 p.m. peak hour trips (21 inbound trips, 55 outbound trips).

Existing Conditions

Under this scenario, all of the study intersections operate within applicable jurisdictional Level of Service (LOS) standards during the a.m. and p.m. peak hour.

Background Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards during the a.m. and p.m. peak hours.

Background plus SMP 39 Conditions

Under this scenario, substantial project impacts were observed at two study intersections. Impacts are reduced to acceptable levels with improvements.

Background plus SMP 40 Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards.

Background plus SMP 39 & 40 Conditions

Under this scenario, substantial project impacts were observed at two study intersections. Impacts are reduced to acceptable levels with improvements.

Cumulative Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards during the a.m. and p.m. peak hours, except for four intersections along West Jack London Boulevard, Isabel Avenue, and El Charro Road.

Cumulative plus SMP 39 Conditions

Under this scenario, substantial project impacts were observed at five study intersections. With improvements, impacts are reduced to acceptable levels, or to levels lower than or similar to observed under Cumulative Conditions.

Cumulative plus SMP 40 Conditions

Under this scenario, substantial project impacts were observed at one study intersection. With improvements, impacts are reduced to levels lower than observed under Cumulative Conditions.

Cumulative plus SMP 39 & 40 Conditions

Under this scenario, substantial project impacts were observed at six study intersections. With improvements, impacts are reduced to acceptable levels, or to levels lower than or similar to observed under Cumulative Conditions.

Recommended Improvement Measures

Recommended improvement measures for each scenario are summarized in **Table M. Figure M** illustrates study intersections where improvements are recommended under Cumulative Conditions.

Parking

The SMP 39 project proposes to provide 1,647 parking stalls and the SMP 40 project proposes to provide a total of 797 parking stalls. The number of proposed automobile parking spaces is **adequate** for both SMP 39 and SMP 40 projects. The SMP 39 and SMP 40 projects require 30 bicycle parking spaces each.

Site Access and On-Site Circulation

The proposed vehicular access to the SMP 39 project site will be via three driveways on West Jack London Boulevard. Two driveways are full-access, and one is right-in and right-out only. All three driveways are located on the south side of West Jack London Boulevard. The proposed vehicular access to the SMP 40 project site will be via two driveways on Atlantis Court and Challenger Street. Both driveways are full-access and are located on existing roadways south of Discovery Drive. Pedestrians and bicyclists can use the existing multimodal network to access the project site. The parking aisles are wide enough to allow for two-way circulation. Based on a preliminary review of the project site plan, the site access and on-site circulation is considered adequate.

Pedestrian Impacts

The project does not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is **less than significant**.

Bicycle Impacts

The impact to bicycle facilities are expected to be ***less than significant*** after accounting for appropriate driveway design considerations for the SMP 39 project.

Transit Impacts

The project site is within walking distance to two Tri-Valley Wheels bus stops that provide local and regional access. Impacts to transit service are expected to be ***less than significant***.

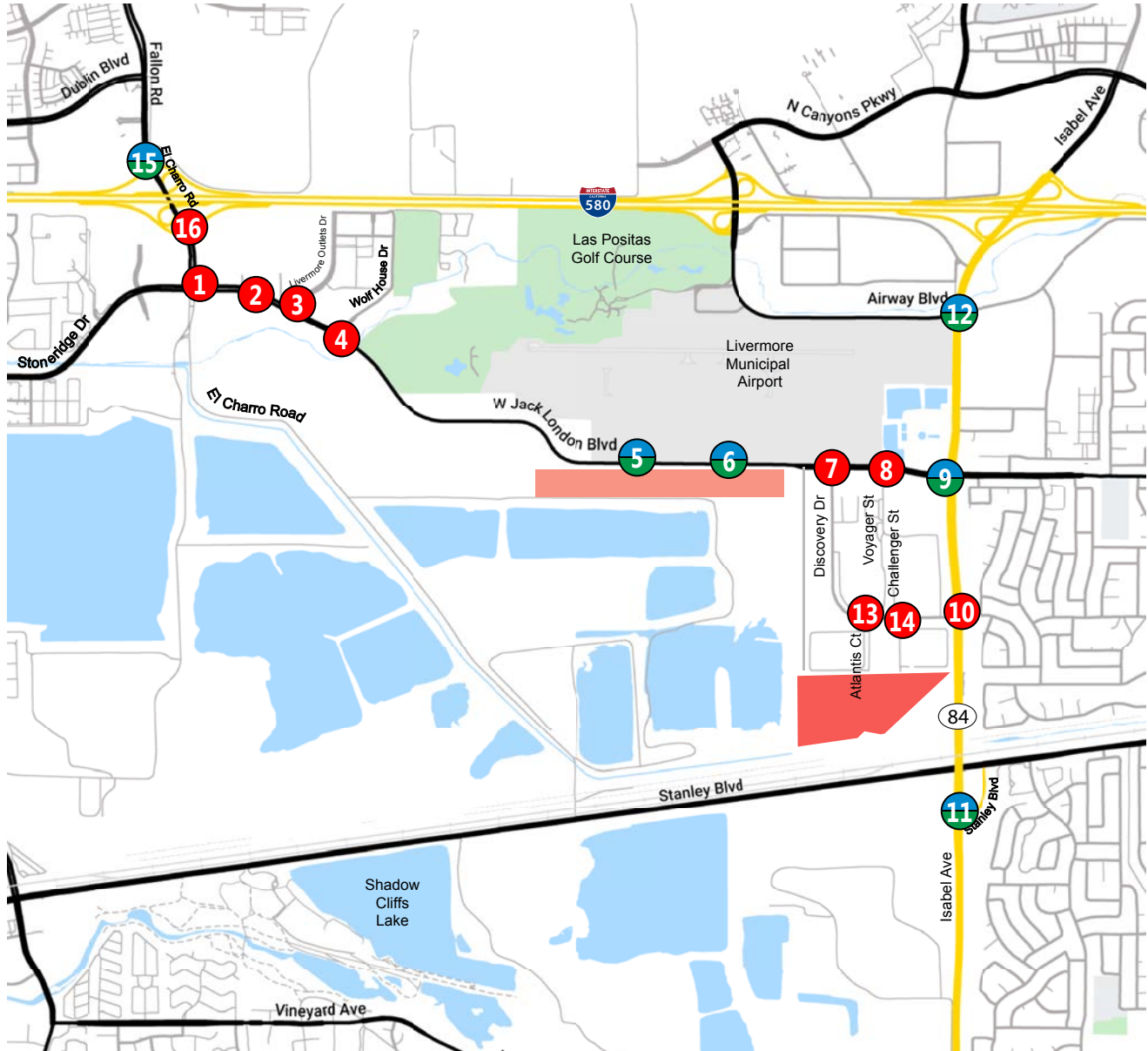
Vehicle Miles Travelled Analysis

TJKM recommends the SMP 39 and SMP 40 project to provide one mitigation measure; an employer carpool program. With this mitigation measure, both SMP 39 and SMP 40 VMT are found to have ***less than significant*** impacts for the base year condition.

Table M: Recommended Improvement Measures

#	Intersection	Background plus SMP 39 Improvements	Background plus SMP 40 Improvements	Background plus SMP 39 & 40 Improvements	Cumulative plus SMP 39 Improvements	Cumulative plus SMP 40 Improvements	Cumulative plus SMP 39 & 40 Improvements
5	W Jack London Blvd/Ambassador Dwy	Addition of WBL pocket, Signalize intersection	None needed	Addition of WBL pocket, Signalize intersection	None needed	None needed	Signalize intersection
6	W Jack London Blvd/Airport Dwy	Addition of WBL pocket, Signalize intersection	None needed	Addition of WBL pocket, Signalize intersection	Signalize intersection	None needed	Signalize intersection
9	W Jack London Blvd./Isabel Ave	None needed	None needed	None needed	Modify signal timing	None needed	Modify signal timing
11	Isabel Ave/Stanley Blvd	None needed	None needed	None needed	Addition of WBR pocket, Modify signal timing	None needed	Addition of WBR pocket, Modify signal timing
12	Isabel Ave/Airway Blvd	None needed	None needed	None needed	Modify signal timing	Modify signal timing	Modify signal timing
15	El Charro Rd/I-580 WB Ramps	None needed	None needed	None needed	Modify signal timing	None needed	Modify signal timing

Figure M: Recommended Cumulative Improvement Measures Map



LEGEND

- Project Site - SMP 39
- Project Site - SMP 40
- x Study Intersection with No Recommended Improvements
- + Improvements Recommended under Cumulative plus SMP 39 & 40



1.0 INTRODUCTION

This report summarizes the results of the Traffic Impact Study (TIS) for the proposed manufacturing and warehouse developments at SMP 39 and SMP 40, respectively, in the City of Livermore.

1.1 PROJECT DESCRIPTION

The SMP 39 project proposes to develop 48 acres of land along West Jack London Boulevard to construct six buildings of various sizes for manufacturing purposes. Additionally, the SMP 40 project will develop 41 acres to construct two buildings for warehouse uses south of Oaks Business Park. SMP 39 will provide a total of 1,647 parking stalls and SMP 40 will provide 633 parking stalls. The SMP 39 project is accessible via two, full-access driveways, and one right-in/right-out driveway. The SMP 40 project is accessible via two full-access driveways. It should be noted that the site plan for SMP 39 was updated after the preparation of this report, including a slight reduction in square footage and addition of one right-in/right-out driveway. The additional driveway and change in square footage would have minimal impacts on the analysis, thus this study is considered a conservative analysis.

The following section discusses the TIS purpose, study intersections, and analysis scenarios.

1.2 PROJECT PURPOSE

The purpose of the Traffic Impact Study is to evaluate the impacts on the transportation infrastructure due to the addition of the traffic from the proposed project. The report also includes evaluations and recommendations concerning project site access and on-site circulation for vehicles, bicycles, and pedestrians, queuing analysis at the study intersections, parking supply, and a Vehicle Miles Traveled (VMT) analysis.

1.3 STUDY INTERSECTIONS

TJKM evaluated traffic conditions at 16 study intersections during the a.m. and p.m. peak hours for a typical weekday. The study intersections were selected in consultation with City of Livermore staff. The peak periods were between 7:00 a.m. – 9:00 a.m. and 4:00 p.m. – 6:00 p.m. The study intersections and associated traffic controls are as follows:

1. W Jack London Blvd/El Charro Rd (Signal)*
2. W Jack London Blvd/Shops-Outlet Driveway (Signal)
3. W Jack London Blvd/Livermore Outlets Dr (Signal)
4. W Jack London Blvd/Wolf House Dr (Signal)
5. W Jack London Blvd/SMP 39 West Driveway (One-Way Stop)
6. W Jack London Blvd/SMP 39 East Driveway (One-Way Stop)
7. W Jack London Blvd/Discovery Dr (Signal)
8. W Jack London Blvd/Voyager St (Signal)
9. W Jack London Blvd/Isabel Ave (Signal)**
10. Isabel Ave/Discovery Dr (Signal)**
11. Isabel Ave/Stanley Blvd (Signal)**
12. Isabel Ave/Airway Blvd (Signal)**
13. Discovery Dr/Atlantis Ct (One-Way Stop)

14. Discovery Dr/Challenger St (Two-Way Stop)
15. El Charro Rd/I-580 WB Ramps (Signal)**
16. El Charro Rd/I-580 EB Ramps (Signal)**

Notes: *Denotes City of Pleasanton intersection.
 **Denotes Caltrans intersection.

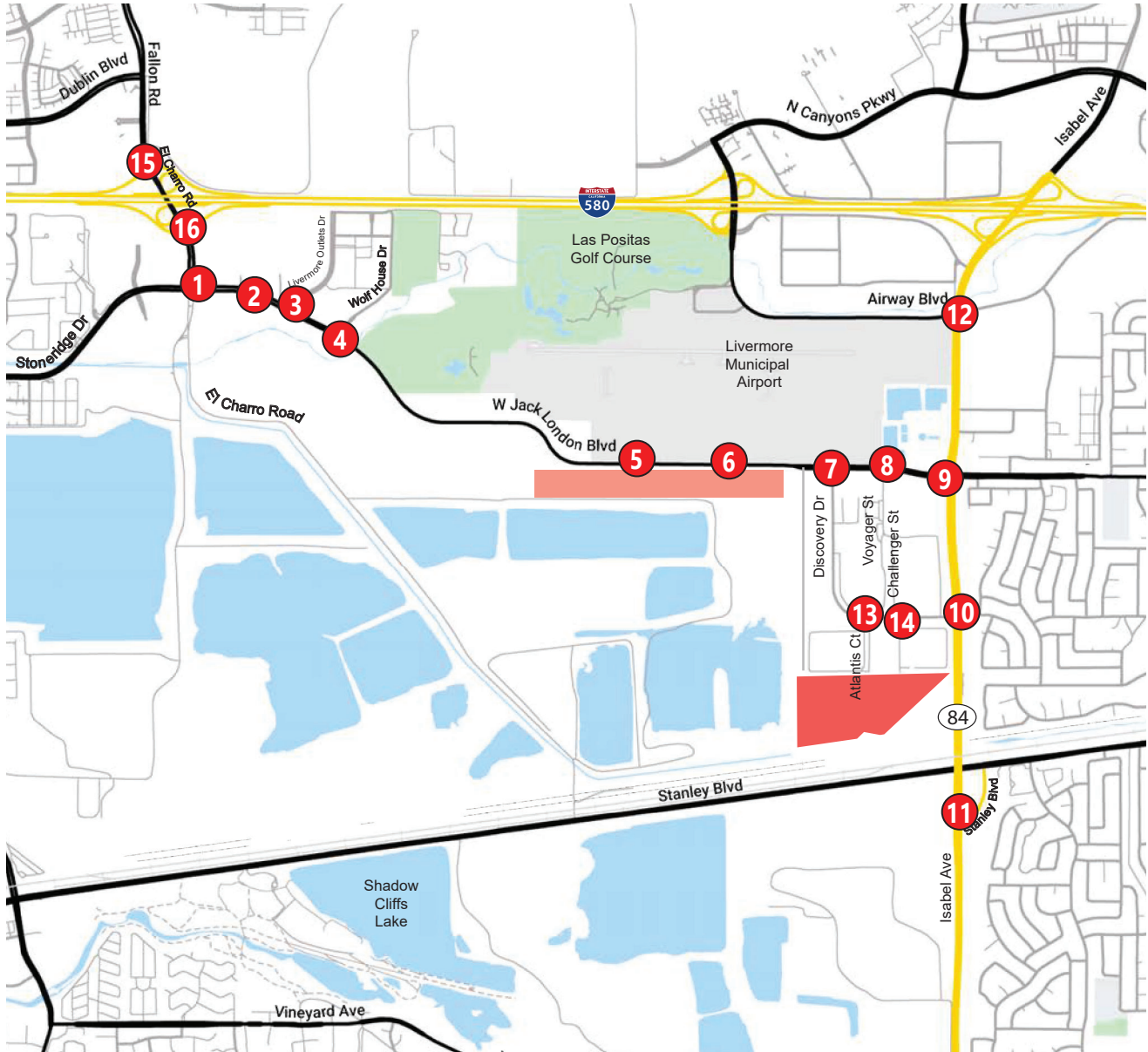
Figure 1 illustrates the study intersections and the vicinity map of the proposed project. **Figure 2** and **Figure 3** shows the proposed project site plan for SMP 39 and 40, respectively.

1.4 ANALYSIS SCENARIOS

This study addresses the following nine traffic scenarios:

- **2021 Existing Conditions** – This scenario evaluates the study intersections based on existing traffic volumes, lane geometry, and traffic controls.
- **2025 Background Conditions** – This scenario evaluates the study intersections with the addition of approved projects in the study area.
- **2025 Background plus SMP 39** – This scenario is similar to Background Conditions, but with the addition of project traffic from SMP 39.
- **2025 Background plus SMP 40** – This scenario is similar to Background Conditions, but with the addition of project traffic from SMP 40.
- **2025 Background plus SMP 39 & 40** – This scenario is similar to Background Conditions, but with the addition of project traffic from SMP 39 *and* SMP 40.
- **2040 Cumulative Conditions** – This analysis scenario evaluates future transportation conditions based on forecasted travel volumes without the project.
- **2040 Cumulative plus SMP 39** – This scenario is similar to Cumulative Conditions, but with the addition of project traffic from SMP 39.
- **2040 Cumulative plus SMP 40** – This scenario is similar to Cumulative Conditions, but with the addition of project traffic from SMP 40.
- **2040 Cumulative plus SMP 39 & 40** – This scenario is similar to Cumulative Conditions, but with the addition of project traffic from SMP 39 *and* SMP 40.

Figure 1: Vicinity Map



LEGEND

- Project Site - SMP 39
- Project Site - SMP 40
- X Study Intersection



Figure 2: Site Plan for SMP 39

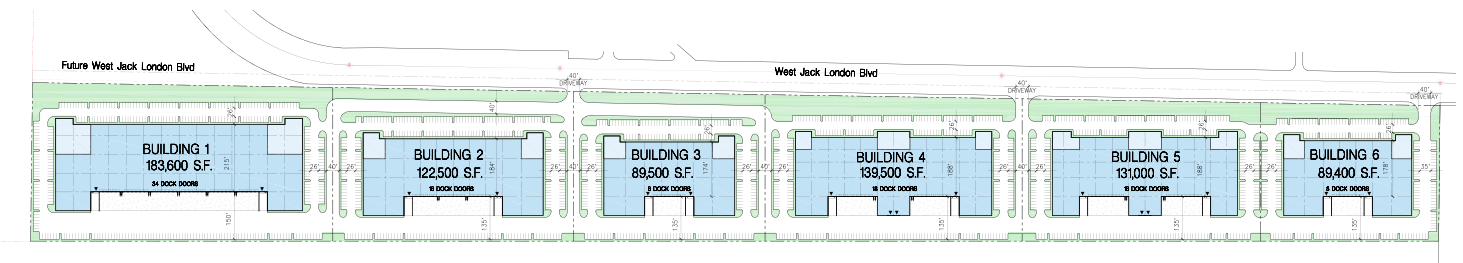
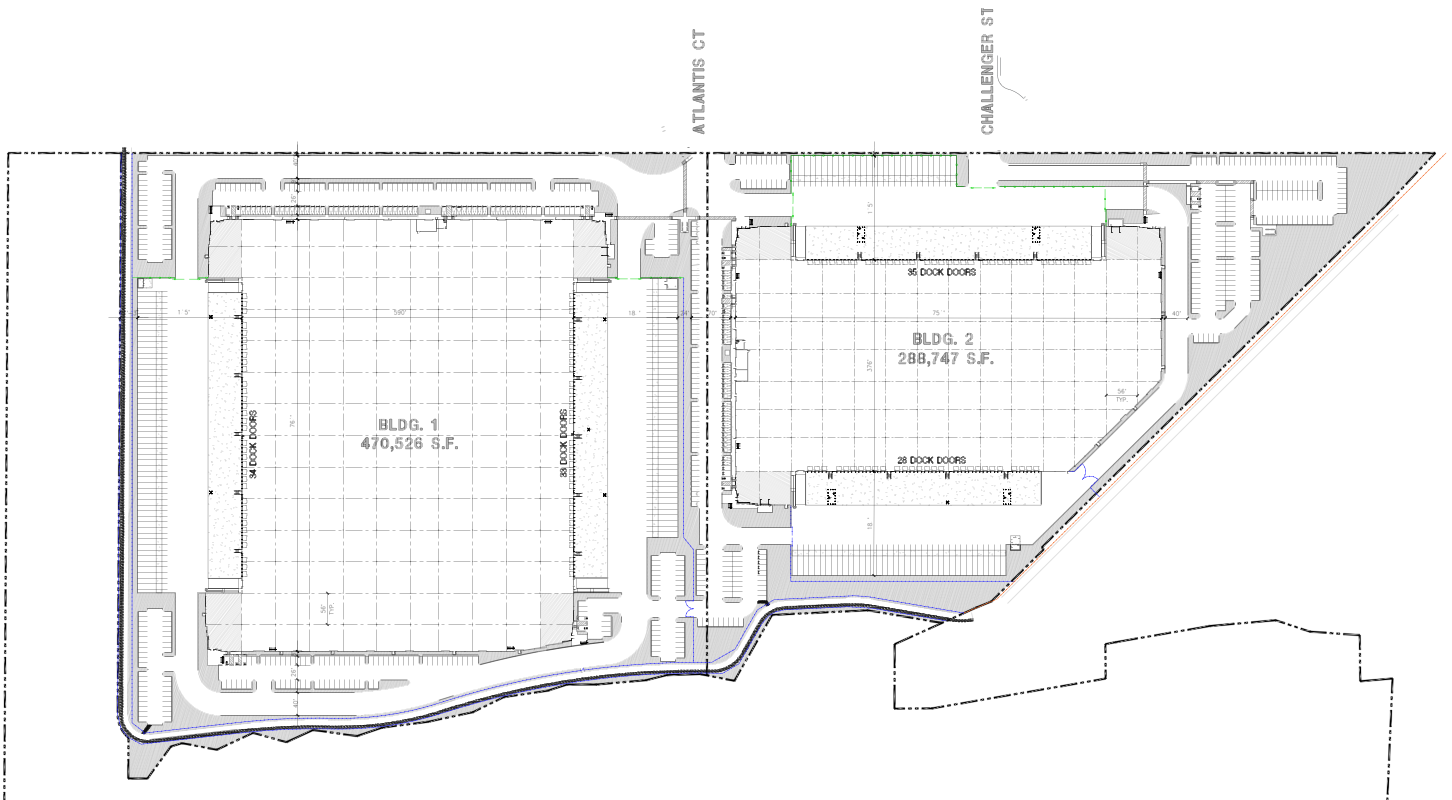


Figure 3: Site Plan for SMP 40



2.0 STUDY METHODOLOGY

Traffic impacts related to the proposed project were evaluated for both compliance with applicable regulatory documents and environmental significance as defined in the California Environmental Quality Act (CEQA). In Accordance with the *Technical Advisory* published by the Governor's Office of Planning and Research (OPR), a qualitative and quantitative VMT analysis forms the basis of the CEQA analysis for the proposed project. As of July 1, 2020, intersection level of service (LOS) can no longer be used to determine significant impacts for CEQA purposes. However, an LOS analysis was conducted to determine consistency with City of Livermore plans and standards.

2.1 LEVEL OF SERVICE ANALYSIS METHODOLOGY & STANDARDS

Level of Service (LOS) is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. The LOS generally describes these conditions in terms of such factors as speed and travel time, delays, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The operational LOS are given letter designations from A to F, with A representing the best operating conditions (free-flow) and F the worst (severely-congested flow with high delays). Intersections generally are the capacity-controlling locations with respect to traffic operations on arterial and collector streets. Of the 16 study intersections, 14 study intersections were analyzed using the Highway Capacity Manual (HCM) 6th Edition Operations Methodology, contained within Synchro Software. The remaining two study intersections were analyzed using the previous 2000 version of the HCM due to limitation in the analysis methodology (pertaining to non-standard lane configurations and signal timing structure). The methodology is described in detail in **Appendix A**.

Signalized Intersections in Livermore

Although level of service is no longer used for identifying impacts under CEQA, level of service analysis is still used for determining consistency with adopted agency plans and standards. Where standards refer to significant environmental impacts, this analysis instead identifies these as significant inconsistencies with adopted plans.

In brief, the LOS standard for signalized intersections in the City of Livermore is mid-level LOS D or better (average control delay equal to or less than 45.0 seconds per vehicle) with and without the project. For signalized intersections located near freeway interchanges (Isabel Avenue/Airway Boulevard) or intersections that carry a high percentage of regional cut-through traffic (Isabel Avenue/Jack London Boulevard), the LOS standard is LOS E or better. The signalized intersection experiences a substantial inconsistency if:

- The project traffic added to existing conditions would result in the level of service deteriorating below the level of service threshold for signalized intersections i.e., delay greater than 45.0 seconds per vehicle (or deteriorates to LOS F for gateway intersections near freeway interchanges).
- For intersections already operating at an unacceptable LOS without the project, it is considered a substantial impact if the project related traffic increases the average intersection delay by more than 5.0 seconds.

Unsignalized Intersections in Livermore

The level of service standard for unsignalized intersections is delay less than or equal to 90.0 seconds. Unsignalized intersections experiences a substantial inconsistency if:

- The project traffic added to existing conditions would result in the delay being greater than 90.0 seconds.

Signalized Intersections in Pleasanton

The City of Pleasanton LOS standard is LOS D. For signalized intersections, a project impact would be considered substantial if:

- Deterioration of a signalized intersection from LOS D (or better) to LOS E or LOS F; or
- The project adds ten or more trips to an intersection projected to operate at LOS E or F prior to the addition of project traffic.

2.2 SIGNAL WARRANT

Traffic signal warrants are a series of standards that provide guidelines for determining if a traffic signal is appropriate. Signal warrant analyses are typically conducted at intersections of uncontrolled major streets and stop sign-controlled minor streets. If one or more signal warrants are met, signalization of the intersection may be appropriate. However, a signal should not be installed if none of the warrants are met, since the installation of signals would increase delays on the previously uncontrolled major street, and may increase the occurrence of particular types of accidents.

The MUTCD states that, "This (peak hour) signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time." The peak hour warrant is being used in this study as an "indicator" of the likelihood of an unsignalized intersection warranting a traffic signal in the future as part of the project mitigations. Intersections that exceed the peak hour warrant are considered (for the purposes of this impact analysis) to be likely to meet one or more of the other signal warrants (such as the four-hour or eight-hour warrants). This peak hour analysis is not intended to replace a rigorous and complete traffic signal warrant analysis by the responsible jurisdiction.

2.3 CEQA REQUIREMENTS

CEQA Requirements for VMT Evaluations

Section 15064.3 describes the requirements and significance thresholds for assessing transportation impacts based on vehicle miles traveled (VMT) that apply statewide. As described in Section 15064.3:

- Land use projects: Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.

The following are also subject to CEQA significance thresholds:

- The project conflicts with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.
- If the project substantially increases hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- The project results in inadequate emergency access.
- Transportation projects: Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.

The following criteria are not subject to CEQA significance criteria but should be addressed as appropriate in the findings of the traffic study:

- The project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways
- If the project site design does not have adequate parking or circulation capacity to accommodate the anticipated demand
- If the project would result in inadequate internal circulation to accommodate project traffic.

2.3 VEHICLE MILES TRAVELED

SB 743, which was signed into law by Governor Brown in 2013 and codified in Public Resources Code 21099, tasked OPR with establishing new criteria for determining the significance of transportation impacts under CEQA. SB 743 requires the new criteria to “promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” SB 743 changes the way that public agencies evaluate the transportation impacts of projects under CEQA, recognizing that roadway congestion, while an inconvenience to drivers, is not itself an environmental impact (see Pub. Resource Code, § 21099 (b)(2)). In December 2018, OPR circulated its most recent *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR) that provides recommendations and describes various options for assessing VMT for transportation analysis purposes. “Vehicle miles traveled” refers to the amount and distance of automobile travel “attributable to a project”. Other relevant considerations may include the effects of the project on transit or non-motorized travel. The VMT analysis options described by OPR are primarily tailored towards single-use development residential, office or office projects, not mixed use projects and not athletic facility projects. OPR recommends the following methodology and criteria for specific land uses:

- For residential projects, OPR recommends that VMT impacts be considered potentially significant if a residential project is expected to generate VMT per Capita (i.e., VMT per resident) at a rate that exceeds 85 percent of a regional average.
- For office projects, OPR recommends that VMT impacts be considered potentially significant if an office project is expected to generate VMT per Employee at a rate that exceeds 85 percent of a regional average.
- For retail projects, OPR recommends that VMT impacts be considered potentially significant if a project results in a net increase in total VMT. This approach takes into account the likelihood that retail developments may lead to increases or decreases in VMT, depending on previously existing retail travel patterns. This approach may also be used for other types of projects with customer components.
- OPR also indicates that local serving retail (projects smaller than 50,000 square feet) may be presumed to have a less than significant VMT impact.
- OPR does not provide specific guidance on evaluating other land use types, except to say that other land uses could choose to use the method applicable to the land use with the most similarity to the proposed project.
- For mixed-use projects, OPR describes several options that include (1) evaluating each land use separately; or (2) evaluating mixed-use projects based on the method applicable to the dominant land use. Evaluating each land use separately would potentially fail to measure the positive effects of mixed-use projects in reducing VMT.

OPR also recommends exempting some project types from VMT analysis based on the likelihood that such projects will generate low rates of VMT:

- OPR recommends that projects generating less than 110 trips per day generally may be assumed to cause a less than significant transportation impact.
- OPR notes that residential and office projects that located in areas with low VMT, and that incorporate similar features, will tend to exhibit similar low VMT, and can be screened out.
- OPR states that residential, retail, office and mixed-use projects near transit stations or major transit stops should be screened out based on the likelihood that such projects will have a less than significant impact on VMT.

If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered: a lead agency may evaluate the project's vehicle miles travelled qualitatively.

A lead agency may use models to estimate a project's vehicle miles traveled, and may revise those estimates to reflect professional judgment based on substantial evidence. In consultation with the City of Livermore, the Alameda County Transportation Commission (ACTC) Travel Demand Model was used for the VMT assessment using the City's thresholds for office projects (note, neither the OPR nor ACTC include guidelines that apply specifically to industrial projects such as the proposed project). Detailed analysis is provided in Chapter 9 of this report.

2.4 MULTIMODAL ASSESSMENT METHODOLOGY

Under CEQA, a significant impact occurs if the project conflicts with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Pedestrian Facilities: A project is defined to have a significant impact to the pedestrian facilities if implementation of the project would:

- Eliminate existing or planned pedestrian facilities.
- Degrade existing or planned pedestrian facilities. Examples of degradation include, but are not limited to, reduction of sidewalk/path width to less than the City standards, removal of a crosswalk, or removal of a landscape buffer.
- Create a highly circuitous pedestrian circulation pattern that would discourage walking to local destinations or transit facilities.
- Result in unsafe conditions for pedestrians, including unsafe bicycle/pedestrian or pedestrian/motor vehicle conflicts.

Bicycle Facilities: A project is defined to have a significant impact to the bicycle facilities if implementation of the project would:

- Eliminate existing or planned bike paths, lanes, or routes.
- Result in an unsafe condition for bicycles, including but not limited to, unsafe bicycle/vehicle or bicycle/pedestrian conflicts or bicycle facility pavement degradation.

Transit Facilities: A project is defined to have a significant impact to the transit system if implementation of the project would:

- Eliminate existing or planned transit service.
- Remove an existing bus stop.
- Cause a substantial rerouting of existing or planned bus service.

3.0 EXISTING CONDITIONS

This section describes existing conditions in the immediate project site vicinity, including roadway facilities, bicycle and pedestrian facilities, and available transit service. In addition, existing traffic volumes and operations are presented for the study intersections, including the results of LOS calculations.

3.1 EXISTING SETTING AND ROADWAY SYSTEM

Important roadways in the immediate vicinity of the project site are discussed below:

Interstate 580 (I-580) is an east-west, eight to ten lane freeway with four mixed flow lanes, one Auxiliary lane and two eastbound express lanes and one westbound express lane near the project vicinity. Access from I-580 to the project site is provided via eastbound and westbound ramps at Isabel Avenue/State Route 84 and at eastbound and westbound ramps at El Charro Road.

Isabel Avenue/State Route 84 is a north-south, four to six lane highway near the project vicinity. The posted speed limit along Isabel Avenue is 40-45 miles per hour (mph).

Airway Boulevard is a generally east-west, two to four lane major roadway within the project vicinity. The posted speed limit along Airway Boulevard is 45 mph.

Jack London Boulevard is an east-west, four lane divided major roadway within the project vicinity. The speed limit along Jack London Boulevard is 35 mph east of Isabel Avenue and 45 mph west of Isabel Avenue. This roadway provides direct access to SMP 40.

Stanley Boulevard is an east-west, four lane divided major roadway within the project vicinity. The speed limit along Stanley Boulevard is 45-55 mph.

Voyager Street is a north-south, two lane local street that provides direct access to the project site. The speed limit on Voyager Street is 25 mph. The eastern side of the roadway is currently unimproved along the project frontage.

Discovery Drive is a two-lane local street that curves from north-south where it intersects with West Jack London Boulevard to east-west where it intersects Isabel Avenue. The speed limit on Discovery Drive is 25 mph.

El Charro Road is a four to six-lane facility in the City of Pleasanton providing a connection to I-580 and continuing north of I-580 as Fallon Road in the City of Dublin.

3.2 EXISTING PEDESTRIAN FACILITIES

Walkability is defined as the ability to travel easily and safely between various origins and destinations without having to rely on automobiles or other motorized travel. The ideal "walkable" community includes wide sidewalks, a mix of land uses such as residential, employment, and shopping opportunities, a limited number of conflict points with vehicle traffic, easy access to transit facilities and services and a network of pedestrian facilities. Pedestrian facilities are comprised of crosswalks, sidewalks, pedestrian signals, and off-street paths, which provide safe and convenient routes for pedestrians to access the destinations such as institutions, businesses, public transportation, and recreation facilities. Along the project frontage of

SMP 39, there is an approximate 10 foot wide, paved multi-use trail that is accessible by pedestrians and bicycles. This trail provides connectivity to the San Francisco Premium Outlets and surrounding shopping centers to Oaks Business Park. Along Atlantis Court and Challenger Street, sidewalks are approximately six feet wide.

All signalized intersections, except at Isabel Ave/Stanley Blvd and at the El Charro Interchange, have marked crosswalks and pedestrian signal heads.

The existing pedestrian facilities in the study area are shown in **Figure 4**.

3.3 EXISTING BICYCLE FACILITIES

The 2018 City of Livermore Bicycle, Pedestrian, & Trails Active Transportation Plan outlines goals and objectives to improve the current active transportation system that includes walking and biking. The various bicycle facilities throughout the city are described below. Existing bicycle facilities in the project vicinity are illustrated in **Figure 5**. In addition to the four classes of bicycle facilities, Alameda County Transportation Commission (Alameda CTC), has adopted a set of sub-classifications for each classification.

- **Class I Shared-Use Path:** Class I bikeways are a completely separate right-of-way designed for the exclusive use of cyclists and pedestrians, with minimal crossings for motorists. These paths are often located along creeks, canals, and rail lines. There are Class I facilities along Jack London boulevard, Isabel Avenue, and Stanley Boulevard. Class I facilities can also be sub-classified into the following:
 - Class IA for paved paths,
 - Class IB for unpaved paths.
- **Class II Bike Lanes:** Class II bike lanes use special lane markings, pavement legends, and signage. Bike lanes provide designated street space for bicyclists, typically adjacent to outer vehicle travel lanes. Buffered bike lanes increase separation through painted buffers between vehicle lanes and/or parking, and green paint at conflict zones (e.g., driveways or intersections). Class II Bike Lanes are available Stoneridge Drive, Jack London Boulevard, Airway Boulevard, and Isabel Avenue. Class II facilities can be sub-classified into the following:
 - Class IIA – conventional bicycle lanes, consisting of a single strip to delineate the lane,
 - Class IIB – with a striped buffer or with green conflict markings in the bicycle lane,
 - Class IIC – climbing bicycle lanes, which have a dedicated bicycle lane in the uphill direction and a Class III facility in the downhill direction,
 - Class IID – contraflow bicycle lanes.
- **Class III Bike Routes:** Bike routes provide enhanced mixed-traffic conditions for bicyclists through signage, sharrow striping, and or traffic calming treatments, and provide continuity to a bikeway network. Bike routes are typically designated along gaps between bike trails or bike lanes, or along low-volume, low-speed streets. Bicycle Boulevards further enhance bike routes by encouraging slower speeds and discouraging non-local vehicle traffic using traffic diverters, chicanes, traffic circles, and speed tables. There are no existing Class III facilities in the project area. Class III facilities can also be sub-classified into the following:

- Class IIIA – for signage only routes,
 - Class IIIB – for wide curb or shoulder lanes, that may or may not include signage,
 - Class IIIC – for routes with shared lane markings i.e., sharrows, or other pavement markings, and may also include signage,
 - Class IIID – for routes with green-backed sharrows,
 - Class IIIE – for bicycle boulevards, which are signed and typical located on roadways with low volumes.
- **Class IV Bikeway:** Bikeways are also known as cycle tracks or separated bikeways, are set aside for the exclusive use of bicycles and physically separated from vehicle traffic. Separated bikeways were adopted by Caltrans in 2015. Separation may include grade separation, flexible posts, physical barriers, or on-street parking. There are no existing Class IV facilities in the project area. Class IV facilities can be sub-classified into the following:
 - Class IVA – for one-way separated bikeways,
 - Class IVB – for two-way separated bikeways,

3.4 EXISTING TRANSIT FACILITIES

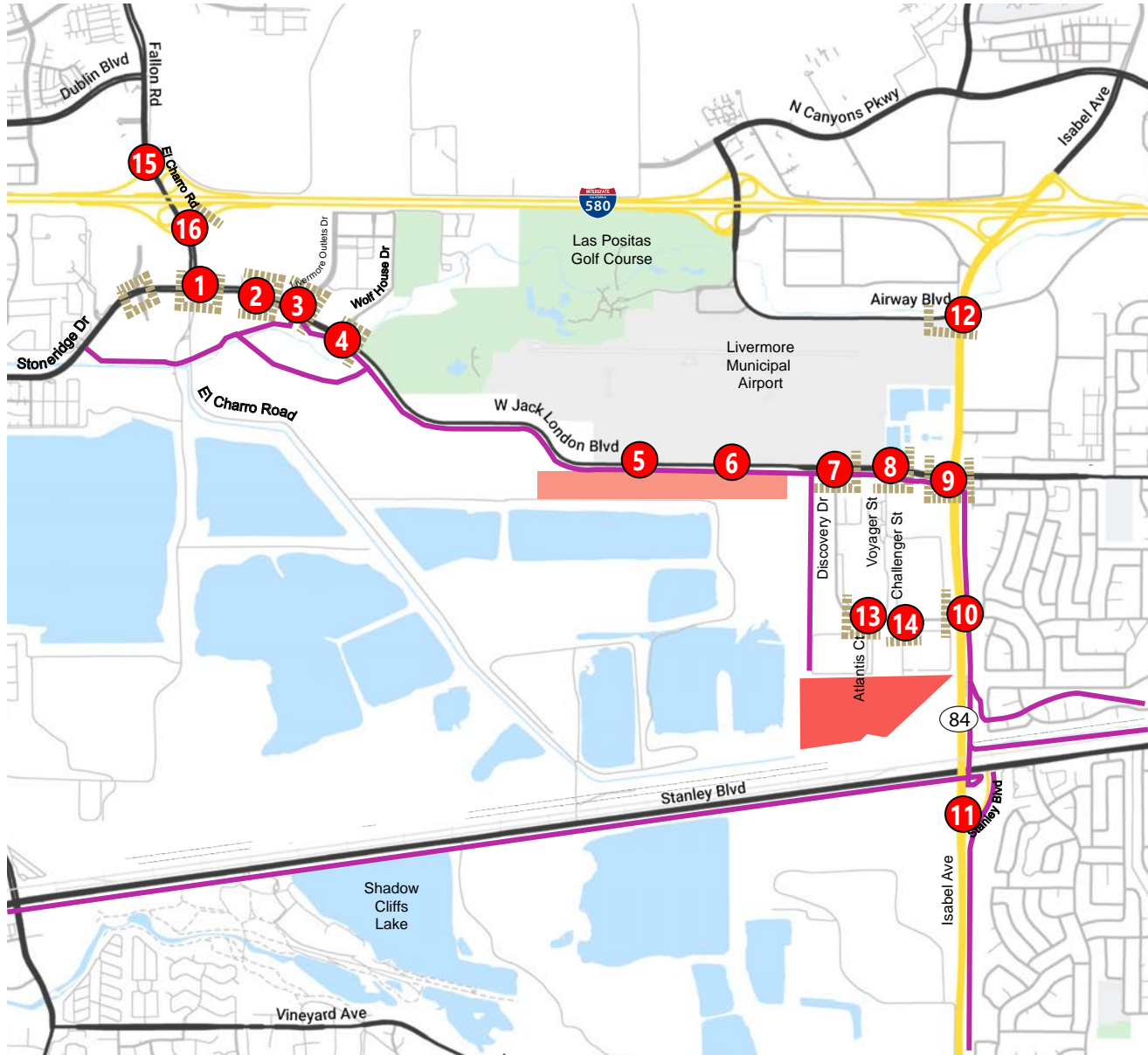
Tri-Valley Wheels provides transit service throughout Dublin, Pleasanton, Livermore, and unincorporated Alameda County. The main transit center in Livermore is the Livermore Transit Center, located in Downtown Livermore. From the Transit Center, riders can connect to Dublin/Pleasanton BART, Lawrence Livermore Lab, Las Positas College as well as local destinations. **Table 1** summarizes the existing Wheels service in the project vicinity. **Figure 6** illustrates the existing transit facilities.

Table 1: Existing Tri-Valley Wheels Transit Service

Route	From	To	Weekdays		Weekends	
			Operating Hours	Headway (minutes)	Operating Hours	Headway (minutes)
14	East Dublin/Pleasanton BART	Livermore Transit Center	6:26 a.m. – 9:40 p.m.	30-60	7:59 a.m. – 9:52 p.m. (Saturday) 7:51 a.m. – 9:44 p.m. (Sunday)	60
10R	East Dublin/Pleasanton BART	Livermore Transit Center	4:24 a.m. – 11:17 p.m.	30-60	5:08 a.m. – 11:10 p.m. (Saturday) 5:40 a.m. – 11:10 p.m. (Sunday)	30-40
30R	West Dublin BART	East/Vasco & LLNL	5:14 a.m. – 10:50 p.m.	30	5:24 a.m. – 10:53 p.m. (Saturday) 5:16 a.m. – 10:45 p.m. (Sunday)	30-60
20X	East Dublin Pleasanton BART	Livermore Transit Center	7:32 a.m. – 9:08 a.m. & 4:40 p.m. – 6:19 p.m.	60	None	None

Source: Tri-Valley Wheels Website
R = Rapid
X = Express

Figure 4: Existing Pedestrian Facilities

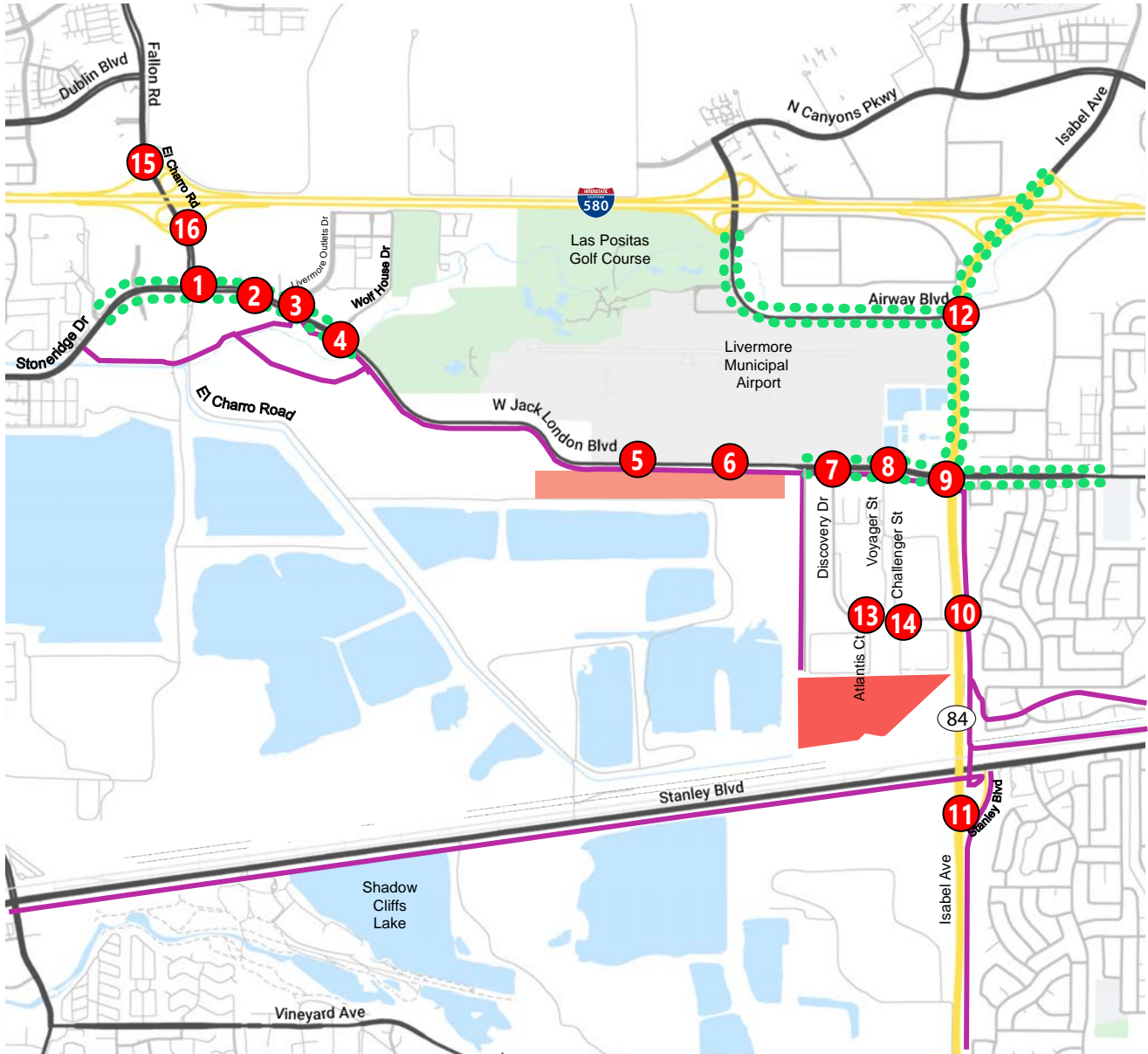


LEGEND

- Project Site - SMP 39
- Project Site - SMP 40
- X Study Intersection
- Class I Trail
- Marked Crosswalk



Figure 5: Existing Bicycle Facilities

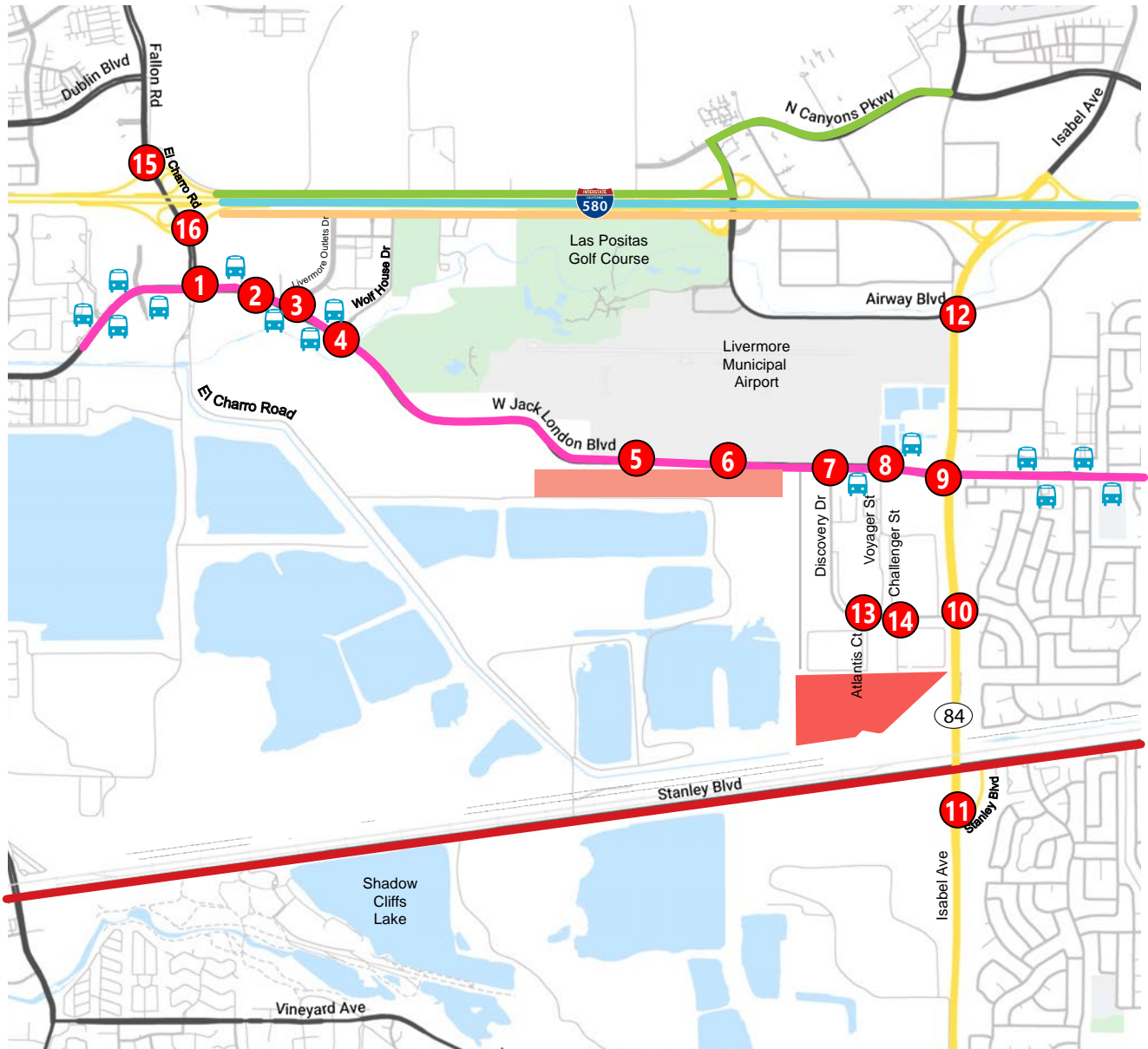


LEGEND

- Project Site - SMP 39
- Project Site - SMP 40
- x Study Intersection
- Class I Trail
- Class II Bike Trail



Figure 6: Existing Transit Facilities



LEGEND

- Project Site - SMP 39
- Project Site - SMP 40
- X Study Intersection
- Bus Route 14
- Bus Route 10R
- Bus Route 20X
- Bus Route 580X
- Bus Route 30R
- BUS Bus Stop



3.5 EXISTING PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS

The existing operations of the study intersections were evaluated for the highest one-hour volumes during weekday morning and evening peak periods. TJKM conducted vehicle, pedestrian and bicycle turning movement counts (TMCs) in November 2021 for all study intersections during the weekday a.m. peak period (7:00-9:00 a.m.) and p.m. peak period (4:00-6:00 p.m.). **Appendix B** includes all data sheets for the collected vehicle, bicycle, and pedestrian counts. **Figure 7** illustrates the existing lane geometry, traffic controls, and peak hour volumes for the a.m. and p.m. peak hours at the study intersections.

3.6 INTERSECTION LEVEL OF SERVICE ANALYSIS – EXISTING CONDITIONS

Existing intersection lane configurations, signal timings, and turning movement volumes are used to calculate the level of service for the study intersections during each peak hour. **Table 2** below summarizes peak hour LOS at the study intersections under Existing Conditions. Under this scenario, all of the study intersections operate at the applicable jurisdictional service levels of service for both the a.m. and p.m. peak hour. LOS worksheets are provided in **Appendix C**.

Table 2: Intersection Level of Service Analysis – Existing Conditions

#	Intersection	Control	Peak Hour ¹	Existing Conditions	
				Delay ²	LOS ³
1	El Charro Rd/Stoneridge Rd-W Jack London Blvd	Signal	AM	15.4	B
			PM	18.6	B
2	W Jack London Blvd/Shops Dwy-Outlets Dwy	Signal	AM	9.3	A
			PM	23.9	C
3	W Jack London Blvd/Livermore Outlets Dr	Signal	AM	7.5	A
			PM	8.1	A
4	W Jack London Blvd/Wolf House Dr	Signal	AM	8.2	A
			PM	6.1	A
5	W Jack London Blvd/Ambassador Dwy	One-Way Stop	AM	14.9	B
			PM	0.0	A
6	W Jack London Blvd/Airport Dwy	One-Way Stop	AM	16.4	C
			PM	10.1	B
7	W Jack London Blvd/Discovery Dr	Signal	AM	4.2	A
			PM	8.9	A
8	W Jack London Blvd/Voyager St	Signal	AM	7.3	A
			PM	7.8	A
9	W Jack London Blvd/Isabel Ave	Signal	AM	34.3	C
			PM	33.2	C
10	Isabel Ave/Discovery Dr	Signal	AM	7.4	A
			PM	7.5	A

#	Intersection	Control	Peak Hour ¹	Existing Conditions	
				Delay ²	LOS ³
11	Isabel Ave/Stanley Blvd	Signal	AM	20.3	C
			PM	24.0	C
12	Isabel Ave/Airway Blvd	Signal	AM	33.3	C
			PM	28.6	C
13	Discovery Dr/Atlantis Ct	One-Way Stop	AM	9.5	A
			PM	9.2	A
14	Discovery Dr/Challenger St	Two-Way Stop	AM	9.5	A
			PM	9.5	A
15	El Charro Rd/I-580 WB Ramps	Signal	AM	9.3	A
			PM	11.8	B
16	El Charro Rd/I-580 EB Ramps	Signal	AM	6.1	A
			PM	6.5	A

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.

3.7 95TH PERCENTILE QUEUEING ANALYSIS – EXISTING CONDITIONS

TJKM conducted a vehicle queueing and storage analysis for exclusive left and right turn pockets at the study signalized intersections for Existing Conditions. The 95th percentile queues were analyzed using Synchro 10.0 software. Under Existing Conditions, all study have queue lengths within the available storage lengths, except the El Charro Road/I-580 Westbound Ramps (Intersection #15), where the westbound right turn queue exceeds the available storage length during the p.m. peak hour. **Table 3** summarizes the 95th percentile queue lengths under Existing Conditions. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario.

Table 3: 95th Percentile Queueing Analysis – Existing Conditions

#	Intersection	Lane Group	Storage Length	Existing Conditions	
				AM	PM
1	El Charro Rd/Stoneridge Dr-W Jack London Blvd	EBL	400	50	175
		EBR	305		0
		WBL	350	15	35
		WBR	-	25	35
		NBL	110	10	25
		SBL	600	75	215
		SBR	420	0	0
2	W Jack London Blvd/Outlets Dwy-Shops Dwy	EBL	220	35	180
		WBL	150	25	55
		NBL	-	10	105
		SBR	-	0	55

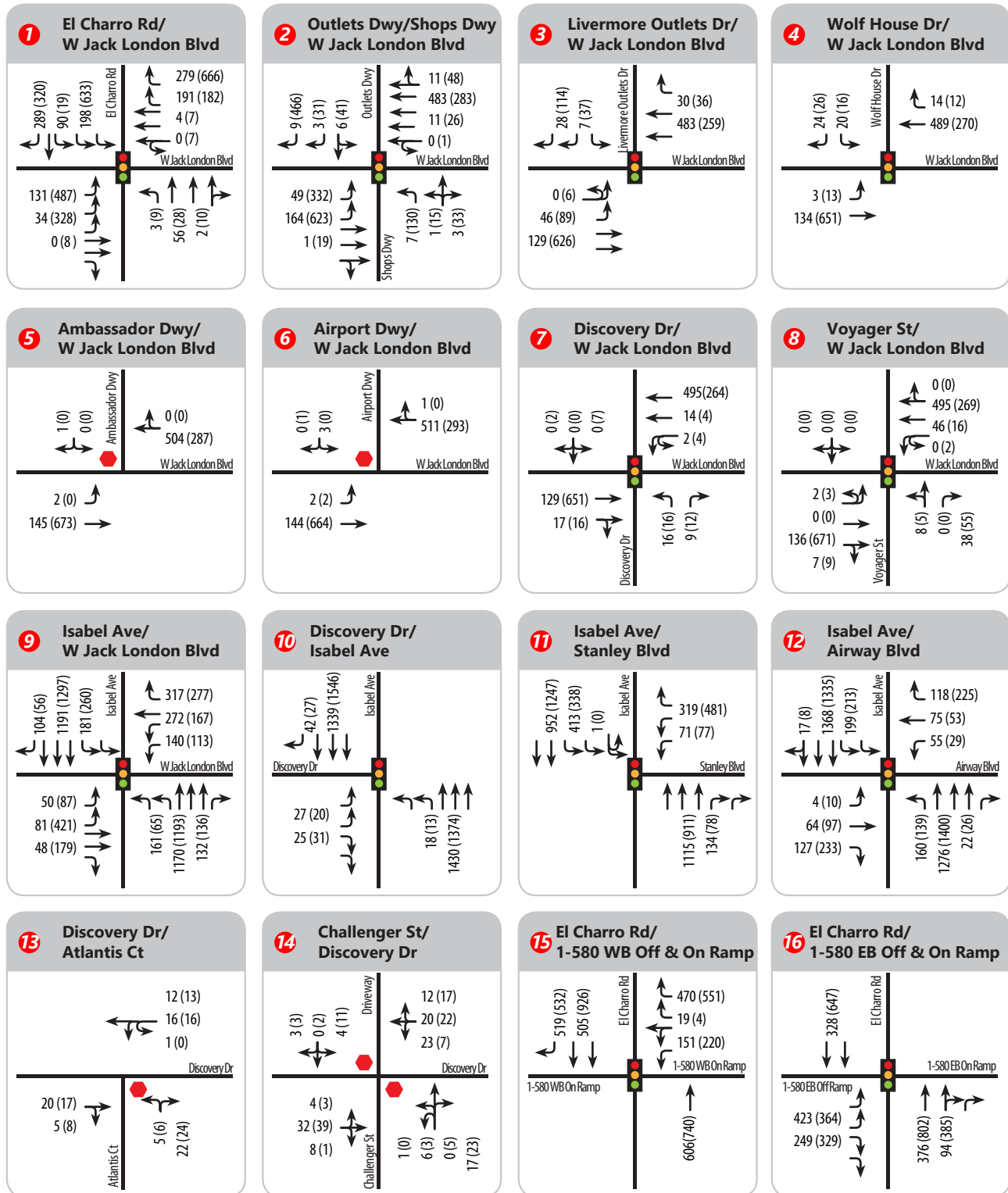
#	Intersection	Lane Group	Storage Length	Existing Conditions	
				AM	PM
3	W Jack London Blvd/Livermore Outlets Dr	EBL	320	15	35
		WBR	625	10	10
		SBL	180	10	40
		SBR	-	5	20
4	W Jack London Blvd/Wolf House Dr	EBL	375	5	20
		WBR	75	10	10
		SBL	-	20	15
		SBR	-	5	10
7	W Jack London Blvd/Discovery Dr	WBL	200	20	15
		NBL	-		
		NBR	335	0	0
8	W Jack London Blvd/Voyager St	EBL	165	5	5
		WBL	295	40	20
		NBR	320	0	0
		EBL	190	50	60
9	W Jack London Blvd/Isabel Ave	EBR	450	0	65
		WBL	185	115	70
		WBR	-	280	210
		NBL	290	125	45
		NBR	335	45	40
		SBL	240	140	150
		SBR	250	30	0
10	Isabel Ave/Discovery Dr	EBL	160	15	10
		EBR	290	5	5
		NBL	255	10	10
		SBR	200	15	10
11	Isabel Ave/Stanley Blvd	WBL	-	35	845
		WBR	-	50	165
		NBR	435	15	5
		SBL	295	105	95
		EBL	95	15	30
12	Isabel Ave/Airway Blvd	EBR	105	35	65
		WBL	130	95	60
		WBR	130	35	45
		NBL	325	300	245
		NBR	325	0	0
		SBL	490	140	150
15	El Charro Rd/I-580 WB Ramps	WBL	135	70	85
		WBR	115	95	135
		SBR	190	15	35
16	El Charro Rd/I-580 EB Ramps	EBL	270	40	65
		EBR	290	10	25
		NBR	-	10	30

Notes:

Queue lengths shown in feet per lane.

Bold indicates 95th percentile queue length exceeds available storage length.

Figure 7: Existing Conditions Lane Geometry, Traffic Controls, and Volumes



LEGEND

- Project Site
- X Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- Traffic Signal
- Stop Sign

4.0 BACKGROUND CONDITIONS

This section details expected traffic conditions at the study intersections under Background (No Project) Conditions. This analysis scenario is defined as baseline conditions without the proposed project in year 2025, using a two percent annual increase in traffic from Existing Conditions. Under Background Conditions, lane geometry and traffic controls reflect Existing Conditions, except at the intersection of West Jack London Boulevard and Isabel Avenue, where one additional westbound through lane exists at the eastbound approach. **Figure 8** illustrates the existing lane geometry, traffic controls, and peak hour volumes at the study intersections under Background Conditions.

4.1 INTERSECTIONS LEVEL OF SERVICE ANALYSIS – BACKGROUND (2025) CONDITIONS

Table 4 below summarizes peak hour LOS at the study intersections under Background Conditions. Under this scenario, all of the study intersections continue to operate at the applicable jurisdictional service levels of service for both the a.m. and p.m. peak hours. LOS worksheets are provided in **Appendix D**.

Table 4: Intersection Level of Service Analysis – Background Conditions

#	Intersection	Control	Peak Hour ¹	Background Conditions	
				Delay ²	LOS ³
1	El Charro Rd/Stoneridge Rd-W Jack London Blvd	Signal	AM	15.7	B
			PM	19.6	C
2	W Jack London Blvd/Shops Dwy-Outlets Dwy	Signal	AM	9.5	A
			PM	24.2	C
3	W Jack London Blvd/Livermore Outlets Dr	Signal	AM	7.9	A
			PM	8.4	A
4	W Jack London Blvd/Wolf House Dr	Signal	AM	8.5	A
			PM	6.5	A
5	W Jack London Blvd/Ambassador Dwy	One-Way Stop	AM	15.7	C
			PM	0.0	A
6	W Jack London Blvd/Airport Dwy	One-Way Stop	AM	17.5	C
			PM	10.2	B
7	W Jack London Blvd/Discovery Dr	Signal	AM	4.3	A
			PM	9.1	A
8	W Jack London Blvd/Voyager St	Signal	AM	7.5	A
			PM	7.9	A
9	W Jack London Blvd/Isabel Ave	Signal	AM	38.2	D
			PM	36.1	D
10	Isabel Ave/Discovery Dr	Signal	AM	7.6	A
			PM	7.7	A

#	Intersection	Control	Peak Hour ¹	Background Conditions	
				Delay ²	LOS ³
11	Isabel Ave/Stanley Blvd	Signal	AM	23.5	C
			PM	29.8	C
12	Isabel Ave/Airway Blvd	Signal	AM	36.5	D
			PM	32.5	C
13	Discovery Dr/Atlantis Ct	One-Way Stop	AM	9.5	A
			PM	9.2	A
14	Discovery Dr/Challenger St	Two-Way Stop	AM	9.5	A
			PM	9.6	A
15	El Charro Rd/I-580 WB Ramps	Signal	AM	10.5	B
			PM	14.6	B
16	El Charro Rd/I-580 EB Ramps	Signal	AM	6.3	A
			PM	7.0	A

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.

4.2 95TH PERCENTILE QUEUEING ANALYSIS – BACKGROUND CONDITIONS

TJKM conducted a vehicle queueing and storage analysis for exclusive left and right turn pockets at the study signalized intersections for Background Conditions. Under Background Conditions, three study intersections exhibit queue lengths which exceed the available storage length during one peak hour.

Table 5 summarizes the 95th percentile queue lengths under Background Conditions. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario.

Table 5: 95th Percentile Queuing Analysis – Background Conditions

#	Intersection	Lane Group	Storage Length	Background Conditions	
				AM	PM
1	El Charro Rd/Stoneridge Dr-W Jack London Blvd	EBL	400	55	195
		EBR	305		0
		WBL	350	15	40
		WBR	-	25	35
		NBL	110	10	25
		SBL	600	80	235
2	W Jack London Blvd/Outlets Dwy-Shops Dwy	SBR	420	0	0
		EBL	220	40	195
		WBL	150	30	60
3	W Jack London Blvd/Livermore Outlets Dr	NBL	-	10	115
		SBR	-	0	55
		EBL	320	20	40
		WBR	625	15	15
4	W Jack London Blvd/Wolf House Dr	SBL	180	10	40
		SBR	-	10	20
		EBL	375	10	20
		WBR	75	10	10
7	W Jack London Blvd/Discovery Dr	SBL	-	5	10
		WBL	200	20	15
		NBL	-		
8	W Jack London Blvd/Voyager St	NBR	335	0	0
		EBL	165	5	5
		WBL	295	45	20
9	W Jack London Blvd/Isabel Ave	NBR	320	0	5
		EBL	190	55	80
		EBR	450	0	60
		WBL	185	125	100
		WBR	-	340	265
		NBL	290	140	60
		NBR	335	55	55
		SBL	240	160	245
10	Isabel Ave/Discovery Dr	SBR	250	40	0
		EBL	160	15	10
		EBR	290	10	10
		NBL	255	10	10
11	Isabel Ave/Stanley Blvd	SBR	200	15	15
		WBL	-	35	40
		WBR	-	55	225
		NBR	435	15	5
12	Isabel Ave/Airway Blvd	SBL	295	120	105
		EBL	95	15	30
		EBR	105	35	85
		WBL	130	100	60
		WBR	130	35	50
		NBL	325	330	275
		NBR	325	0	0
SBL	490	155	170		

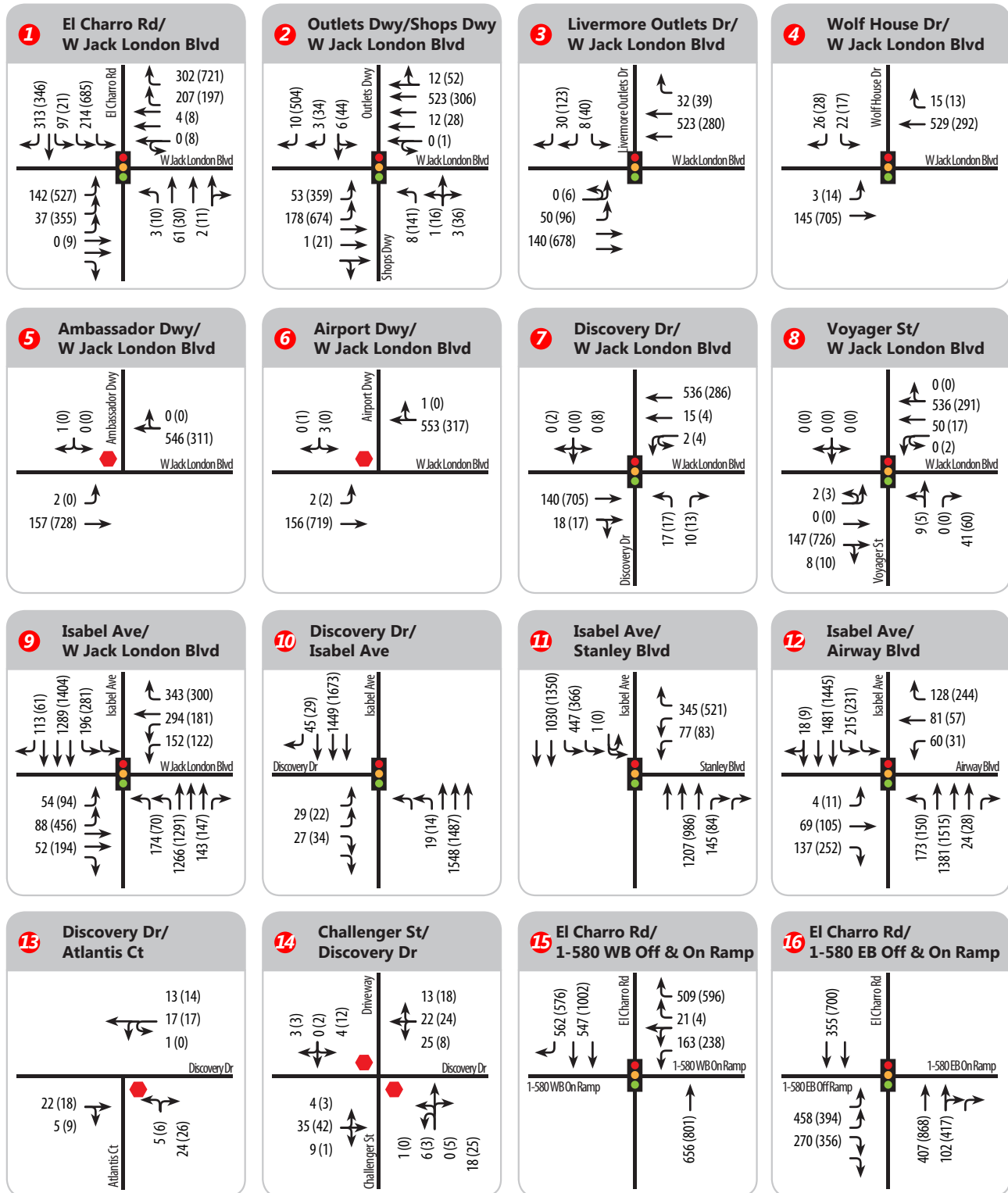
#	Intersection	Lane Group	Storage Length	Background Conditions	
				AM	PM
15	El Charro Rd/I-580 WB Ramps	WBL	135	70	95
		WBR	115	115	155
		SBR	190	15	35
16	El Charro Rd/I-580 EB Ramps	EBL	270	40	75
		EBR	290	10	40
		NBR	-	10	30

Notes:

Queue lengths shown in feet per lane.

Bold indicates 95th percentile queue length exceeds available storage length.

Figure 8: Background Conditions Lane Geometry, Traffic Controls, and Volumes



LEGEND

- Project Site
- Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- Traffic Signal
- Stop Sign

5.0 PLUS PROJECT(S) CONDITIONS

The impacts of the proposed project on the transportation system are discussed in this chapter. First, the method used to estimate the amount of traffic generated by each project is described. Then, the proposed project traffic is displayed for SMP 39, SMP 40, and both SMP 39 & 40 developments.

The amount of traffic added to the roadway system by the proposed development is estimated using a three-step process.

- Trip Generation – Estimates the amount of traffic added to the roadway network,
- Trip Distribution – Estimates the direction of travel to and from the project site,
- Trip Assignment – The new trips are assigned to specific street segments and intersection turning movements.

5.1 PROJECT TRIP GENERATION

TJKM developed estimated project trip generation for the proposed project based on published trip generation rates from the ITE publication *Trip Generation (11th Edition)*. TJKM used published trip rates for the ITE land use Manufacturing (ITE Code 140) for SMP 39 and High Cube Warehouse (ITE Code 154) for SMP 40. The proposed SMP 39 project is expected to generate 3,596 daily trips, including 515 a.m. peak hour trips (391 inbound trips, 124 outbound trips) and 560 p.m. peak hour trips (174 inbound trips, 386 outbound trips). The proposed SMP 40 project is expected to generate 1,062 daily trips, including 61 a.m. peak hour trips (47 inbound trips, 14 outbound trips) and 76 p.m. peak hour trips (21 inbound trips, 55 outbound trips). **Tables 6** and **7** show the project trip generation expected to be generated by the proposed SMP 39 and SMP 40 projects, respectively.

Table 6: Trip Generation for SMP 39

Land Use	Size ¹		Daily		A.M. Peak				P.M. Peak					
			Rate	Trips	Rate	In:Out	In	Out	Total	Rate	In:Out	In	Out	Total
Proposed Uses														
Manufacturing (ITE 140)	755.5	KSF	4.75	3,596	0.680	76:24	391	124	515	0.740	31:69	174	386	560
Net Trips				3,596			391	124	515			174	386	560

Source: ITE Trip Generation Manual, 11th Edition, 2019

Notes:

¹KSF = 1,000 square feet

Table 7: Trip Generation for SMP 40

Land Use	Size ¹		Daily		A.M. Peak				P.M. Peak					
			Rate	Trips	Rate	In:Out	In	Out	Total	Rate	In:Out	In	Out	Total
Proposed Uses														
High Cube Warehouse (ITE 154)	759.3	KSF	1.40	1,062	0.08	77:23	47	14	61	0.10	28:72	21	55	76
Net Trips				1,062			47	14	61			21	55	76

Source: ITE Trip Generation Manual, 11th Edition, 2019

Notes:

¹KSF = 1,000 square feet

5.2 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area and also determines the various routes that vehicles would take from the project site to each destination using the calculated trip distribution.

Trip distribution and assignment assumptions for the proposed projects were developed based on existing travel patterns, knowledge of the study area, and engineering judgment. These assumptions were then verified with City staff. Note, the trip distribution assumptions for the two proposed projects vary. Additionally, separate trip distributions were considered for vehicles and trucks.

The vehicle distribution assumptions for the SMP 39 project are as follows:

- 25 percent to/from Interstate 580 west of Fallon Road/El Charro Road
- 20 percent to/from Interstate 580 north of Airway Boulevard
- 20 percent to/from Jack London Boulevard east of Isabel Avenue
- 10 percent to/from Fallon Road north of Interstate 580
- 10 percent to/from Stanley Boulevard east of Isabel Avenue
- 7 percent to/from Stoneridge Road west of El Charro Road
- 5 percent to/from Isabel Avenue south of Stanley Boulevard
- 3 percent to/from Stanley Boulevard west of Isabel Avenue

The truck distribution assumptions for the SMP 39 project are as follows:

- 45 percent to/from Interstate 580 west of Fallon Road/El Charro Road
- 35 percent to/from Interstate 580 north of Airway Boulevard
- 20 percent to/from Isabel Avenue south of Stanley Boulevard

Figures 9a, 9b, and 9c illustrate the trip distribution, vehicle trip assignment, and truck trip assignment for the SMP 39 project.

The vehicle distribution assumptions for the SMP 40 project are as follows:

- 25 percent to/from Interstate 580 west of Fallon Road/El Charro Road
- 20 percent to/from Interstate 580 north of Airway Boulevard
- 15 percent to/from Jack London Boulevard east of Isabel Avenue
- 10 percent to/from Fallon Road north of Interstate 580
- 15 percent to/from Stanley Boulevard east of Isabel Avenue
- 3 percent to/from Stoneridge Road west of El Charro Road
- 5 percent to/from Isabel Avenue south of Stanley Boulevard
- 7 percent to/from Stanley Boulevard west of Isabel Avenue

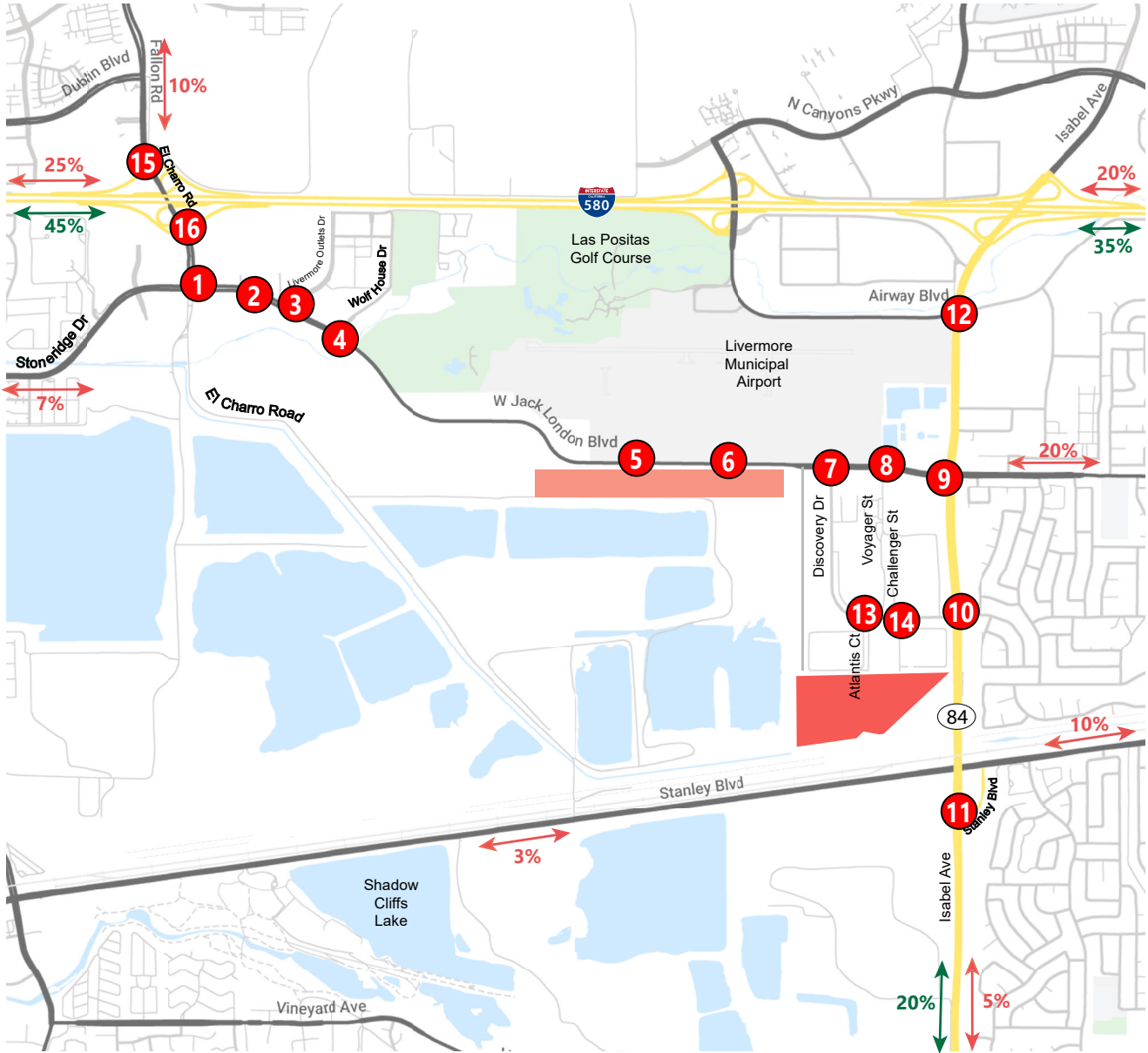
The truck distribution assumptions for the SMP 40 project are as follows:

- 40 percent to/from Interstate 580 west of Fallon Road/El Charro Road
- 35 percent to/from Interstate 580 north of Airway Boulevard
- 25 percent to/from Isabel Avenue south of Stanley Boulevard

Figures 10a, 10b, and 10c illustrate the trip distribution, vehicle trip assignment, and truck trip assignment for the SMP 40 project.

Figures 11a and 11b illustrate the trip assignment for both proposed projects. The assigned project trips were then added to traffic volumes under Background and Cumulative Conditions to generate Background plus Project and Cumulative plus Project Conditions traffic volumes. Each project was considered separately and together for a total of three plus project scenarios.

Figure 9a: SMP 39 Trip Distribution

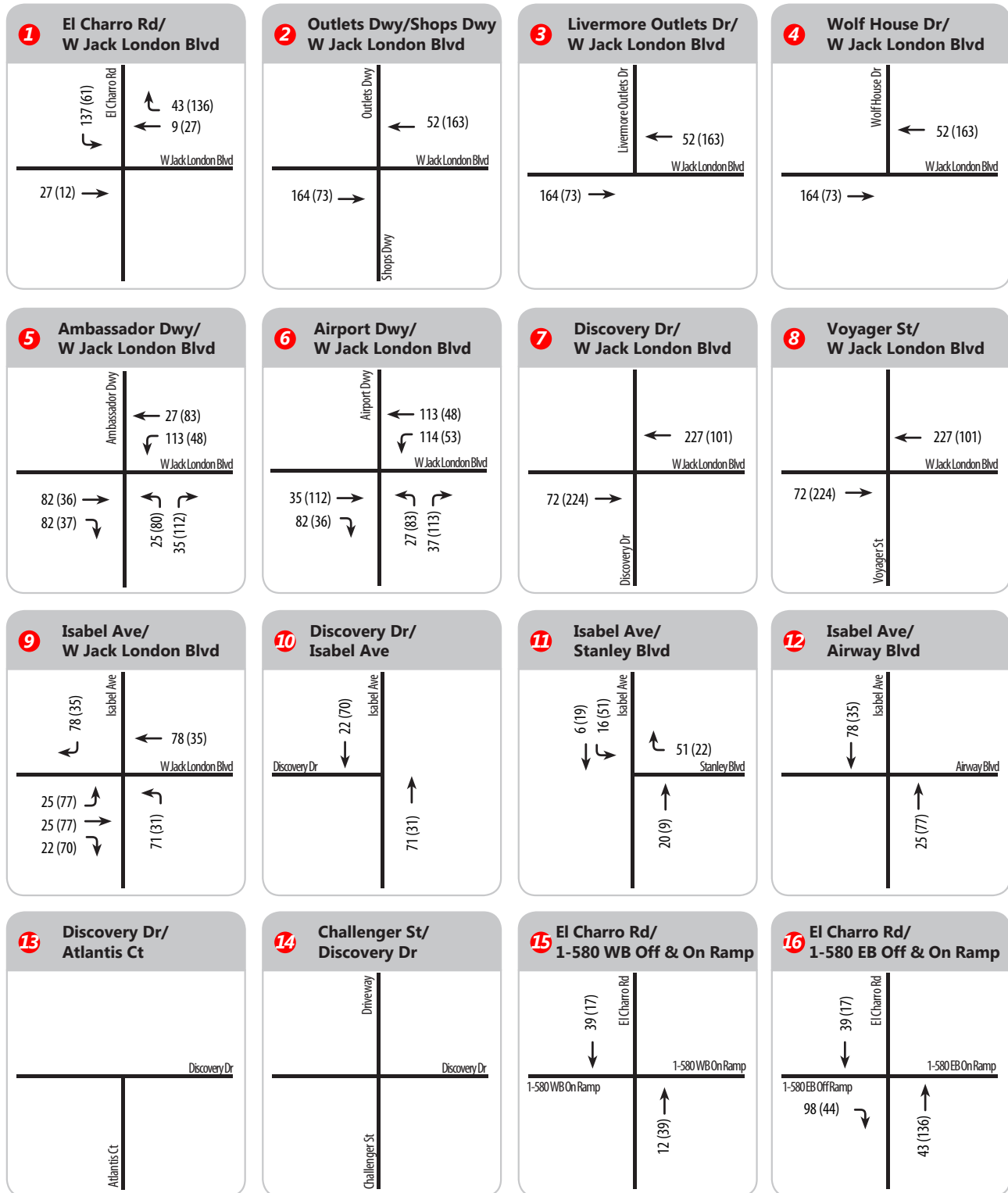


LEGEND

- Project Site - SMP 39
- Project Site - SMP 40
- X Study Intersection
- XX%** Vehicle Trip Distribution
- XX%** Truck Trip Distribution



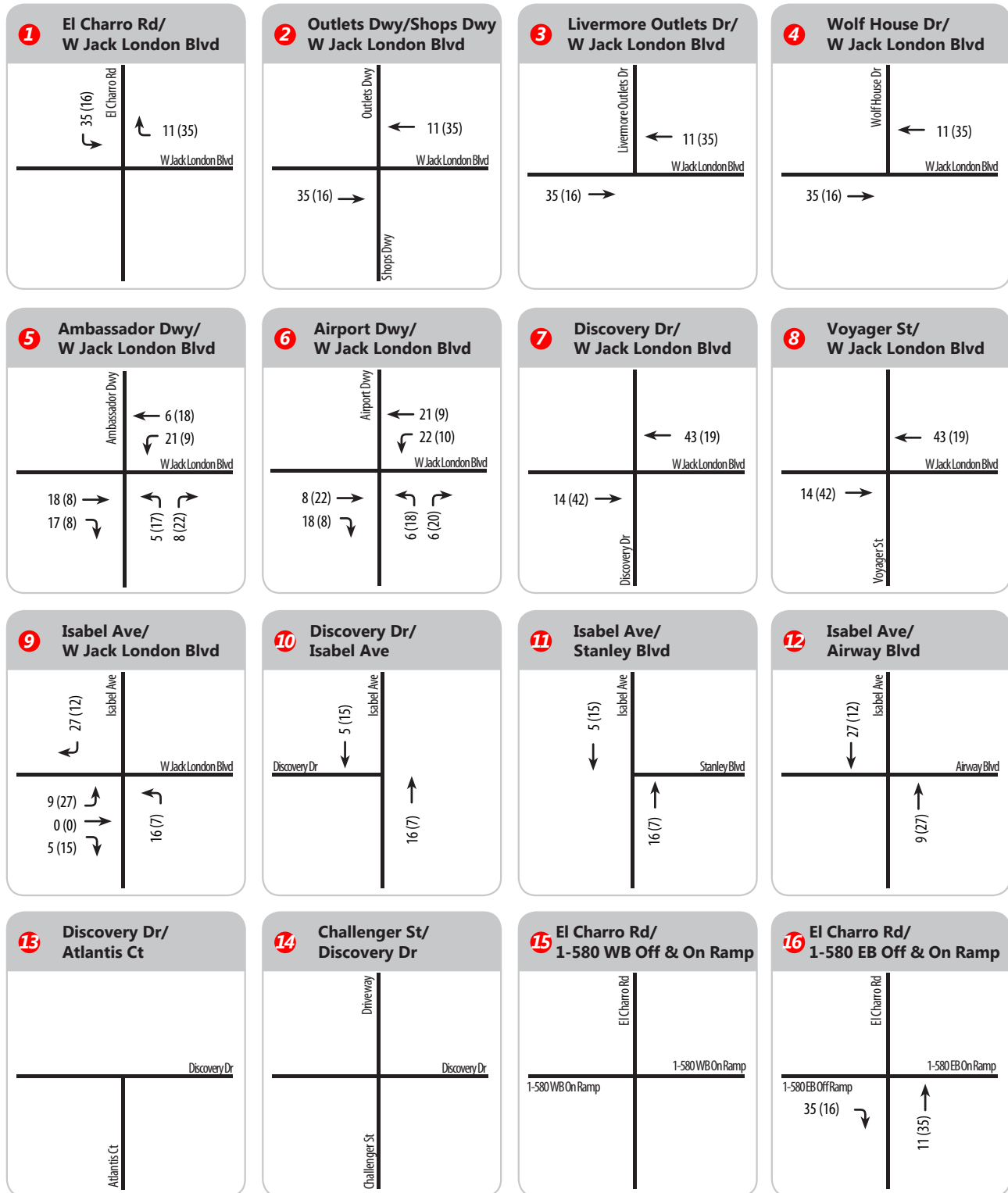
Figure 9b: SMP 39 Vehicle Trip Assignment



LEGEND

- Project Site
- Study Intersection
- XX AM Peak Hour Vehicle Trips
- (XX) PM Peak Hour Vehicle Trips

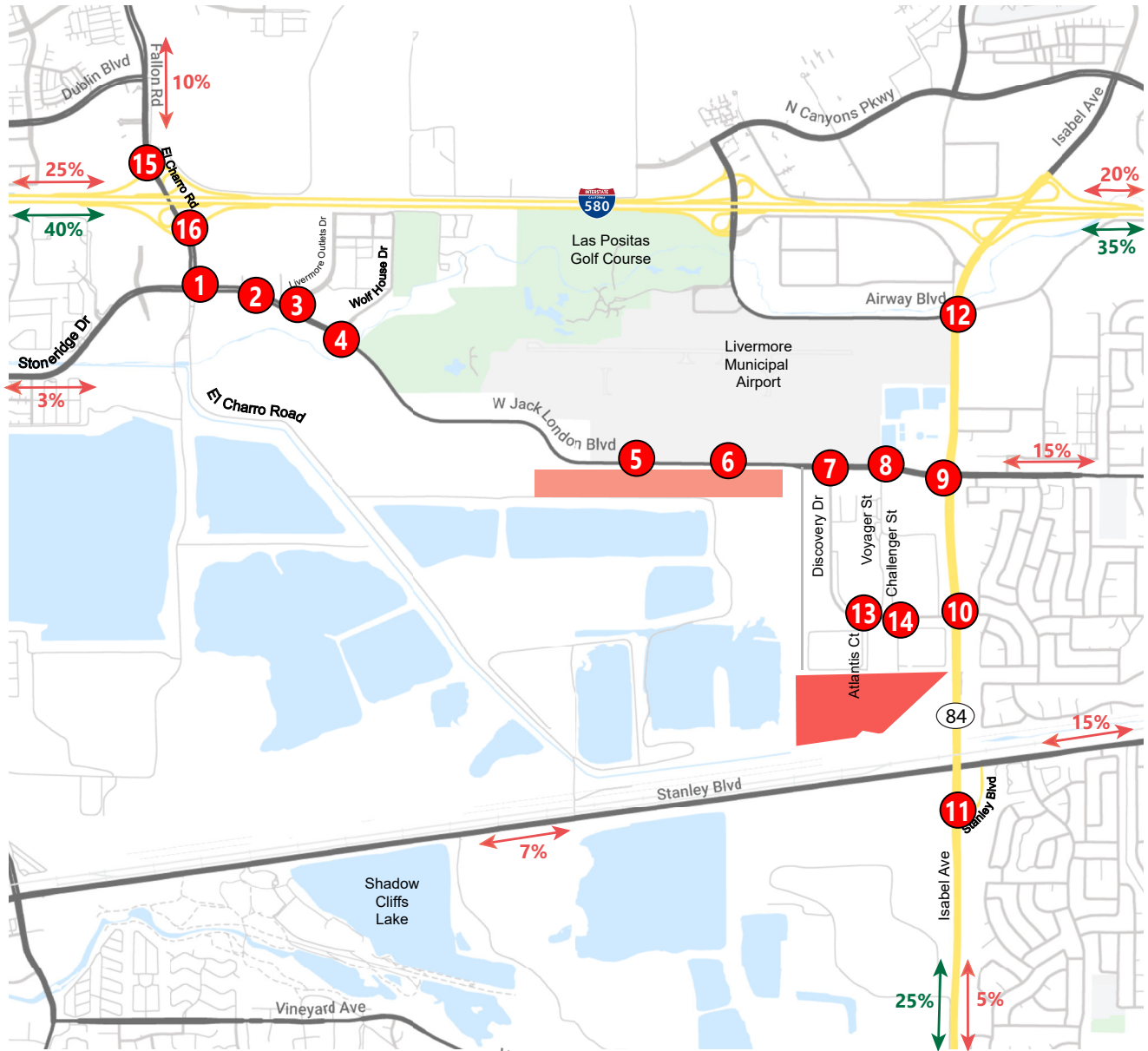
Figure 9c: SMP 39 Truck Trip Assignment



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Truck Trips
- (XX) PM Peak Hour Truck Trips

Figure 10a: SMP 40 Trip Distribution

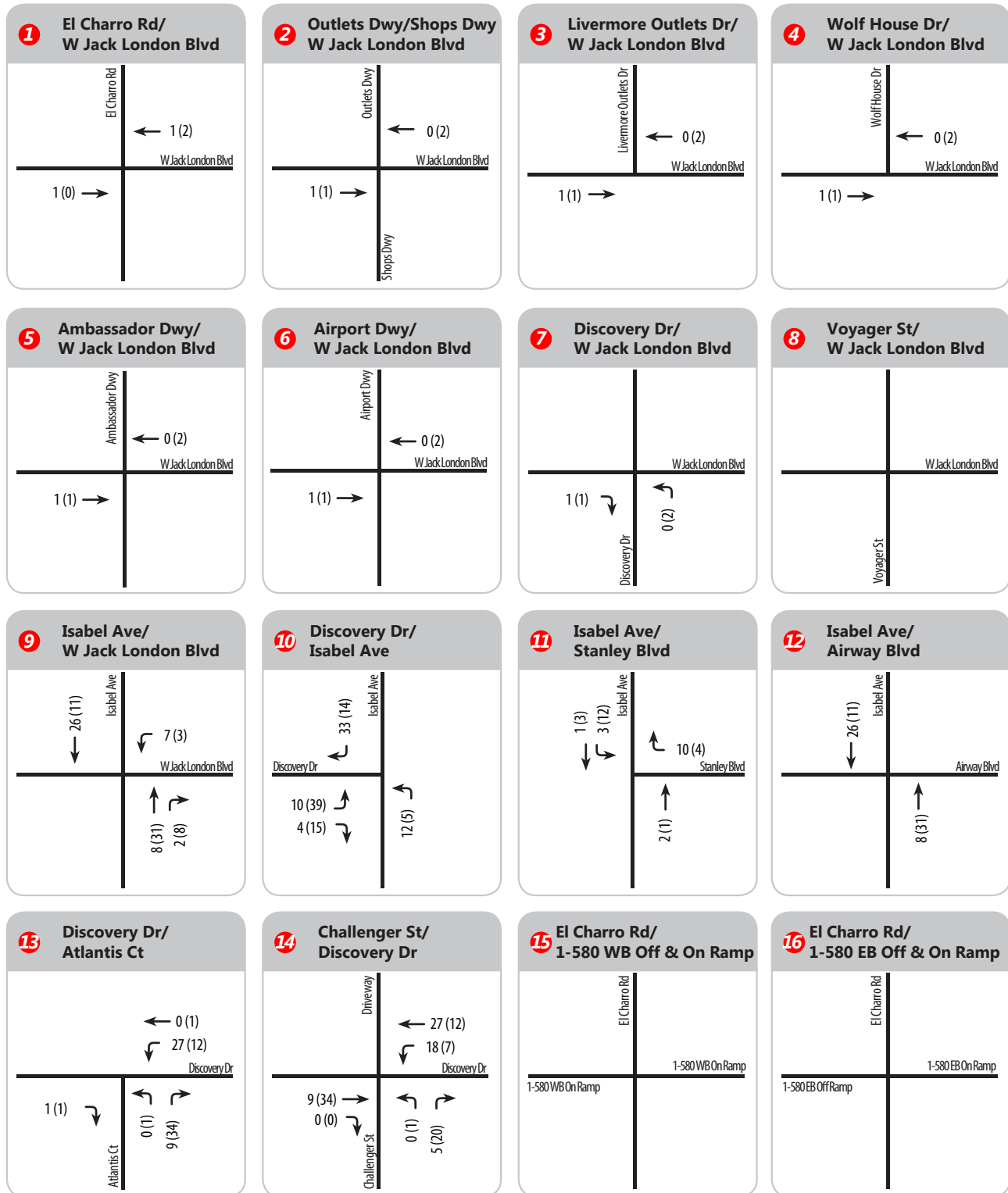


LEGEND

- Project Site - SMP 39
- Project Site - SMP 40
- Study Intersection
- ↔ XX% Vehicle Trip Distribution
- ↔ XX% Truck Trip Distribution



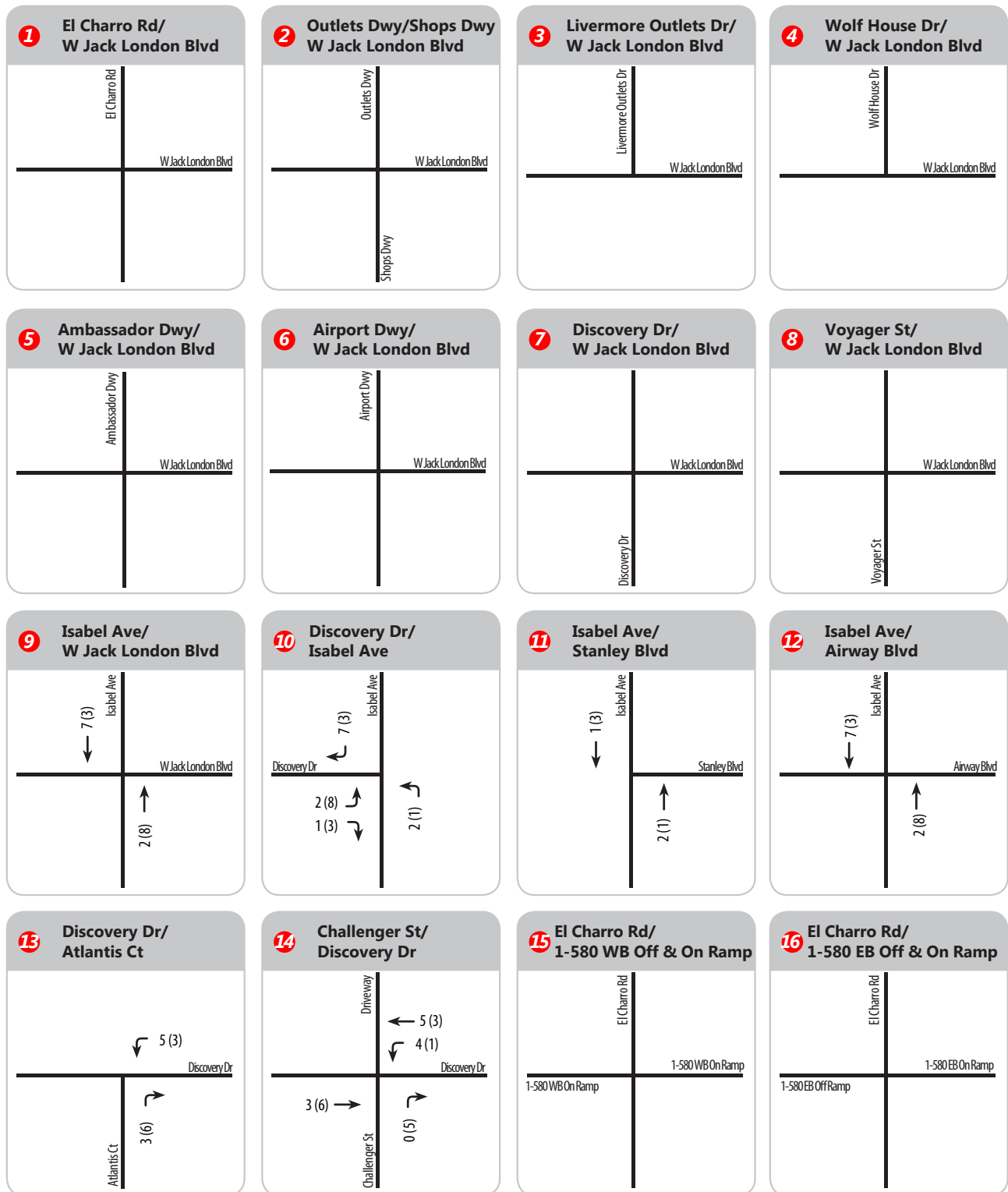
Figure 10b: SMP 40 Vehicle Trip Assignment



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Vehicle Trips
- (XX) PM Peak Hour Vehicle Trips

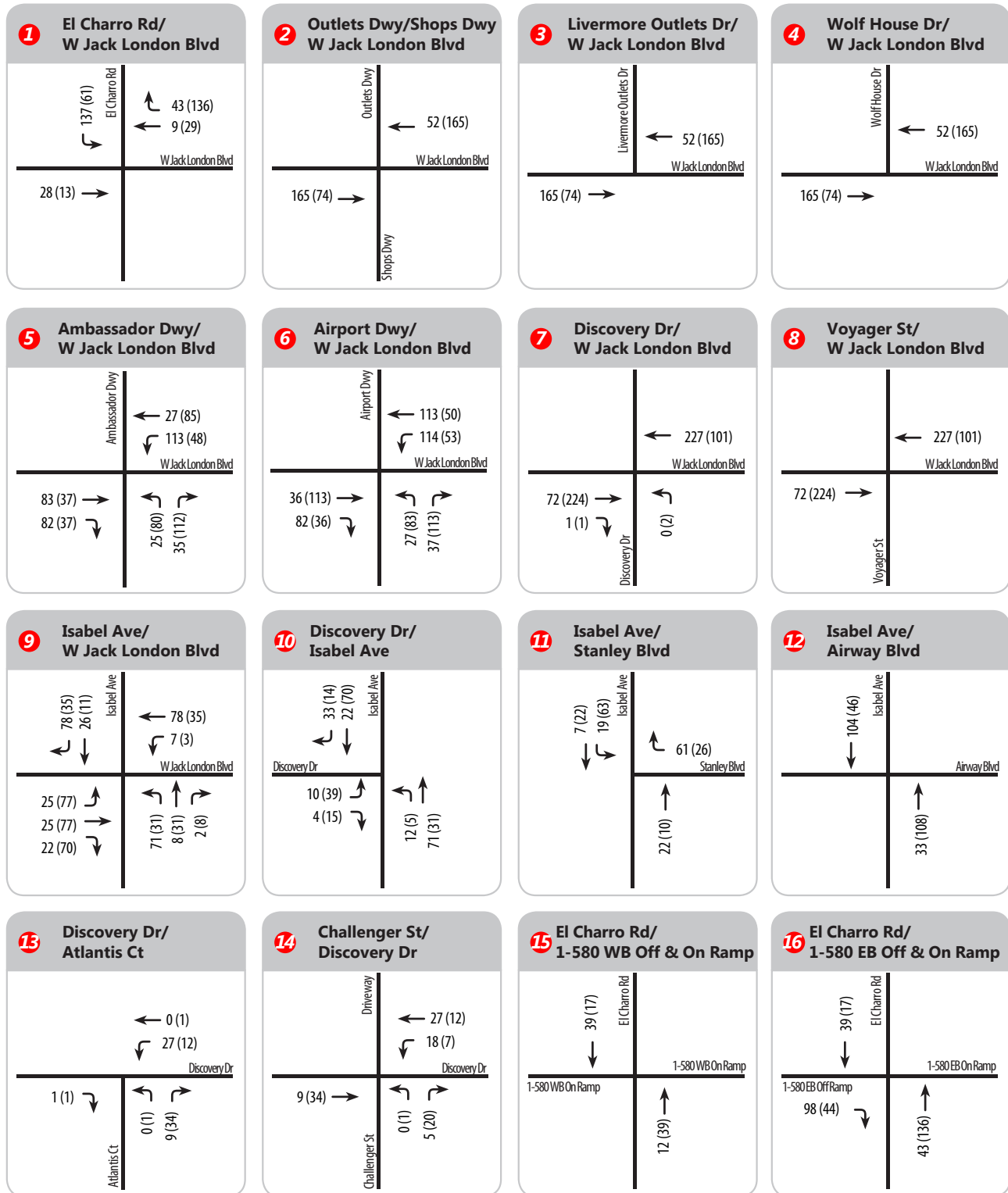
Figure 10c: SMP 40 Truck Trip Assignment



LEGEND

- Project Site
- Study Intersection
- XX AM Peak Hour Truck Trips
- (XX) PM Peak Hour Truck Trips

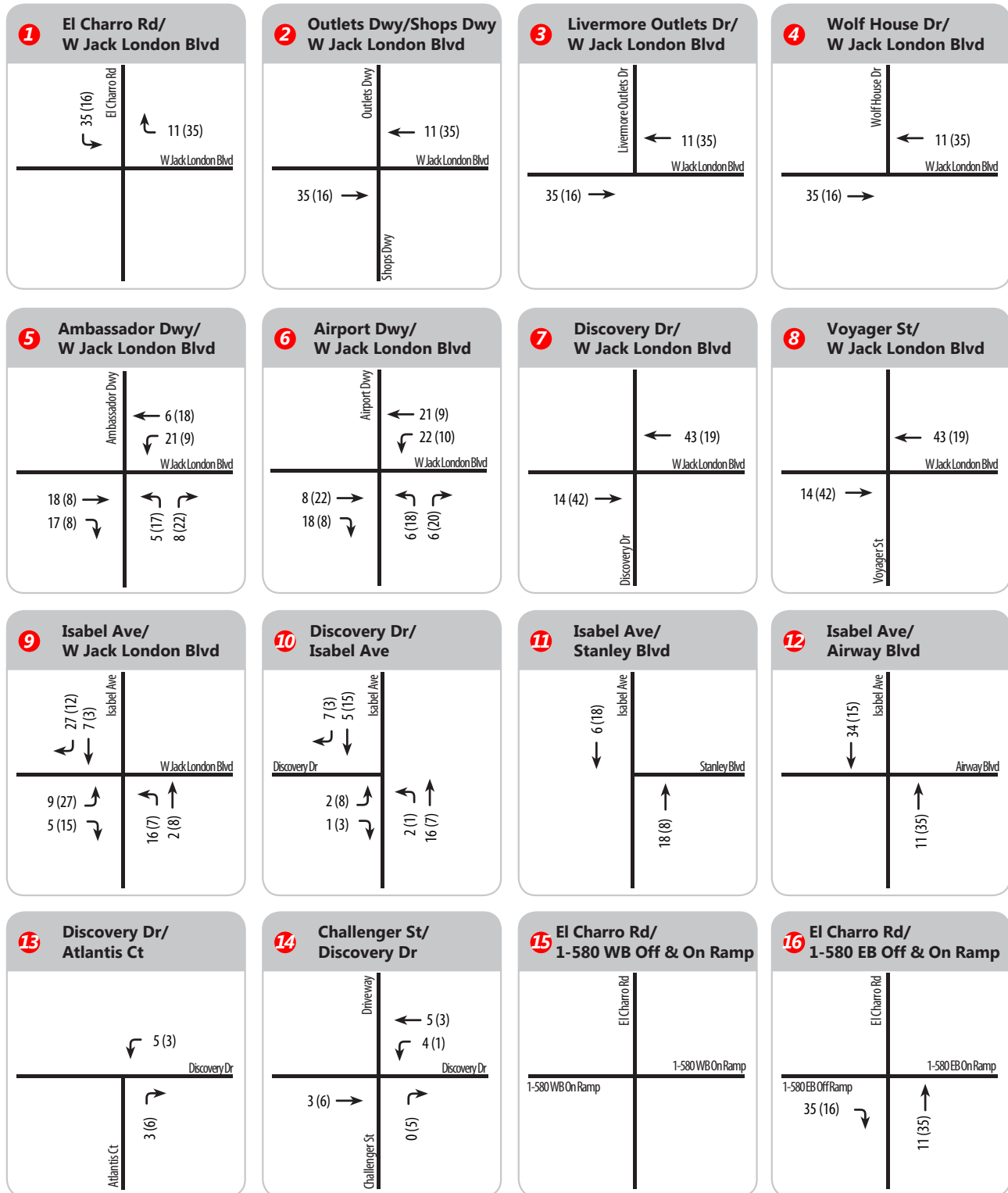
Figure 11a: SMP 39 & 40 Vehicle Trip Assignment



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Vehicle Trips
- (XX) PM Peak Hour Vehicle Trips

Figure 11b: SMP 39 & 40 Truck Trip Assignment



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Truck Trips
- (XX) PM Peak Hour Truck Trips

6.0 BACKGROUND PLUS PROJECT(S) CONDITIONS

This section details expected traffic conditions at the study intersections under Background plus Project Conditions. This analysis scenario is identical to Background Conditions, but with the addition of the proposed project traffic.

6.1 INTERSECTION LEVEL OF SERVICE ANALYSIS – BACKGROUND PLUS PROJECT(S)

The intersection LOS analysis results for Background plus SMP 39, Background plus SMP 40, and Background plus SMP 39 and 40 Conditions are summarized in **Table 8**. Detailed calculation sheets for Background plus SMP 39 Conditions are contained in **Appendix E**. All except for two study intersections are expected to continue operating within the applicable jurisdictional standards in both the a.m. and p.m. peak hour. Intersections 5 and 6, the two new unsignalized intersections serving SMP 39 operate with unsatisfactory conditions. The results for Background Conditions are included for comparison purposes.

Figures 12, 13, and 14 display the peak hour turning movement volumes at the study intersections under Background plus SMP 39, Background plus SMP 40, and Background plus SMP 39 & 40 Conditions.

Table 8: Intersection Level of Service Analysis – Background plus Project(s) Conditions

#	Intersection	Control	Methodology	Peak Hour ¹	Background Conditions		Background plus SMP 39		Background plus SMP 40		Background plus SMP 39 & 40	
					Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
1*	El Charro Rd/Stoneridge Rd-W Jack London Blvd	Signal	HCM 6	AM	15.7	B	16.3	B	15.7	B	16.3	B
				PM	19.6	C	21.1	C	19.6	B	21.1	C
2	W Jack London Blvd/Shops Dwy-Outlets Dwy	Signal	HCM 2000	AM	9.5	A	8.9	A	9.5	A	8.9	A
				PM	24.2	C	24.6	C	24.2	C	24.6	C
3	W Jack London Blvd/Livermore Outlets Dr	Signal	HCM 6	AM	7.9	A	7.2	A	7.9	A	7.2	A
				PM	8.4	A	9.0	A	8.4	A	9.0	A
4	W Jack London Blvd/Wolf House Dr	Signal	HCM 6	AM	8.5	A	8.1	A	8.5	A	8.1	A
				PM	6.5	A	7.3	A	6.5	A	7.3	A
5	W Jack London Blvd/Ambassador or Dwy	One-Way Stop	HCM 6	AM	15.7	C	35.1	E	15.7	C	35.3	E
				PM	0.0	A	393.7	F	0.0	A	399.1	F
6	W Jack London Blvd/Airport Dwy	One-Way Stop	HCM 6	AM	17.5	C	57.2	F	17.5	C	57.2	F
				PM	10.2	B	520.9	F	10.2	B	535.5	F
7	W Jack London Blvd/Discovery Dr	Signal	HCM 6	AM	4.3	A	4.5	A	4.3	A	4.6	A
				PM	9.1	A	9.3	A	9.2	A	5.1	A
8	W Jack London Blvd/Voyager St	Signal	HCM 6	AM	7.5	A	7.6	A	7.5	A	7.6	A
				PM	7.9	A	8.0	A	7.9	A	8.0	A
9	W Jack London Blvd/Isabel Ave	Signal	HCM 6	AM	38.2	D	41.2	D	38.9	D	41.9	D
				PM	36.1	D	41.7	D	36.4	D	42.0	D
10	Isabel Ave/Discovery Dr	Signal	HCM 6	AM	7.6	A	7.6	A	8.3	A	8.3	A
				PM	7.7	A	8.1	A	9.2	A	9.6	A
11	Isabel Ave/Stanley Blvd	Signal	HCM 6	AM	23.5	C	28.5	C	24.1	C	29.7	C
				PM	29.8	C	34.3	C	30.5	C	35.2	D

#	Intersection	Control	Methodology	Peak Hour ¹	Background Conditions		Background plus SMP 39		Background plus SMP 40		Background plus SMP 39 & 40	
					Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
12	Isabel Ave/Airway Blvd	Signal	HCM 6	AM	36.5	D	39.0	D	37.0	D	40.0	D
				PM	32.5	C	34.7	C	33.1	C	36.0	D
13	Discovery Dr/Atlantis Ct	One-Way Stop	HCM 6	AM	9.5	A	9.5	A	9.5	A	9.5	A
				PM	9.2	A	9.2	A	9.3	A	9.3	A
14	Discovery Dr/Challenger St	Two-Way Stop	HCM 6	AM	9.5	A	9.5	A	10.3	B	10.3	B
				PM	9.6	A	9.6	A	10.4	B	10.4	B
15	El Charro Rd/I-580 WB Ramps	Signal	HCM 6	AM	10.5	B	10.7	B	10.5	B	10.7	B
				PM	14.6	B	16.7	B	14.5	B	16.7	B
16	El Charro Rd/I-580 EB Ramps	Signal	HCM 2000	AM	6.3	A	6.4	A	6.3	A	6.4	A
				PM	7.0	A	7.8	A	7.0	A	7.8	A

Notes:

1. AM – morning peak hour, PM – evening peak hour
 2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
 3. LOS – Level of Service. **Bold** indicates unacceptable Level of Service.
- It should be noted that some of the intersections are estimated to show a decrease in intersection delay due to the addition of project trips to non-critical turn movements. That is, more vehicles would be using the intersection during the peak hour but on non-critical lanes and movements, so the average delay per vehicle decreases.

6.2 95TH PERCENTILE QUEUEING ANALYSIS – BACKGROUND PLUS PROJECT(S) CONDITIONS

TJKM conducted a vehicle queueing and storage analysis for exclusive left and right turn pockets at the study signalized intersections for Background plus Project(s) Conditions. **Table 9** summarizes the 95th percentile queue lengths under Background plus Project Conditions. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario.

Under Background plus SMP 39 Conditions, queue lengths exceed the available storage at three intersection approaches during one peak hour. However, the SMP 39 project traffic increases the queue length by a maximum of five feet from those observed under Background Conditions, thus impacts are less than substantial. Under Background plus SMP 40 Conditions, queue lengths exceed the available storage at three intersection approaches during one peak hour, however, the SMP 40 project traffic does not increase the queue length from those observed under Background Conditions. Under Background plus SMP 39 and 40 Conditions, queue lengths exceed the available storage at three intersection approaches during one peak hour. Together, the SMP 39 and 40 project traffic increases the queue length by a maximum of five feet from those observed under Background Conditions, thus impacts are less than substantial.

Table 9: 95th Percentile Queuing Analysis – Background plus Project(s) Conditions

#	Intersection	Lane Group	Storage Length	Background Conditions		Background plus SMP 39		Background plus SMP 40		Background plus SMP 39 & 40	
				AM	PM	AM	PM	AM	PM	AM	PM
1	El Charro Rd/Stoneridge Dr-W Jack London Blvd	EBL	400	55	195	60	205	55	195	60	205
		EBR	305	0	0	0	0	0	0	0	0
		WBL	350	15	40	15	40	15	40	15	40
		WBR	-	25	35	25	60	25	35	25	60
		NBL	110	10	25	10	25	10	25	10	25
		SBL	600	80	235	135	265	80	235	135	265
		SBR	420	0	0	0	0	0	0	0	0
2	W Jack London Blvd/Outlets Dwy-Shops Dwy	EBL	220	40	195	40	195	40	195	40	195
		WBL	150	30	60	30	60	30	60	30	60
		NBL	-	10	115	10	115	10	115	10	115
		SBR	-	0	55	0	55	0	55	0	55
3	W Jack London Blvd/Livermore Outlets Dr	EBL	320	20	40	20	40	20	40	20	40
		WBR	625	15	15	10	15	15	15	10	15
		SBL	180	10	40	10	40	10	40	10	40
		SBR	-	10	20	10	20	10	20	10	20
4	W Jack London Blvd/Wolf House Dr	EBL	375	10	20	10	25	10	20	10	25
		WBR	75	10	10	10	15	10	10	10	15
		SBL	-	25	20	25	20	25	20	25	20
		SBR	-	5	10	5	15	5	15	5	15
7	W Jack London Blvd/Discovery Dr	WBL	200	20	15	20	15	20	15	20	15
		NBR	335	0	0	0	0	0	0	0	0
8	W Jack London Blvd/Voyager St	EBL	165	5	5	0	5	5	5	5	5
		WBL	295	45	20	45	25	45	20	45	25
		NBR	320	0	5	0	0	0	5	0	0
9	W Jack London Blvd/Isabel Ave	EBL	190	55	80	90	160	55	80	90	160
		EBR	450	0	60	10	170	0	65	10	170
		WBL	185	125	100	140	100	130	100	145	100
		WBR	-	340	265	360	265	345	265	360	265
		NBL	290	140	60	220	85	140	60	220	85
		NBR	335	55	55	60	55	55	60	60	60
		SBL	240	160	245	175	245	160	245	175	245
		SBR	250	40	0	145	35	40	0	65	35
10	Isabel Ave/Discovery Dr	EBL	160	15	10	15	10	20	25	20	25
		EBR	290	10	10	10	10	10	10	10	10
		NBL	255	10	10	10	10	15	10	15	10
		SBR	200	15	15	15	15	20	15	20	15

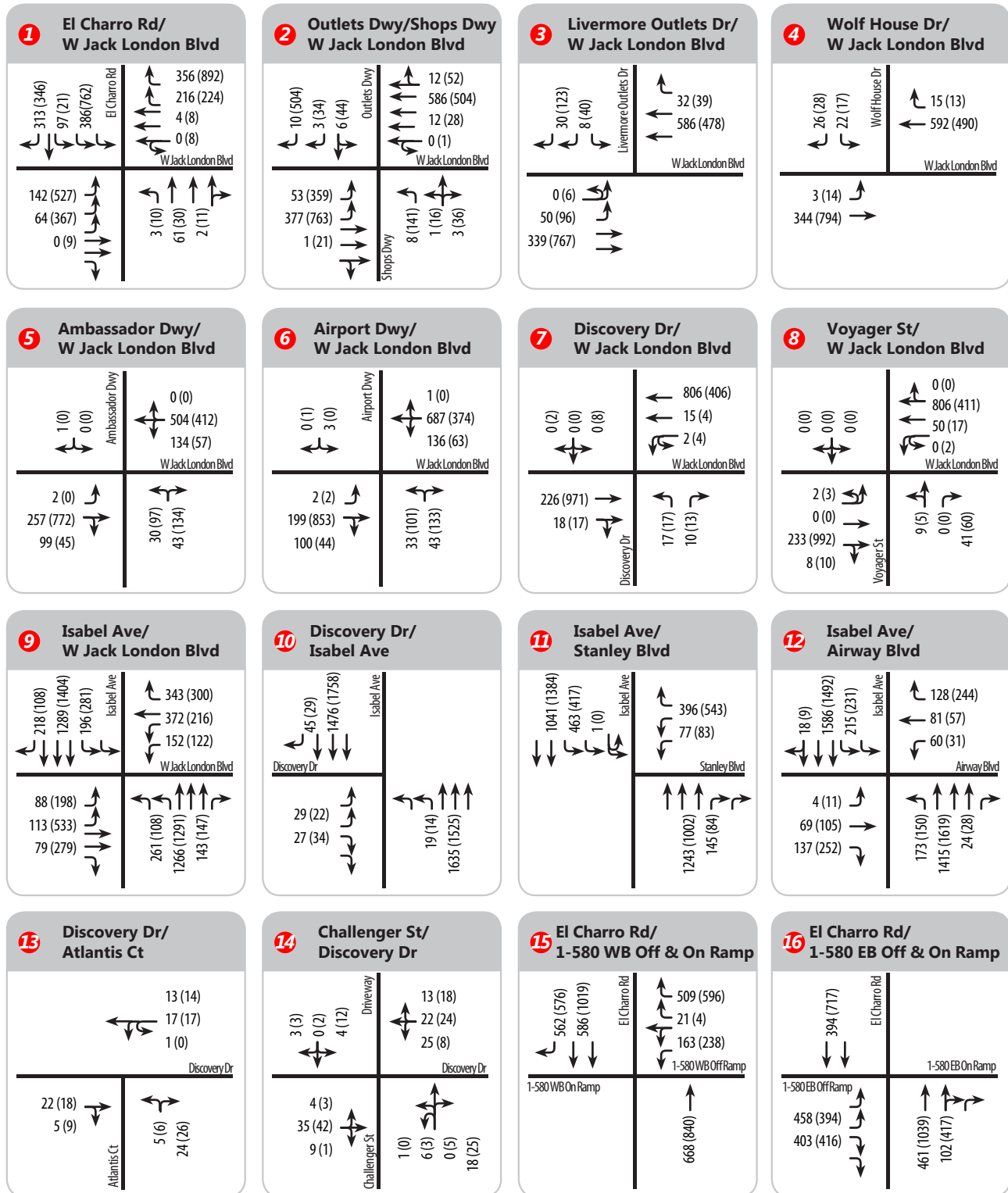
#	Intersection	Lane Group	Storage Length	Background Conditions		Background plus SMP 39		Background plus SMP 40		Background plus SMP 39 & 40	
				AM	PM	AM	PM	AM	PM	AM	PM
11	Isabel Ave/Stanley Blvd	WBL	-	35	40	35	40	35	40	35	40
		WBR	-	55	225	100	295	65	240	110	305
		NBR	435	15	5	20	5	15	5	20	5
		SBL	295	120	105	130	120	120	110	130	120
12	Isabel Ave/Airway Blvd	EBL	95	15	30	15	30	15	30	15	30
		EBR	105	35	85	35	85	35	85	35	85
		WBL	130	100	60	100	60	100	60	100	60
		WBR	130	35	50	35	50	35	50	35	50
		NBL	325	330	275	330	275	330	275	330	275
		NBR	325	0	0	0	0	0	0	0	0
15	El Charro Rd/I-580 WB Ramps	SBL	490	155	170	155	170	155	170	155	170
		WBL	135	70	95	70	95	70	95	70	95
		WBR	115	115	155	115	160	115	155	115	160
		SBR	190	15	35	15	35	15	35	15	35
16	El Charro Rd/I-580 EB Ramps	EBL	270	40	75	45	90	40	75	45	90
		EBR	290	10	40	15	65	10	40	15	65
		NBR	-	10	30	10	30	10	30	10	30

Notes:

Queue lengths shown in feet per lane.

Bold indicates 95th percentile queue length exceeds available storage length.

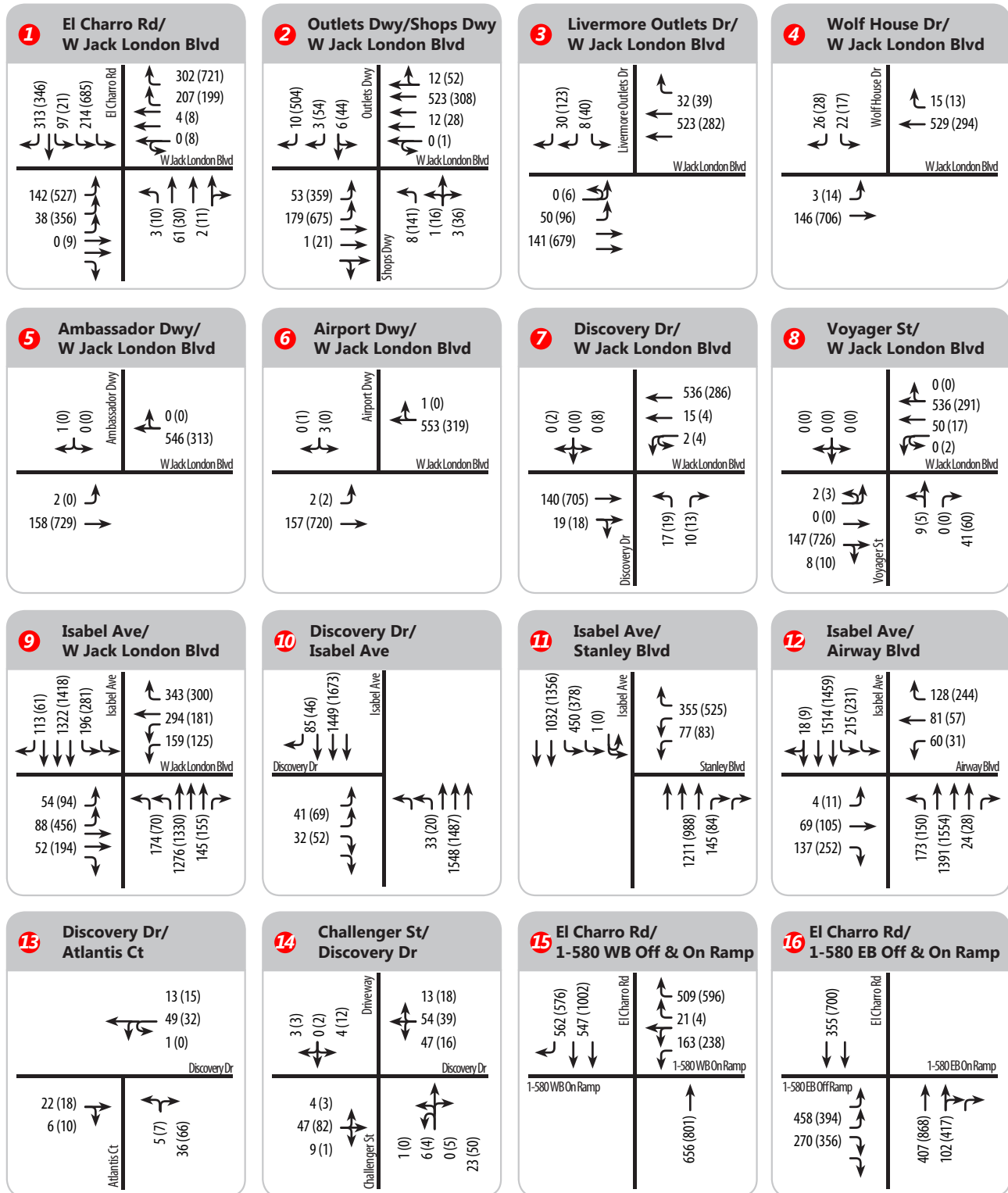
Figure 12: Background plus SMP 39 Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

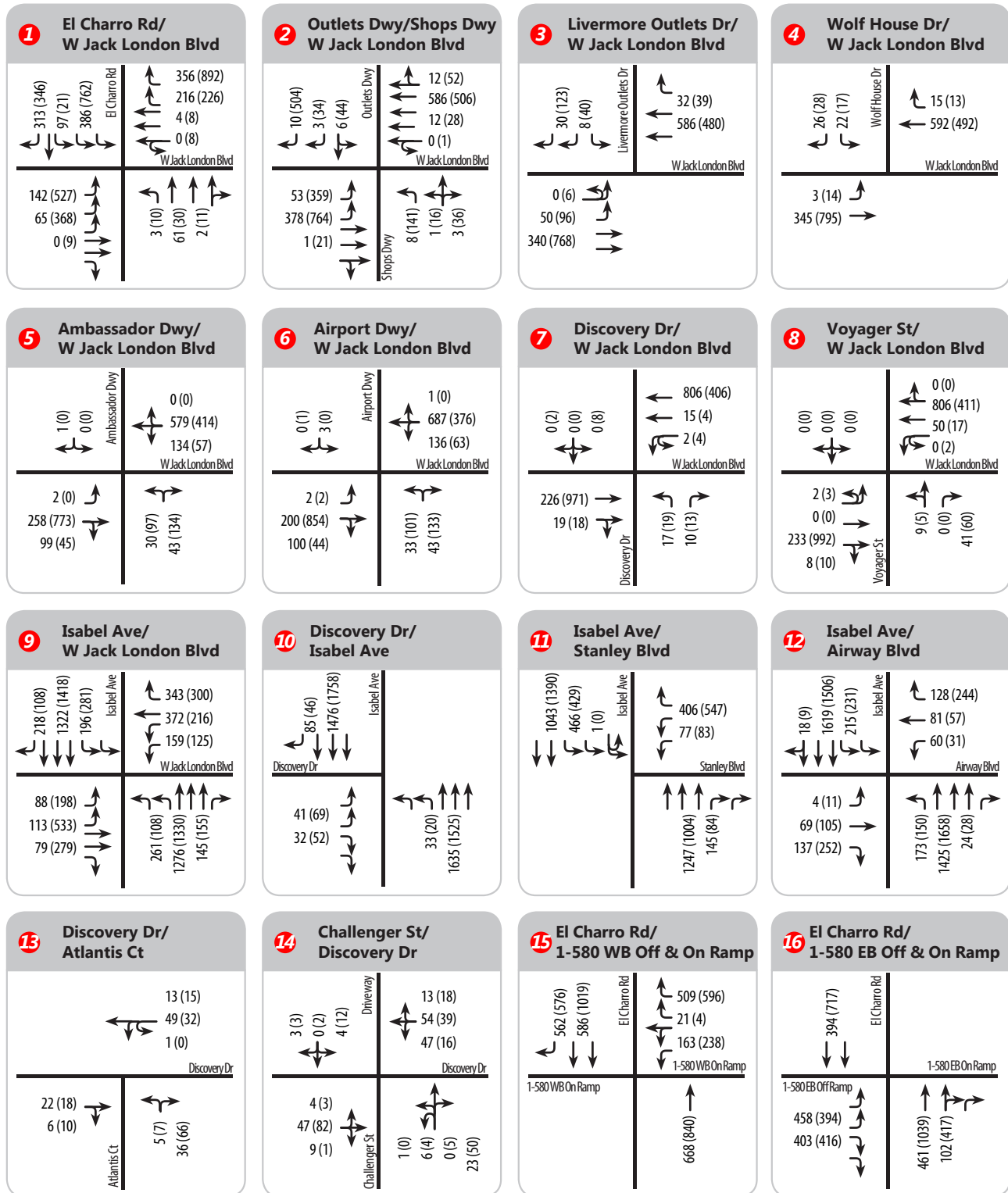
Figure 13: Background plus SMP 40 Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

Figure 14: Background plus SMP 39 & 40 Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

6.3 BACKGROUND PLUS PROJECT IMPROVEMENTS

This section summarizes improvements proposed due to the project impacts at the study intersections under Background plus Project(s) Conditions. It should be noted that improvements at study intersections which don't include project driveways would likely be part of a Transportation Impact Fee in which the proposed project will provide a fair share towards the improvements. **Appendix I** contains a summary of recommended improvement measures under Background plus Project(s) Conditions. **Appendix H** contains the California MUTCD peak hour signal warrants for the intersections at West Jack London Boulevard/Ambassador Driveway (Intersection #5) and West Jack London Boulevard/Airport Driveway (Intersection #6).

Background plus SMP 39 Improvements

Table 10 summarizes intersection operations at intersections where improvements are recommended.

TJKM observed substantial impacts due to the proposed SMP 39 project at the following intersections:

- W. Jack London Boulevard/Ambassador Driveway (Intersection #5) – Substantial impacts observed during both a.m. and p.m. peaks. By adding a westbound left turn pocket and signaling the intersection, the intersection operates at acceptable LOS C or better during both peak hours. Based on California MUTCD guidelines, the intersection meets the peak hour signal warrant under Background Conditions.
- W. Jack London Boulevard/Airport Driveway (Intersection #6) – Substantial impacts observed during both a.m. and p.m. peaks. By adding a westbound left turn pocket and signaling the intersection, the intersection operates at acceptable LOS D or better during both peak hours. Based on California MUTCD guidelines, the intersection meets the peak hour signal warrant under Background Conditions.

Table 10: Intersection Level of Service Analysis – Background plus SMP 39 Improvements

#	Study Intersections	Control	Peak Hour ¹	Background Conditions		Background plus SMP 39		Improvements	
				Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
5	W Jack London Blvd/Ambassador Dwy	One-Way	AM	15.7	C	35.1	E	11.3	B
		Stop	PM	0.0	A	>50	F	29.8	C
6	W Jack London Blvd/Airport Dwy	One-Way	AM	17.5	C	>50	F	11.2	B
		Stop	PM	10.2	B	>50	F	46.5	D

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.

Background plus SMP 40 Improvements

TJKM did not observe substantial impacts due to the proposed SMP 40 project.

Background plus SMP 39 & 40 Improvements

Table 11 summarizes intersection operations at intersections where improvements are recommended. TJKM observed substantial impacts due to both proposed projects at the following intersections:

- W. Jack London Boulevard/Ambassador Driveway (Intersection #5) – Substantial impacts observed during both a.m. and p.m. peaks. By adding a westbound left turn pocket and signaling the intersection, the intersection operates at acceptable LOS C or better during both peak hours. Based on California Manual on Uniform Traffic Control Devices (MUTCD) guidelines, the intersection meets the peak hour signal warrant under Background Conditions.
- W. Jack London Boulevard/Airport Driveway (Intersection #6) – Substantial impacts observed during both a.m. and p.m. peaks. By adding a westbound left turn pocket and signaling the intersection, the intersection operates at acceptable LOS D or better during both peak hours. Based on California MUTCD guidelines, the intersection meets the peak hour signal warrant under Background Conditions.

Table 11: Intersection Level of Service Analysis – Background plus SMP 39 & 40 Improvements

#	Study Intersections	Control	Peak Hour ¹	Background Conditions		Background plus SMP 39 & 40		Improvements	
				Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
5	W Jack London Blvd/Ambassador Dwy	One-Way Stop	AM	15.7	C	35.3	E	11.3	B
			PM	0.0	A	>50	F	29.8	C
6	W Jack London Blvd/Airport Dwy	One-Way Stop	AM	17.5	C	>50	F	11.2	B
			PM	10.2	B	>50	F	46.5	D

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.

As a result of applying the Improvements measures summarized in **Tables 10 and 11**, all impacts have been improved to a level that meets acceptable City of Livermore General Plan standards.

7.0 CUMULATIVE CONDITIONS

This section details expected traffic conditions at the study intersections under Cumulative (No Project) Conditions. This analysis scenario is defined as baseline conditions without the proposed project in year 2040, using a two percent annual increase in traffic from Existing Conditions. Under Cumulative Conditions the following lane geometry changes were considered (due to being planned improvements):

- Jack London Boulevard between El Charro Road and Isabel Avenue is a four-lane roadway
- El Charro Road/Jack London Boulevard (Intersection #1) – Addition of one southbound through lane, one westbound left-turn lane, and one northbound receiving lane. Northbound approach modified to two left-turn lanes, three through lanes, and one exclusive right-turn lane. Sufficient pavement exists at this intersection so that only striping changes are needed.
- El Charro Road south of Jack London Boulevard – Addition of one southbound travel lane.

Figure 15 shows the projected peak hour turning movement volumes at the study intersections under Cumulative Conditions.

7.1 INTERSECTIONS LEVEL OF SERVICE ANALYSIS – CUMULATIVE (2040) CONDITIONS

Table 12 below summarizes peak hour LOS at the study intersections under Cumulative Conditions. Under this scenario, four of the study intersections operate at unacceptable levels of service for at least one peak hour. LOS worksheets are provided in **Appendix F**.

Table 12: Intersection Level of Service Analysis – Cumulative Conditions

#	Intersection	Control	Peak Hour ¹	Cumulative Conditions	
				Delay ²	LOS ³
1	El Charro Rd/Stoneridge Rd-W Jack London Blvd	Signal	AM	15.8	B
			PM	24.4	C
2	W Jack London Blvd/Shops Dwy-Outlets Dwy	Signal	AM	11.8	B
			PM	27.0	C
3	W Jack London Blvd/Livermore Outlets Dr	Signal	AM	8.7	A
			PM	9.2	A
4	W Jack London Blvd/Wolf House Dr	Signal	AM	6.8	A
			PM	5.6	A
5	W Jack London Blvd/Ambassador Dwy	One-Way Stop	AM	14.2	B
			PM	0.0	A
6	W Jack London Blvd/Airport Dwy	One-Way Stop	AM	22.2	C
			PM	9.7	A
7	W Jack London Blvd/Discovery Dr	Signal	AM	4.5	A
			PM	9.0	A

#	Intersection	Control	Peak Hour ¹	Cumulative Conditions	
				Delay ²	LOS ³
8	W Jack London Blvd/Voyager St	Signal	AM	7.8	A
			PM	8.6	A
9	W Jack London Blvd/Isabel Ave	Signal	AM	63.6	E
			PM	64.4	E
10	Isabel Ave/Discovery Dr	Signal	AM	9.1	A
			PM	10.0	B
11	Isabel Ave/Stanley Blvd	Signal	AM	37.9	D
			PM	72.1	E
12	Isabel Ave/Airway Blvd	Signal	AM	>80	F
			PM	>80	F
13	Discovery Dr/Atlantis Ct	One-Way Stop	AM	9.5	A
			PM	9.3	A
14	Discovery Dr/Challenger St	Two-Way Stop	AM	9.6	A
			PM	9.8	A
15	El Charro Rd/I-580 WB Ramps	Signal	AM	21.8	C
			PM	51.8	D
16	El Charro Rd/I-580 EB Ramps	Signal	AM	6.9	A
			PM	8.5	A

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.

7.2 95TH PERCENTILE QUEUEING ANALYSIS – CUMULATIVE CONDITIONS

TJKM conducted a vehicle queueing and storage analysis for exclusive left and right turn pockets at the study signalized intersections for Cumulative Conditions. Under Cumulative Conditions, six intersection lane groups exhibit queue lengths which exceed the available storage length during at least one peak hour. **Table 13** summarizes the 95th percentile queue lengths under Cumulative Conditions. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario.

Table 13: 95th Percentile Queueing Analysis – Cumulative Conditions

#	Intersection	Lane Group	Storage Length	Cumulative Conditions	
				AM	PM
1	El Charro Rd/Stoneridge Dr-W Jack London Blvd	EBL	400	75	340
		EBR	305	0	0
		WBL	350	10	25
		WBR	-	30	105
		NBL	110	5	20
		NBR	-	0	0
		SBL	600	100	320
2	W Jack London Blvd/Outlets Dwy-Shops Dwy	SBR	420	60	0
		EBL	220	45	275
		WBL	150	35	75
		NBL	-	15	165
3	W Jack London Blvd/Livermore Outlets Dr	SBR	-	0	60
		EBL	320	25	50
		WBR	625	15	15
		SBL	180	15	50
4	W Jack London Blvd/Wolf House Dr	SBR	-	10	25
		EBL	375	10	25
		WBR	75	10	15
		SBL	-	30	25
7	W Jack London Blvd/Discovery Dr	SBR	-	20	20
		WBL	200	25	20
8	W Jack London Blvd/Voyager St	NBR	335	0	0
		EBL	165	5	10
		WBL	295	55	30
9	W Jack London Blvd/Isabel Ave	NBR	320	0	15
		EBL	190	75	115
		EBR	450	0	180
		WBL	185	175	140
		WBR	-	550	460
		NBL	290	200	85
		NBR	335	110	95
10	Isabel Ave/Discovery Dr	SBL	240	275	410
		SBR	250	85	10
		EBL	160	20	15
		EBR	290	15	15
11	Isabel Ave/Stanley Blvd	NBL	255	15	10
		SBR	200	20	15
		WBL	-	75	50
		WBR	-	175	535
12	Isabel Ave/Airway Blvd	NBR	435	30	15
		SBL	295	170	135
		EBL	95	20	35
		EBR	105	80	170
		WBL	130	125	75
		WBR	130	45	120
12	Isabel Ave/Airway Blvd	NBL	325	460	290
		NBR	325	0	0
12	Isabel Ave/Airway Blvd	SBL	490	235	255
		SBL	490	235	255

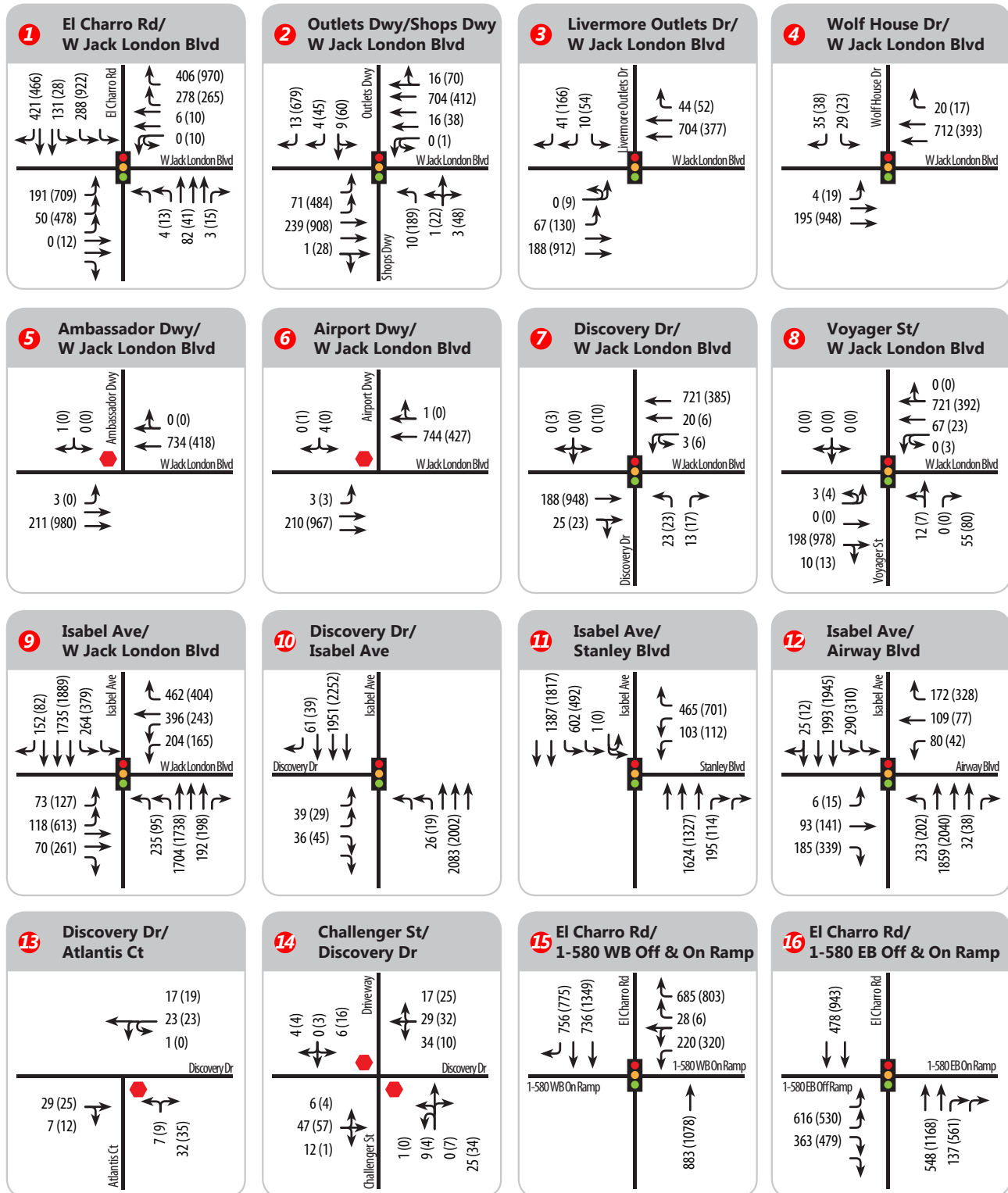
#	Intersection	Lane Group	Storage Length	Cumulative Conditions	
				AM	PM
15	El Charro Rd/I-580 WB Ramps	WBL	135	100	145
		WBR	115	190	245
		SBR	190	40	35
16	El Charro Rd/I-580 EB Ramps	EBL	270	70	145
		EBR	290	15	115
		NBR	-	10	15

Notes:

Queue lengths shown in feet per lane.

Bold indicates 95th percentile queue length exceeds available storage length.

Figure 15: Cumulative Conditions Lane Geometry, Traffic Controls, and Volumes



LEGEND

- Project Site
- Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- Traffic Signal
- Stop Sign

8.0 CUMULATIVE PLUS PROJECT(S) CONDITIONS

This section details expected traffic conditions at the study intersections under Cumulative plus Project Conditions. This analysis scenario is identical to Cumulative Conditions, but with the addition of the proposed project traffic.

8.1 INTERSECTION LEVEL OF SERVICE ANALYSIS – CUMULATIVE PLUS PROJECT(S) CONDITIONS

The intersection LOS analysis results for Cumulative plus SMP 39, Cumulative plus SMP 40, and Cumulative plus SMP 39 and 40 Conditions are summarized in **Table 14**. The results for Cumulative Conditions are included for comparison purposes. Detailed calculation sheets for Cumulative plus SMP 39 Conditions are contained in **Appendix G**. All except for six study intersections are expected to continue operating within the applicable jurisdictional standards in both the a.m. and p.m. peak hour. Intersections 5, 6, 9, 11, 12, and 15 operate with unsatisfactory conditions. It should be noted that intersections 9, 11, and 15 operate with unsatisfactory conditions under Cumulative Conditions without the proposed projects. The results for Cumulative Conditions are included for comparison purposes.

Figures 16, 17, and 18 display the peak hour turning movement volumes at the study intersections under Cumulative plus SMP 39, Cumulative plus SMP 40, and Cumulative plus SMP 39 & 40 Conditions.

Table 14: Intersection Level of Service Analysis – Cumulative plus Project(s) Conditions

#	Intersection	Control	Methodology	Peak Hour ¹	Cumulative Conditions		Cumulative plus SMP 39		Cumulative plus SMP 40		Cumulative plus SMP 39 & 40	
					Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
1*	El Charro Rd/Stoneridge Rd-W Jack London Blvd	Signal	HCM 6	AM	15.8	B	16.6	B	17.8	B	16.6	B
				PM	24.4	C	29.6	C	24.4	C	26.1	C
2	W Jack London Blvd/Shops Dwy-Outlets Dwy	Signal	HCM 2000	AM	11.8	B	11.0	B	11.8	B	11.0	B
				PM	27.0	C	27.7	C	27.0	C	27.7	C
3	W Jack London Blvd/Livermore Outlets Dr	Signal	HCM 6	AM	8.7	A	8.0	A	8.7	A	8.0	A
				PM	9.2	A	9.8	A	9.2	A	9.8	A
4	W Jack London Blvd/Wolf House Dr	Signal	HCM 6	AM	6.8	A	6.4	A	6.8	A	6.4	A
				PM	5.6	A	6.0	A	5.6	A	6.0	A
5	W Jack London Blvd/Ambassador or Dwy	One-Way Stop	HCM 6	AM	14.2	B	25.7	D	14.2	B	25.7	D
				PM	0.0	A	16.6	B	0.0	A	>50	F
6	W Jack London Blvd/Airport Dwy	One-Way Stop	HCM 6	AM	22.2	C	>50	F	22.2	C	>50	F
				PM	9.7	A	>50	F	9.7	A	>50	F
7	W Jack London Blvd/Discovery Dr	Signal	HCM 6	AM	4.5	A	4.9	A	4.5	A	4.9	A
				PM	9.0	A	9.8	A	9.0	A	10.3	B
8	W Jack London Blvd/Voyager St	Signal	HCM 6	AM	7.8	A	7.8	A	7.8	A	7.8	A
				PM	8.6	A	8.9	A	8.6	A	8.9	A
9	W Jack London Blvd/Isabel Ave	Signal	HCM 6	AM	63.6	E	73.5	E	65.3	E	75.9	E
				PM	64.4	E	67.5	E	64.8	E	68.0	E
10	Isabel Ave/Discovery Dr	Signal	HCM 6	AM	9.1	A	9.3	A	9.9	A	10.2	B
				PM	10.0	B	11.0	B	11.8	B	13.3	B
11	Isabel Ave/Stanley Blvd	Signal	HCM 6	AM	37.9	D	46.7	D	39.4	D	48.6	D
				PM	72.1	E	79.7	E	73.3	E	>80	F

#	Intersection	Control	Methodology	Peak Hour ¹	Cumulative Conditions		Cumulative plus SMP 39		Cumulative plus SMP 40		Cumulative plus SMP 39 & 40	
					Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
12	Isabel Ave/Airway Blvd	Signal	HCM 6	AM	>80	F	>80	F	>80	F	>80	F
				PM	>80	F	>80	F	>80	F	>80	F
13	Discovery Dr/Atlantis Ct	One-Way Stop	HCM 6	AM	9.5	A	9.5	A	9.7	A	9.5	A
				PM	9.3	A	9.3	A	9.3	A	9.3	A
14	Discovery Dr/Challenger St	Two-Way Stop	HCM 6	AM	9.6	A	9.6	A	10.2	B	10.2	B
				PM	9.8	A	9.8	A	10.6	B	10.6	B
15	El Charro Rd/I-580 WB Ramps	Signal	HCM 6	AM	21.8	C	22.7	C	21.6	C	22.7	C
				PM	51.8	D	58.6	E	51.8	D	58.1	E
16	El Charro Rd/I-580 EB Ramps	Signal	HCM 2000	AM	6.9	A	6.9	A	6.9	A	7.1	A
				PM	8.5	A	9.8	A	8.5	A	9.8	A

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable Level of Service.

It should be noted that some of the intersections are estimated to show a decrease in intersection delay due to the addition of project trips to non-critical turn movements. That is, more vehicles would be using the intersection during the peak hour but on non-critical lanes and movements, so the average delay per vehicle decreases.

8.2 95TH PERCENTILE QUEUEING ANALYSIS – CUMULATIVE PLUS PROJECT(S) CONDITIONS

TJKM conducted a vehicle queueing and storage analysis for exclusive left and right turn pockets at the study signalized intersections for Cumulative plus Project(s) Conditions. **Table 15** summarizes the 95th percentile queue lengths under Cumulative plus Project(s) Conditions. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario.

Under Cumulative plus SMP 39 Conditions, queue lengths exceed the available storage at nine intersection approaches during at least one peak hour. However, at four of these locations, the queue length does not increase from queue lengths observed under Cumulative Conditions. The SMP 39 project traffic increases the queue length by a maximum of 115 feet, or five vehicle lengths (one vehicle=25 feet), from those observed under Cumulative Conditions. Substantial increases in queue lengths are observed at three locations. The following storage length changes are recommended with the addition of the SMP 39 project:

- El Charro Road/Stoneridge Drive-W Jack London Boulevard (Intersection #1): Increase eastbound left turn storage length by 65 feet, or three vehicle lengths.
- W Jack London Boulevard/Isabel Avenue (Intersection #9): Increase eastbound left turn storage length by 115 feet, or five vehicle lengths. Increase southbound left turn storage by 15 feet.
- Isabel Avenue/Airway Boulevard (Intersection #12): Increase northbound left turn storage length by 100 feet, or four vehicle lengths.
- El Charro Road/I-580 Westbound Ramps (Intersection #15): Increase westbound right turn storage length by 5 feet.

Under Cumulative plus SMP 40 Conditions, queue lengths exceed the available storage at six intersection approaches during at least one peak hour. However, the SMP 40 project traffic does not increase the queue length from those observed under Cumulative Conditions, except at one approach. Substantial increases in queue lengths are observed at one location. The following storage length changes are recommended with the addition of the SMP 40 project:

- Isabel Avenue/Airway Boulevard (Intersection #12): Increase northbound left turn storage length by 100 feet, or four vehicle lengths.

Under Cumulative plus SMP 39 and 40 Conditions, queue lengths exceed the available storage at eight intersection approaches during at least one peak hour. However, the project traffic does not increase the queue length from those observed under Cumulative Conditions, except at three approaches. Substantial increases in queue lengths are observed at three locations. The following storage length changes are recommended with the addition of both projects:

- W Jack London Boulevard/Isabel Avenue (Intersection #9): Increase eastbound left turn storage length by 115 feet, or five vehicle lengths.
- Isabel Avenue/Airway Boulevard (Intersection #12): Increase northbound left turn storage length by 100 feet, or four vehicle lengths.
- El Charro Road/I-580 Westbound Ramps (Intersection #15): Increase westbound right turn storage length by 5 feet.

Table 15: 95th Percentile Queueing Analysis – Cumulative plus Project(s) Conditions

#	Intersection	Lane Group	Storage Length	Cumulative Conditions		Cumulative plus SMP 39		Cumulative plus SMP 40		Cumulative plus SMP 39 & 40	
				AM	PM	AM	PM	AM	PM	AM	PM
1	El Charro Rd/Stoneridge Dr-W Jack London Blvd	EBL	400	75	340	80	405	75	340	80	360
		EBR	305	0	0	0	0	0	0	0	0
		WBL	350	10	25	10	25	10	25	10	25
		WBR	-	30	105	30	130	40	105	30	200
		NBL	110	5	20	5	20	5	20	5	20
		NBR		0	0	0	0	0	0	0	0
		SBL	600	100	320	155	385	100	320	155	350
		SBR	420	60	0	0	0	60	0	0	0
2	W Jack London Blvd/Outlets Dwy-Shops Dwy	EBL	220	45	275	45	275	45	275	45	275
		WBL	150	35	75	35	75	35	75	35	75
		NBL	-	15	165	15	165	15	165	15	165
		SBR	-	0	60	0	60	0	60	0	60
3	W Jack London Blvd/Livermore Outlets Dr	EBL	320	25	50	25	50	25	50	25	50
		WBR	625	15	15	15	15	15	15	15	15
		SBL	180	15	50	15	50	15	50	15	50
		SBR	-	10	25	10	25	10	25	10	25
4	W Jack London Blvd/Wolf House Dr	EBL	375	10	25	10	25	10	25	10	25
		WBR	75	10	15	15	15	10	15	15	15
		SBL	-	30	25	30	25	30	25	30	25
		SBR	-	20	20	20	20	20	20	20	20
7	W Jack London Blvd/Discovery Dr	WBL	200	25	20	25	20	25	20	25	20
		NBR	335	0	0	0	0	0	0	0	0
8	W Jack London Blvd/Voyager St	EBL	165	5	10	5	10	5	10	5	10
		WBL	295	55	30	55	30	55	30	55	30
		NBR	320	0	15	0	15	0	15	0	15
9	W Jack London Blvd/Isabel Ave	EBL	190	75	115	110	230	75	115	110	230
		EBR	450	0	180	25	320	0	180	25	320
		WBL	185	175	140	180	140	180	140	185	140
		WBR	-	550	460	550	460	550	460	550	460
		NBL	290	200	85	325	115	200	85	325	115
		NBR	335	110	95	120	95	115	105	120	105
		SBL	240	275	410	290	410	275	410	290	410
SBR	250	85	10	225	50	85	10	230	50		
10	Isabel Ave/Discovery Dr	EBL	160	20	15	20	15	25	30	25	30
		EBR	290	15	15	15	15	15	15	15	15
		NBL	255	15	10	15	10	20	15	20	15
		SBR	200	20	15	20	15	30	20	30	20

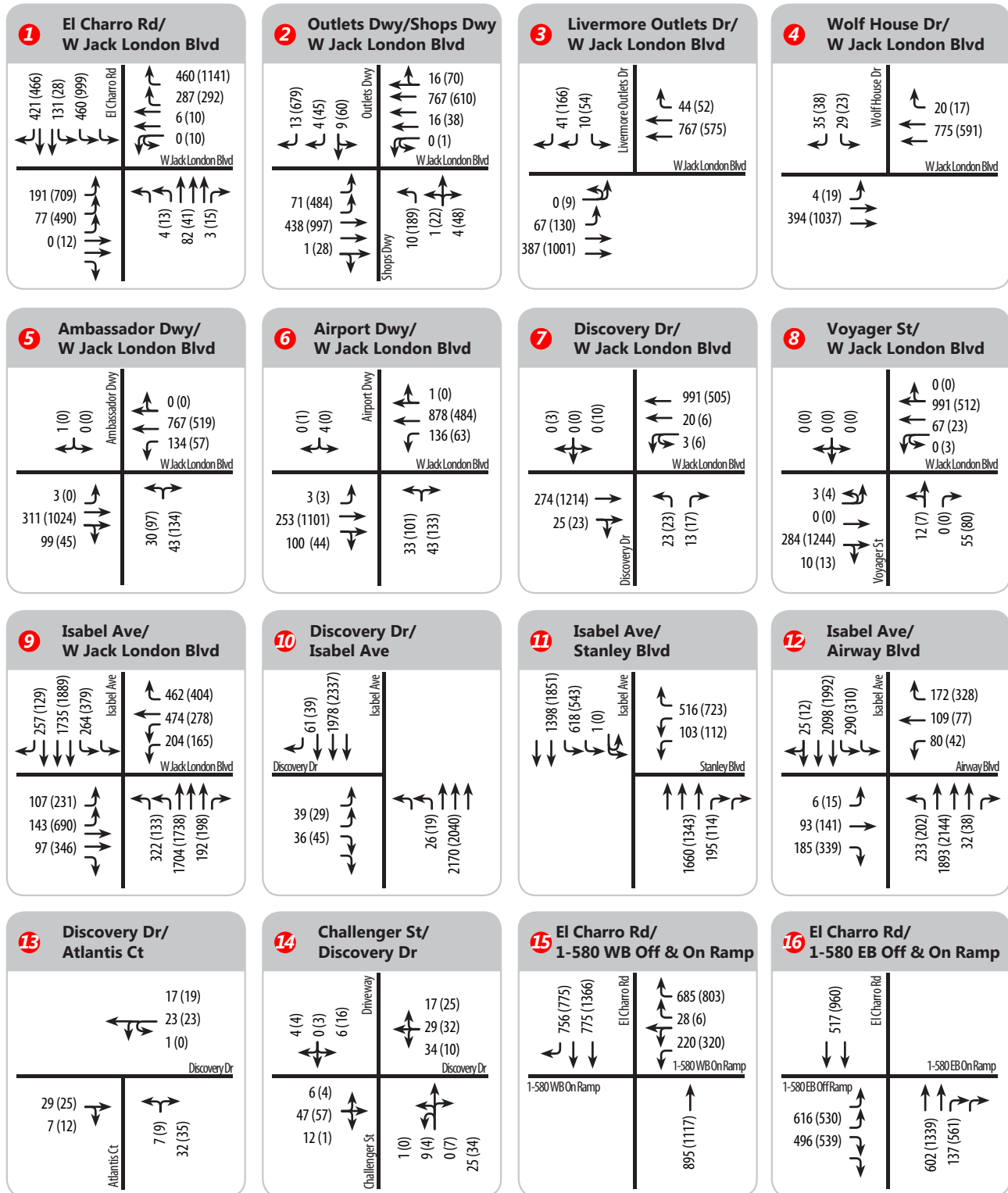
#	Intersection	Lane Group	Storage Length	Cumulative Conditions		Cumulative plus SMP 39		Cumulative plus SMP 40		Cumulative plus SMP 39 & 40	
				AM	PM	AM	PM	AM	PM	AM	PM
11	Isabel Ave/Stanley Blvd	WBL	-	75	50	45	50	45	50	45	50
		WBR	-	175	535	275	580	185	540	295	585
		NBR	435	30	15	30	15	30	15	30	15
		SBL	295	170	135	170	150	170	140	175	150
12	Isabel Ave/Airway Blvd	EBL	95	20	35	20	35	20	35	20	35
		EBR	105	80	170	80	170	80	170	80	170
		WBL	130	125	75	125	75	125	75	125	75
		WBR	130	45	120	45	120	45	120	45	120
		NBL	325	460	290	460	390	460	390	460	390
		NBR	325	0	0	0	0	0	0	0	0
15	El Charro Rd/I-580 WB Ramps	SBL	490	235	255	235	255	235	255	235	255
		WBL	135	100	145	100	145	100	145	100	145
		WBR	115	190	245	190	250	190	245	190	250
		SBR	190	40	35	40	35	40	35	40	35
16	El Charro Rd/I-580 EB Ramps	EBL	270	70	145	65	150	70	145	80	150
		EBR	290	15	115	20	145	15	115	25	145
		NBR	-	10	15	15	20	10	15	10	20

Notes:

Queue lengths shown in feet per lane.

Bold indicates 95th percentile queue length exceeds available storage length.

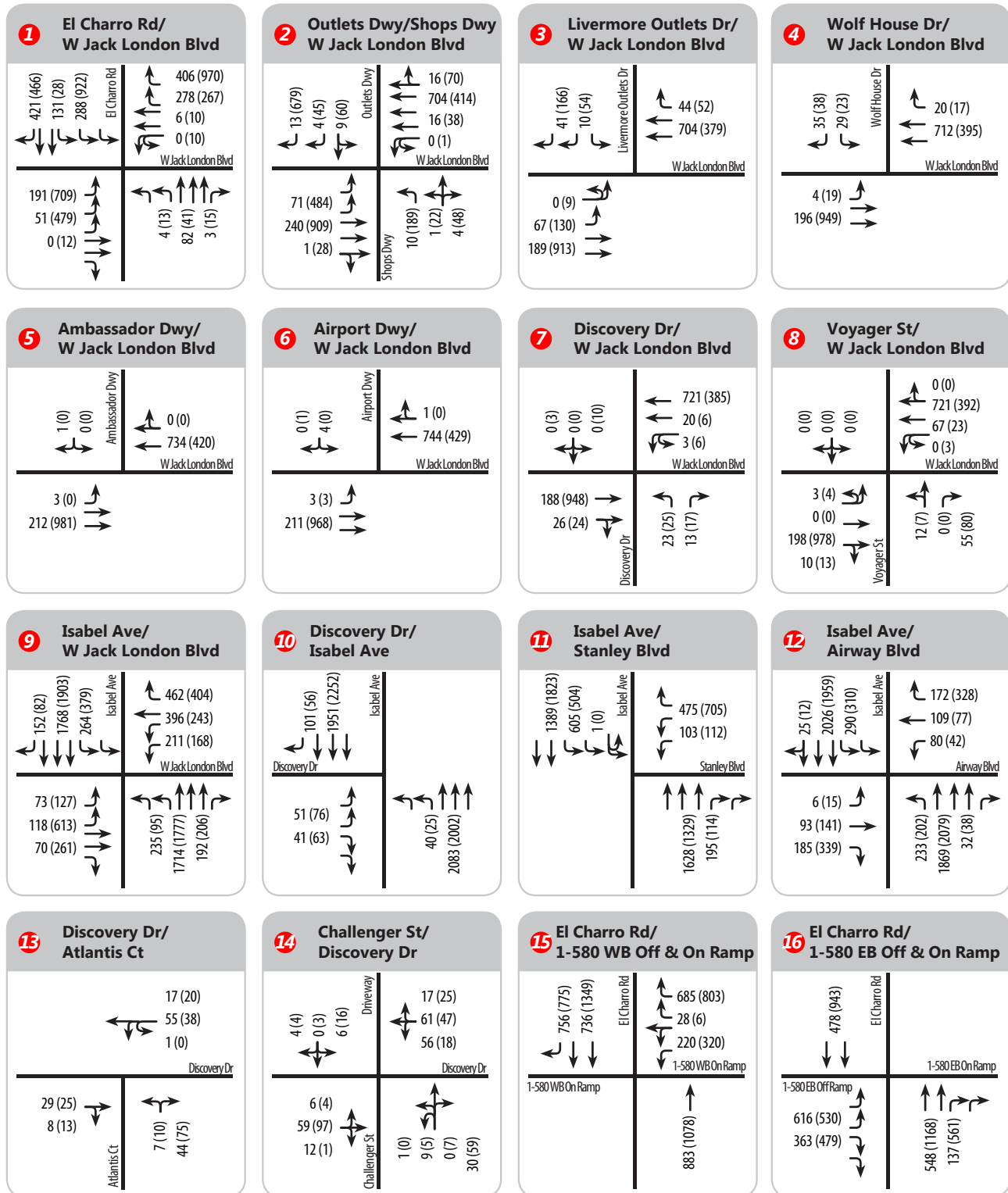
Figure 16: Cumulative plus SMP 39 Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

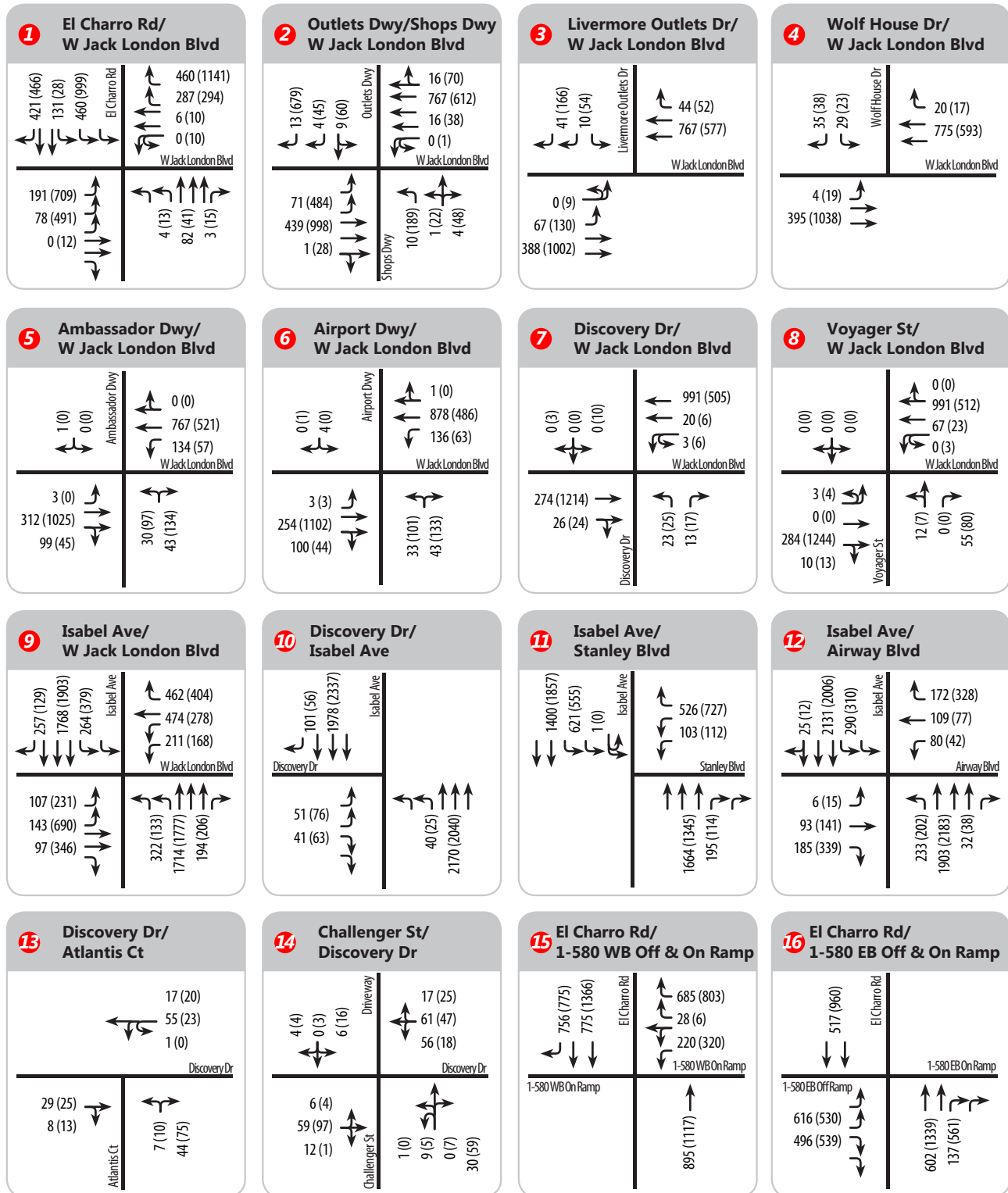
Figure 17: Cumulative plus SMP 40 Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ✘ Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

Figure 18: Cumulative plus SMP 39 & 40 Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes

8.3 CUMULATIVE PLUS PROJECT(S) IMPROVEMENTS

This section summarizes improvements proposed due to the project impacts at the study intersections under Cumulative plus Project(s) Conditions. It should be noted that improvements at study intersections which don't include project driveways would likely be part of a Transportation Impact Fee in which the proposed project will provide a fair share towards the improvements. **Appendix I** contains a summary of recommended improvement measures under Cumulative plus Project(s) Conditions. **Appendix H** contains the California MUTCD peak hour signal warrants for the West Jack London Boulevard/Ambassador Driveway (Intersection #5) and West Jack London Boulevard/Airport Driveway (Intersection #6) intersections.

Cumulative plus SMP 39 Improvements

Table 16 summarizes intersection operations at intersections where improvements are recommended. TJKM observed substantial impacts due to the proposed SMP 39 project at the following intersections:

- W. Jack London Boulevard/Airport Driveway (Intersection #6) – Substantial impacts observed during both a.m. and p.m. peaks. By adding a westbound left turn pocket and signaling the intersection, the intersection operates at acceptable LOS B or better during both peak hours. Based on California MUTCD guidelines, the intersection meets the peak hour signal warrant under Cumulative Conditions.
- W. Jack London Boulevard/Isabel Avenue (Intersection #9) – Substantial impacts observed during the a.m. peak hour. Improving the signal timing to a cycle length of 165 seconds improves intersection operations, however unacceptable level of service remains. Compared to Cumulative Conditions, the delays after improvements would be slightly higher (by approximately 1.9 seconds) during the a.m. peak hour and slightly lower (by approximately 0.7 seconds).
- Isabel Avenue/Stanley Boulevard (Intersection #11) – Substantial impacts observed during the p.m. peak hour. By adding a westbound right turn pocket and improving signal timing to a cycle length of 80 seconds, the intersection operates at LOS C and D during the a.m. and p.m. peak hours, respectively. Although unacceptable operations remain after improvements, the delays are lower than the delays under Cumulative Conditions.
- Isabel Avenue/Airway Boulevard (Intersection #12) – Substantial impacts observed during both peak hours. Improving signal timing to a cycle length of 180 seconds results in the intersection operating at LOS D and E during the a.m. and p.m. peak hours, respectively. Although unacceptable operations remain after improvements, the delays are lower than the delays under Cumulative Conditions.
- El Charro Road/I-580 Westbound Ramps (Intersection #15) – Substantial impact observed during the p.m. peak hour. Improving signal timing to a cycle length of 110 seconds results in the intersection operating at LOS C or better during both peak hours.

Table 16: Intersection Level of Service Analysis – Cumulative plus SMP 39 Improvements

#	Study Intersections	Control	Peak Hour ¹	Cumulative Conditions		Cumulative plus SMP 39		Improvements	
				Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
6	W Jack London Blvd/Airport Dwy	One-Way Stop	AM	22.2	C	>50	F	10.5	B
			PM	9.7	A	>50	F	16.9	B
9	W Jack London Blvd/Isabel Ave	Signal	AM	63.6	E	73.5	E	65.5	E
			PM	64.4	E	67.5	E	63.7	E
11	Isabel Ave/Stanley Blvd	Signal	AM	37.9	D	46.7	D	24.3	C
			PM	72.1	E	79.7	E	38.9	D
12	Isabel Ave/Airway Blvd	Signal	AM	>80	F	>80	F	52.1	D
			PM	>80	F	>80	F	68.3	E
15	El Charro Rd/I-580 WB Ramps	Signal	AM	21.8	C	22.7	C	12.3	B
			PM	51.8	D	58.6	E	34.4	C

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.**Cumulative plus SMP 40 Improvements****Table 17** summarizes intersection operations at intersections where improvements are recommended.

TJKM observed substantial impacts due to the proposed SMP 40 project at the following intersections:

- Isabel Avenue/Airway Boulevard (Intersection #12) – Substantial impact observed during p.m. peak hour. Improving signal timing to a cycle length of 180 seconds results in the intersection operating at LOS D and E during the a.m. and p.m. peak hours, respectively. Although unacceptable operations remain after improvements, the delays are lower than the delays under Cumulative Conditions.

Table 17: Intersection Level of Service Analysis – Cumulative plus SMP 40 Improvements

#	Study Intersections	Control	Peak Hour ¹	Cumulative Conditions		Cumulative plus SMP 40		Improvements	
				Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
12	Isabel Ave/Airway Blvd	Signal	AM	>80	F	>80	F	45.5	D
			PM	>80	F	>80	F	58.3	E

Notes:

1. AM – morning peak hour, PM – evening peak hour

2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.**Cumulative plus SMP 39 & 40 Improvements****Table 18** summarizes intersection operations at intersections where improvements are recommended.

TJKM observed substantial impacts due to both proposed projects at the following intersections:

- W. Jack London Boulevard/Ambassador Driveway (Intersection #5) – Substantial impacts observed during the p.m. peak hour. By adding a westbound left turn pocket and signaling the intersection, the intersection operates at acceptable LOS B during both peak hours. Based on California MUTCD guidelines, the intersection meets the peak hour signal warrant under Background Conditions.
- W. Jack London Boulevard/Airport Driveway (Intersection #6) – Substantial impacts observed during both a.m. and p.m. peaks. By adding a westbound left turn pocket and signaling the intersection, the intersection operates at acceptable LOS B during both peak hours. Based on California MUTCD guidelines, the intersection meets the peak hour signal warrant under Background Conditions.
- W. Jack London Boulevard/Isabel Avenue (Intersection #9) – Substantial impact observed during the a.m. peak hour. Increasing the cycle length to 180 seconds improves intersection operations to within jurisdictional standards (i.e., within 5.0 seconds), however unacceptable level of services remain.
- Isabel Avenue/Stanley Boulevard (Intersection #11) – Substantial impact observed during the a.m. and p.m. peak hours. By adding a westbound right turn pocket and improving signal timing to a cycle length of 80 seconds, the intersection operates at acceptable LOS C during both peak hours.
- Isabel Avenue/Airway Boulevard (Intersection #12) – Substantial impact observed during the p.m. peak hour. Improving signal timing to a cycle length of 180 seconds results in the intersection operating at LOS D and E during the a.m. and p.m. peak hours, respectively. Although unacceptable operations remain after improvements, the LOS and delays improve as compared to Cumulative Conditions.
- El Charro Road/I-580 Westbound Ramps (Intersection #15) – Substantial impact observed during the p.m. peak hour. Improving signal timing to a cycle length of 110 seconds results in the intersection operating at LOS C or better during both peak hours.

Table 18: Intersection Level of Service Analysis – Cumulative plus SMP 39 & 40 Improvements

#	Study Intersections	Control	Peak Hour ¹	Cumulative Conditions		Cumulative plus SMP 39 & 40		Improvements	
				Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
5	W Jack London Blvd/Ambassador Dwy	One-Way	AM	14.2	B	25.7	D	10.3	B
		Stop	PM	0.0	A	>50	F	16.6	B
6	W Jack London Blvd/Airport Dwy	One-Way	AM	22.2	C	>50	F	10.4	B
		Stop	PM	9.7	A	>50	F	18.9	B
9	W Jack London Blvd/Isabel Ave	Signal	AM	63.6	E	75.9	E	66.7	E
			PM	64.4	E	68.0	E	64.7	E
11	Isabel Ave/Stanley Blvd	Signal	AM	37.9	D	48.6	D	27.3	C
			PM	72.1	E	> 80	F	34.3	C
12	Isabel Ave/Airway Blvd	Signal	AM	> 80	F	> 80	F	49.1	D
			PM	> 80	F	> 80	F	63.5	E
15	El Charro Rd/I-580 WB Ramps	Signal	AM	21.8	C	22.7	C	16.7	B
			PM	51.8	D	58.1	E	33.6	C

Notes:

1. AM – morning peak hour, PM – evening peak hour
2. Delay – Whole intersection weighted average control delay expressed in seconds per vehicle for signalized and all-way stop controlled intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
3. LOS – Level of Service. **Bold** indicates unacceptable LOS and Delay.

It should be noted that as a result of applying the measures summarized in **Tables 16, 17 and 18**, all impacts have been reduced to a level that meets acceptable City of Livermore General Plan standards, or improved to levels below or similar to Cumulative Conditions.

9.0 ADDITIONAL ANALYSES

The following sections provide additional analyses of other transportation issues associated with the project site, including:

- Parking Analysis
- Site access and onsite circulation;
- Pedestrian, Bicycle, and Transit Impacts
- Vehicle Miles Travelled Analysis

Unlike the LOS impact methodology, the analyses in these sections is based on professional judgment in accordance with the standards and methods employed by traffic engineers. Although operational issues are not considered CEQA impacts, they do describe traffic conditions that are relevant to the project environment.

9.1 PARKING ANALYSIS

This section discusses vehicle parking for the proposed project and includes an assessment of whether the proposed parking supply is adequate based on the proposed project size and zoning regulations. As shown on the SMP 39 project site plan dated February 1, 2022 (**Figure 2**), the SMP 39 project proposes to provide 1,647 parking stalls. As shown on the SMP 40 project site plan dated June 1, 2023 (**Figure 3**), and the SMP 40 project proposes to provide a total of 797 parking stalls, including 404 standard parking stalls, 115 compact parking stalls, 17 accessible parking stalls, 97 parking stalls for clean air and van pool, and 164 trailer parking stalls. The standard parking stalls would be nine feet by 19 feet for the SMP 39 project, and nine feet by 18 feet for the SMP 40 project. Both projects will provide loading docks on one or more sides of the industrial buildings, which are considered separate from the vehicle parking. The project proposes to provide bicycle parking via indoor bicycle racks at both SP 39 and SMP 40 project sites. It is acknowledged that both projects will have to meet the EV parking standards as per City's Reach Code at the time of permitting.

For industrial uses, the City of Livermore Development Code requires one automobile parking space per 1,200 square feet of warehouse or manufacturing areas plus one automobile parking space per 300 square feet of associated office or business areas. The proposed SMP 39 project consists of 693,500 square feet of industrial building space and 62,000 square feet of office space for a total of 755,500 square feet. The proposed SMP 40 project consists of 736,273 square feet of warehouse space and 23,000 square feet of office building space for a total of 759,273 square feet. Based on the City's requirements for industrial uses, 785 parking spaces are required for the SMP 39 project, and 691 parking spaces are required for the SMP 40 project. The number of proposed automobile parking spaces is **adequate** for both SMP 39 and SMP 40 projects.

Additionally, under the City's parking requirements a development must provide bicycle parking spaces equal to 10 percent of the total required off-street parking, up to a maximum of 30 bicycle stalls. Thus, the SMP 39 and SMP 40 projects require 30 bicycle parking stalls each, for a total of 60 bicycle parking stalls

for both projects. Assuming each project will provide 30 bicycle parking spaces, the number of proposed bicycle parking spaces is **adequate** for both SMP 39 and SMP 40 projects.

9.2 SITE ACCESS AND ON-SITE CIRCULATION

Site Access

The proposed vehicular access to the SMP 39 project site will be via three driveways on West Jack London Boulevard. Two driveways are full-access, and one is right-in and right-out only. All three driveways are located on the south side of West Jack London Boulevard. Sight distance for vehicles exiting the driveways appears to be adequate. Pedestrians and bicyclists can use the existing sidewalks and bike lanes on West Jack London Boulevard to access the project site. The two full-access project driveways will need to be signalized to maintain acceptable intersection operations.

The proposed vehicular access to the SMP 40 project site will be via two driveways on Atlantis Court and Challenger Street. Both driveways are full-access and are located on existing roadways south of Discovery Drive. Sight distance for vehicles exiting the driveways appears to be adequate. Pedestrians can use the existing sidewalks on Atlantis Court and Challenger Street to access the project site. There are no bicycle facilities on Atlantis Court and Challenger Street to access the project site.

On-Site Circulation

In terms of external access, the project plans show the project driveways are located on the existing roadways of West Jack London Boulevard, Atlantis Court and Challenger Street. All driveways appear to accommodate two-way travel. The circulation aisles appear to provide enough space for two-way circulation and truck circulation. In addition, both site plans allow for adequate access and circulation of emergency vehicles.

9.3 PEDESTRIAN, BICYCLE, AND TRANSIT IMPACTS

Pedestrian Access

Pedestrian access to the SMP 39 project site will be facilitated by an existing Class I pathway along the south side of West Jack London Boulevard. There is adequate existing street lighting along W. Jack London Boulevard. Pedestrian access to the SMP 40 project site will be facilitated by existing sidewalks along the west side of Atlantis Court and the east side of Challenger Street. There is adequate existing street lighting along both Atlantis Court and Challenger Street.

The proposed projects do not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is **less than significant**.

Bicycle Access

Bicycle access to the SMP 39 project site will be facilitated by an existing Class I pathway on the south side of West Jack London Boulevard. Due to the location of the site, the proposed vehicular driveways would need to cross the Class 1 pathway in order to access the road network. In order to minimize conflicts, it is recommended that the Class I pathway be treated in a similar fashion as has been done farther east, bordering the Oaks Business Park and Prologis sites (such as installing bike lane striping and crosswalks at intersections and stop signs at all driveway exits to West Jack London Boulevard). This configuration of the

driveway and the Class 1 pathway will be further refined in the design plans for the SMP 39 project, to be submitted to the City at a later date.

There are currently no bicycle facilities along Atlantis Court and Challenger Street to facilitate bicycle access to the SMP 40 project site.

The impact to bicycle facilities are expected to be **less than significant** after accounting for appropriate driveway design considerations for the SMP 39 project.

Transit Access

The SMP 39 project site is located within walking distance of two Tri-Valley Wheels bus stops on West Jack London Boulevard, east of Discovery Drive. The SMP 40 project site is located approximately one mile walking distance from the two Tri-Valley Wheels bus stops on West Jack London Boulevard, east of Discovery Drive. The existing pedestrian facilities in the project vicinity provide adequate connectivity for pedestrians to the transit stops. Impacts to transit service are expected to be **less than significant**.

9.4 VEHICLE MILES TRAVELLED ANALYSIS

This section evaluates project-related VMT as outlined in the Office of Planning and Research (OPR) guidelines regarding SB 743. These guidelines direct analysts and local jurisdictions in implementing VMT as a metric for determining the transportation impact for land use projects. The OPR guidelines state that for analysis purposes, "VMT" refers to automobile VMT, specifically passenger vehicles and light trucks. Heavy truck traffic is typically excluded.

As of January 2023, the City of Livermore has not adopted VMT procedures standards. In consultation with City of Livermore staff, the Alameda County Transportation Commission (ACTC) Travel Demand Model was used for this VMT assessment using the City's thresholds for office projects. Though the project is industrial in nature, neither the OPR nor ACTC include guidelines that apply specifically to industrial projects.

The ACTC guidelines include a screening process that describes five scenarios in which a project would be exempted from a VMT analysis requirement: 1) projects exempt from CEQA analysis, 2) small projects, 3) local serving projects, 4) projects in transit priority areas, and 5) projects in low VMT areas. It should be noted that even if a project satisfies one or more of the screening criteria, lead agencies may still require a VMT analysis if there is evidence that the project has characteristics that might lead to a significant amount of VMT. The project does not satisfy the requirements for screening criteria 1-4.

Under the ACTC VMT methodology, a low VMT area is defined as a city or unincorporated portion within one of the ACTC subregions where home-based VMT per resident is at least 15 percent below the countywide or where the commute VMT per employee is at least 15 percent below the regional average. A conservative reading of the methodology would indicate that when the citywide average VMT per resident is above the countywide average, projects cannot be screened out based on location, and a VMT analysis must be completed. In such cases, the appropriate significance thresholds based on countywide or regional average would be applied. The methodology also permits the applicable average VMT for the subject municipality or unincorporated ACTC subregion to be utilized instead of the countywide or regional average, if it is less stringent.

Under ACTC guidelines, a project would have a significant impact on VMT if it would generate employee VMT per capita higher than 85 percent of the Alameda County average. However, as several other local agencies in the San Francisco Bay Area, considering the characteristics of industrial projects which tend to generate higher VMT than typical office projects, the City of Livermore recommended using the City average without a 15 percent reduction as the significance criteria for the proposed project. Thus, if the proposed project would result in VMT per employee in excess of the City average of 16.20, a significant impact would occur.

9.4.1. Screening Criteria and Methodology

ACTC guidance (OPR Technical Memo, December 2018) on VMT analysis for office projects require a base year condition model run along with baseline plus project model run to extract VMT data for the TAZ that the project is located in. The project is located in two different TAZs in the ACTC model (TAZs #1201 and #1202); land uses stemming from this project were added to the land use input file and the base year ACTC model was ran to generate VMT metrics for this project.

9.4.2. VMT Forecasting and Analysis

The project consists of office and warehouse developments. Based on parking spaces provided in the project’s site plans, SMP 39 is located in TAZ #1201 and will add 207 office employees and 579 warehouse employees. SMP 40 is located in TAZ #1202 and will add 78 office employees and 614 warehouse employees. **Table 19** shows the land use changes for the base year plus project run.

Table 19: Land Use Changes for Base Year

TAZ	Office Employee	Warehouse Employee	Total Employees
#1201	+207	+579	+786
#1202	+78	+614	+692

A total of 1,478 employees were added to the ACTC model for the SMP 39 and 40 project. A base year plus project model run was conducted with the land use changes added. The ACTC model results are summarized in **Table 20**.

Table 20: Home Based VMT Per Employee Comparison (Alameda County Average)

TAZ	Base Year Average Daily VMT per Employee (per ACTC Model)	Livermore Average (per ACTC Model)	15% Below Livermore Average (per ACTC Model)	Base Year Plus Project Average Daily VMT per Resident (per ACTC Model run)
#1201	17.97	16.20	13.77	17.01
#1202	0*	16.20	13.77	16.45

*No employees currently coded in TAZ #1202 for the base year no project condition

The existing base year daily VMT per employee for TAZ #1201 is 17.97, while TAZ #1202 has 0 VMT per employee since there are no employee generating land uses there for the no project condition. Coding the project into the TAZs results in a VMT per employee of 17.01 for TAZ #1201 and 16.45 for TAZ #1202. For the SMP 39 and 40 projects, the average of the two TAZs VMT per employee results in a value of **16.73**, which is higher than the significance threshold of **16.20**. In order for the VMT impacts to be insignificant, a mitigation of **3 percent** is required.

Table 21 shows the ACTC model outputs regarding the SMP 39 and SMP 40 project.

Table 21: ACTC Model Outputs for the SMP 39 and SMP 40 Project

TAZ	Total Employees	VMT Attraction Total	VMT per Employee
#1201 - No Project	1,200	21,569	17.97
#1201 - With Project	1,986	33,791	17.01
#1202 - No Project	0	0	0
#1202 - With Project	692	11,401	16.45

TJKM ran the ACTC VMT mitigation tool for this project. One measure was considered; an employer carpool program.

The employer carpool program will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions. This mitigation measure will reduce the VMT per employee metric for this project by **4 percent**.

By applying the employer carpool program mitigation measure, the VMT/Employee value is reduced to **16.06**, which is under the significance criteria of **16.20**. Therefore, with mitigation, VMT impacts for the SMT 39 and 40 project are found to **be less than significant** in the base year condition.

Table 22 shows the ACTC VMT Mitigation Tool outputs for this project.

Table 22: ACTC VMT Mitigation Tool Outputs for the SMP 39 and SMP 40 Project

TDM Strategy Results				
TDM ID	Strategy Name	Strategy Type	VMT Type	Change in VMT
1A	Voluntary Employer Commute Program	Project/Site	Employee commute trips	
1B	Mandatory Employer Commute Program	Project/Site	Employee commute trips	
1C	Employer Carpool Program	Project/Site	Employee commute trips	-4.0%
1D1	Implement Subsidized or Discounted Transit Program (for Employees)	Project/Site	Employee commute trips	
1D2	Implement Subsidized or Discounted Transit Program (for Residents)	Project/Site	Project-generated trips	
1E	Employer Vanpool Program	Project/Site	Employee commute trips	
1F	Employer Telework Program	Project/Site	Employee commute trips	
2A	Transit Oriented Development	Project/Site	Project-generated trips	
2B1	Increase Residential Density	Project/Site	Project-generated trips	
2B2	Increase Employment Density	Project/Site	Employee commute trips	
2C	Integrate Affordable and Below Market Rate Housing	Neighborhood/City	All neighborhood/city trips	
3A1	Price Workplace Parking	Project/Site	Employee commute trips	
3A2	Unbundle Parking Costs from Property Cost	Project/Site	Project-generated trips	
3B	Parking Cash Out	Project/Site	Employee commute trips	
3C	Limit Parking Supply	Project/Site	Project-generated trips	
3D	Provide Bike Parking	Project/Site	Project-generated trips	
4A	Street Connectivity Improvement	Neighborhood/City	All neighborhood/city trips	
4B	Pedestrian Facility Improvement	Neighborhood/City	All neighborhood/city trips	
4C	Bikeway Network Expansion	Neighborhood/City	All neighborhood/city trips	
4D	Bike Facility Improvement	Neighborhood/City	Trips on roadway with bikeway addition	
4E	Bikeshare	Neighborhood/City	All neighborhood/city trips	
4F	Carshare	Neighborhood/City	All neighborhood/city trips	
4G	Community-Based Travel Planning	Neighborhood/City	All neighborhood/city trips	
4H	Provide Neighborhood Traffic Calming Measures	Neighborhood/City	All neighborhood/city trips	
5A	Transit Service Expansion	Neighborhood/City	All neighborhood/city trips	
5B	Transit Frequency Improvements	Neighborhood/City	All neighborhood/city trips	
5C	Transit-Supportive Treatments	Neighborhood/City	All neighborhood/city trips	
5D	Transit Fare Reduction	Neighborhood/City	All neighborhood/city trips	
5E	Microtransit NEV Shuttle	Neighborhood/City	All neighborhood/city trips	
Employee Commute Trips - Total Change in VMT				-4.0%
Project-Generated Trips - Total Change in VMT				0.0%
All Neighborhood/City Trips - Total Change in VMT				0.0%
Trips on Roadway Affected by Bikeway Addition - Total Change in VMT				0.0%

10.0 CONCLUSIONS AND RECOMMENDATIONS

Project Trip Generation

The proposed SMP 39 project is expected to generate 3,596 daily trips, including 515 a.m. peak hour trips (391 inbound trips, 124 outbound trips) and 560 p.m. peak hour trips (174 inbound trips, 386 outbound trips). The proposed SMP 40 project is expected to generate 1,062 daily trips, including 61 a.m. peak hour trips (47 inbound trips, 14 outbound trips) and 76 p.m. peak hour trips (21 inbound trips, 55 outbound trips).

Existing Conditions

Under this scenario, all of the study intersections operate within applicable jurisdictional Level of Service (LOS) standards during the a.m. and p.m. peak hour.

Background Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards during the a.m. and p.m. peak hours.

Background plus SMP 39 Conditions

Under this scenario, substantial project impacts were observed at two study intersections. Impacts are reduced to acceptable levels with improvements.

Background plus SMP 40 Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards during the a.m. and p.m. peak hours.

Background plus SMP 39 & 40 Conditions

Under this scenario, substantial project impacts were observed at two study intersections. Impacts are reduced to acceptable levels with improvements.

Cumulative Conditions

Under this scenario, all of the study intersections continue to operate within applicable jurisdictional LOS standards during the a.m. and p.m. peak hours, except for four intersections along West Jack London Boulevard, Isabel Avenue, and El Charro Road.

Cumulative plus SMP 39 Conditions

Under this scenario, substantial project impacts were observed at five study intersections. With improvements, impacts are reduced to acceptable levels, or to levels lower than or similar to observed under Cumulative Conditions.

Cumulative plus SMP 40 Conditions

Under this scenario, substantial project impacts were observed at one study intersection. With improvements, impacts are reduced to levels lower than observed under Cumulative Conditions.

Cumulative plus SMP 39 & 40 Conditions

Under this scenario, substantial project impacts were observed at six study intersections. With improvements, impacts are reduced to acceptable levels, or to levels lower than or similar to observed under Cumulative Conditions.

Parking

The SMP 39 project proposes to provide 1,647 parking stalls and the SMP 40 project proposes to provide a total of 797 parking stalls. The number of proposed automobile parking spaces are **adequate** for both SMP 39 and SMP 40 projects. The SMP 39 and SMP 40 projects require 30 bicycle parking spaces each.

Site Access and On-Site Circulation

The proposed vehicular access to the SMP 39 project site will be via three driveways on West Jack London Boulevard. Two driveways are full-access, and one is right-in and right-out only. All three driveways are located on the south side of West Jack London Boulevard. The proposed vehicular access to the SMP 40 project site will be via two driveways on Atlantis Court and Challenger Street. Both driveways are full-access and are located on existing roadways south of Discovery Drive. Pedestrians and bicyclists can use the existing multimodal network to access the project site. The parking aisles are wide enough to allow for two-way circulation. Based on a preliminary review of the project site plan, the site access and on-site circulation is considered adequate. The site plans allow for adequate access and circulation of emergency vehicles.

Pedestrian Impacts

The project does not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is **less than significant**.

Bicycle Impacts

The impact to bicycle facilities are expected to be **less than significant** after accounting for appropriate driveway design considerations for the SMP 39 project.

Transit Impacts

The project site is within walking distance to two Tri-Valley Wheels bus stops that provide local and regional access. Impacts to transit service are expected to be **less than significant**.

Vehicle Miles Travelled Analysis

TJKM recommends the SMP 39 and SMP 40 project to provide one mitigation measure: an employer carpool program. With this mitigation measure, both SMP 39 and SMP 40 VMT are found to have **less than significant** impacts for the base year condition.

Appendix A – Level of Service Methodology

Traffic impacts related to the proposed project were evaluated for both compliance with applicable regulatory documents and environmental significance as defined in the California Environmental Quality Act (CEQA). In CEQA published by the Governor's Office of Planning and Research (OPR), the July 1, 2020 Technical Memorandum prepared by Fehr & Peers describing the VMT methodology adopted by the County of San Mateo Department of Public Works in September 23, 2020. As of July 1, 2020, intersection level of service (LOS) can no longer be used to determine significant CEQA impacts.

2.1 LEVEL OF SERVICE ANALYSIS METHODOLOGY

Level of Service (LOS) is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. LOS generally describes these conditions in terms of speed and travel time, delays, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. The operational LOS are given letter designations from A to F, with A representing the best operating conditions (free-flow with little or no delay) and F representing the worst conditions (severely congested flow with high delays). Intersections are generally the capacity-controlling locations, with respect to traffic operations, on arterial and collector streets.

Signalized Intersections

The study intersections under traffic signal control were analyzed using Highway Capacity Manual 6th Edition (HCM 6) Operations Methodology for Signalized Intersections (Transportation Research Board, 2016), as described in Chapter 19. This methodology determines LOS based on overall average control delay per vehicle for the intersection during peak hour operating conditions. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections was calculated using Synchro 10 software and correlated to a LOS designation. **Table 1** presents the HCM 6 delay and LOS definitions.

Unsignalized Intersections

Stop-control study intersections were analyzed using HCM 6 Operations Methodology for Unsignalized Intersections, as described in Chapters 20 and 21. LOS ratings for stop-control intersections are based on average control delay expressed in seconds per vehicle. At the side street of one-way stop-controlled intersections or two-way stop sign intersections, the control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. The weighted average delay for the entire intersections is presented for all-way stop-controlled (AWSC) intersections, while the worst-movement delay is presented for side-street stop-controlled intersections. The average control delay for unsignalized intersections was calculated using Synchro 10 software and correlated to a LOS designation. At an unsignalized intersection, most of the major street traffic is not delayed, and by definition has acceptable conditions. The major street left-turn movements and minor street movements are all susceptible to delay of varying degrees. Generally, higher major street traffic volumes are associated with higher delay for minor movements. HCM 6 definitions for delay and LOS at signalized intersections are presented in **Table 1**. The analysis methodology described above was used to measure a.m. and p.m. peak hour traffic operations for all study intersections.

Table 1 describes the LOS thresholds from the HCM 6th edition for intersections. The intersection LOS thresholds differ between signalized and unsignalized intersections.

Table 1: Level of Service Thresholds Based on Intersection Control Delay

Level of Service	Description	Signalized Intersection Delay (D) (sec)	Unsignalized Intersection Delay (D) (sec)
A	Very low control delay, up to 10 seconds per vehicle. Progression is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.	$0 \leq D \leq 10$	$0 \leq D \leq 10$
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.	$10 < D \leq 20$	$10 < D \leq 15$
C	Control delay greater than 20 and up to 35 seconds per vehicle. Fair progression or longer cycle lengths, or both cause higher delays. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve queued vehicles and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	$20 < D \leq 35$	$15 < D \leq 25$
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestions becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	$35 < D \leq 55$	$25 < D \leq 35$
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.	$55 < D \leq 80$	$35 < D \leq 50$
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.	$80 < D$	$50 < D$

Source: HCM 6th Edition

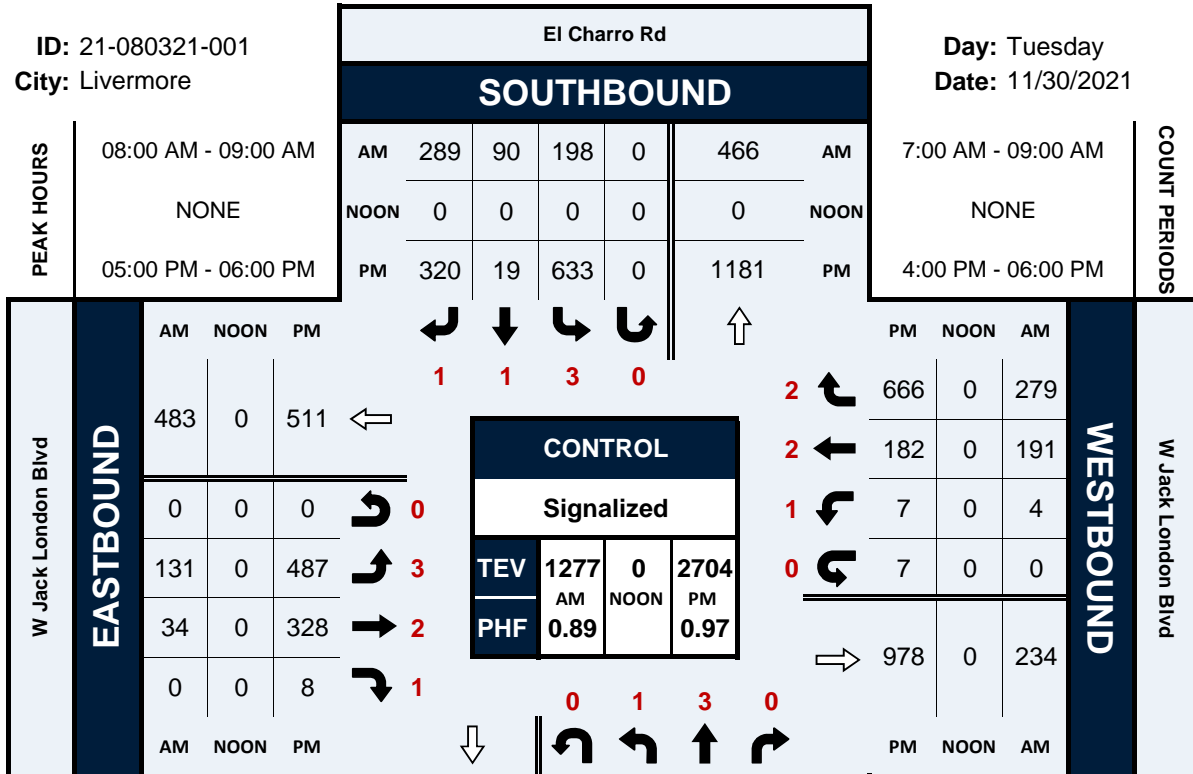
Appendix B – Existing Traffic Counts

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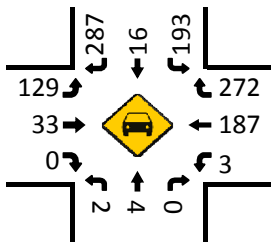
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City: Livermore

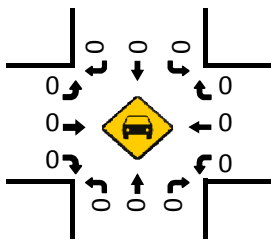
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Date: 11/30/2021



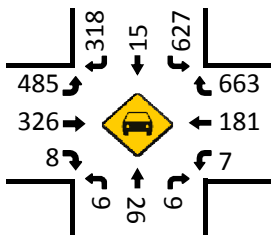
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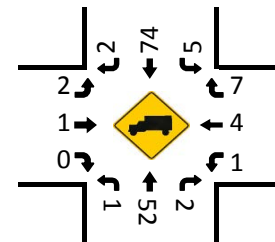
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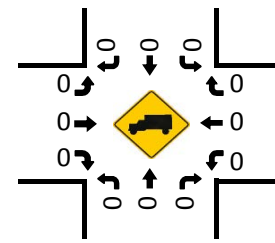
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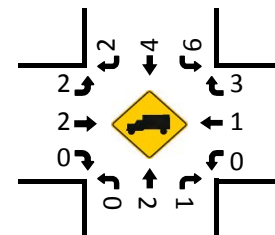
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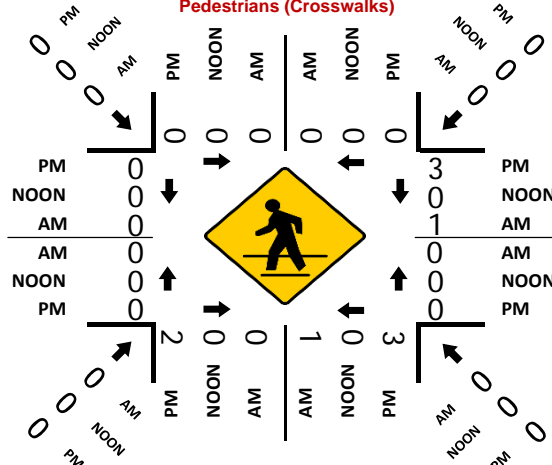
HT (NOON)



HT (PM)



Pedestrians (Crosswalks)

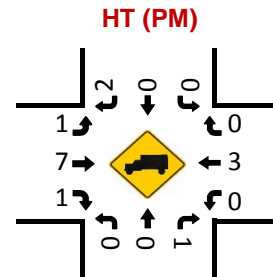
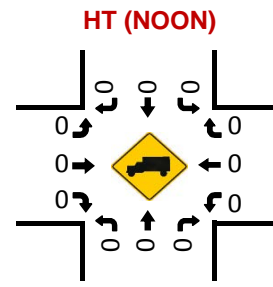
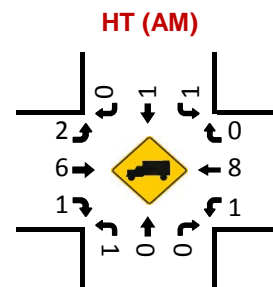
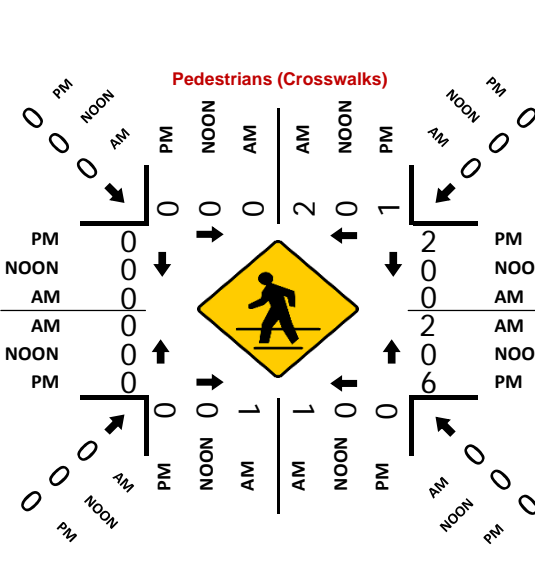
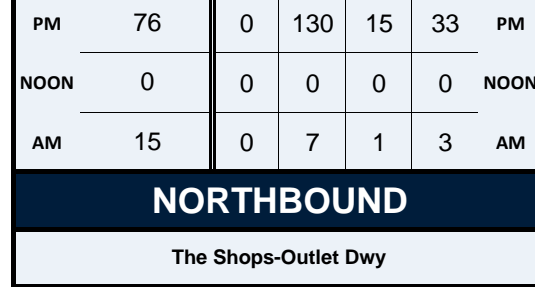
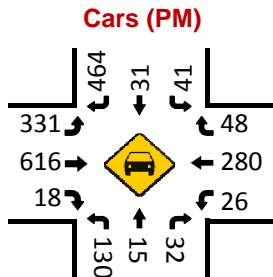
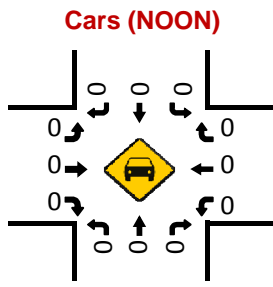
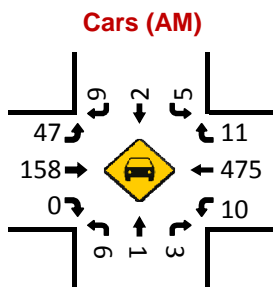
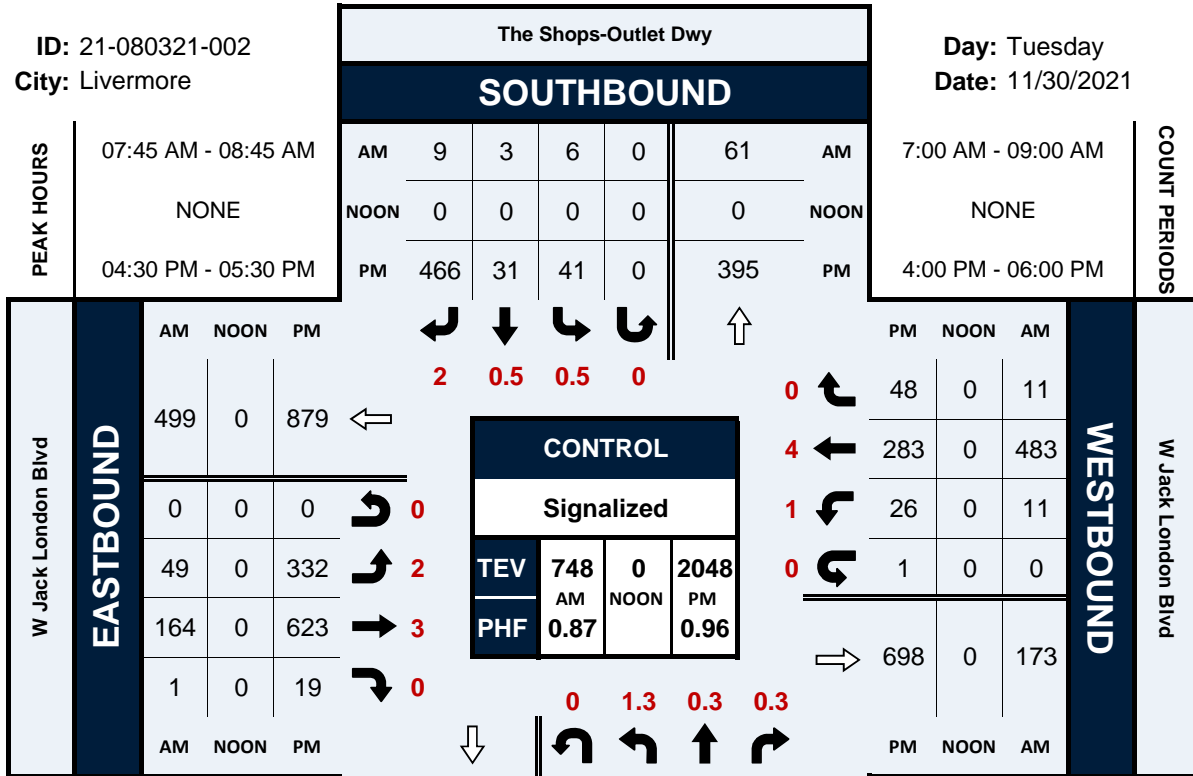


The Shops-Outlet Dwy & W Jack London Blvd

Peak Hour Turning Movement Count

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City: Livermore

Day: Tuesday
Date: 11/30/2021

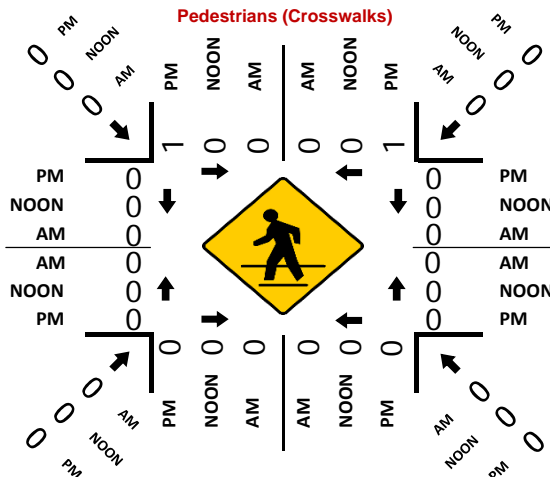
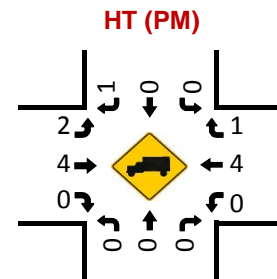
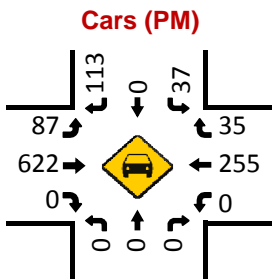
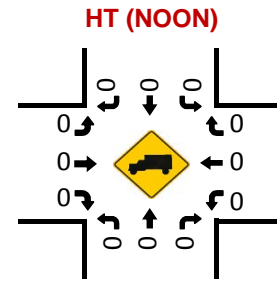
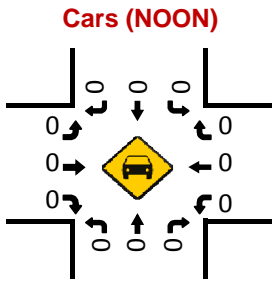
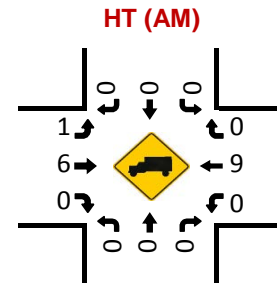
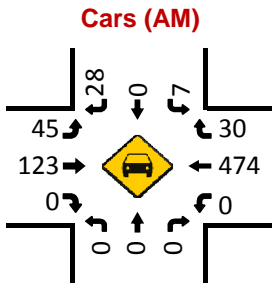
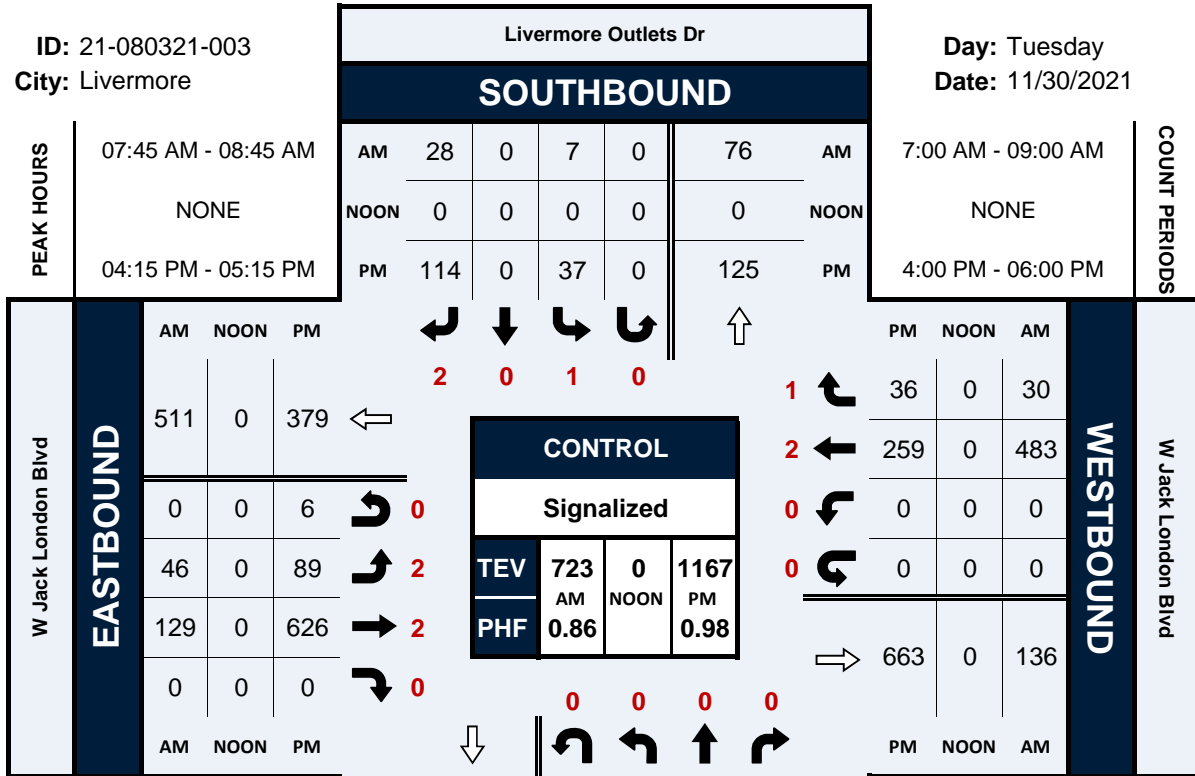


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 City: Livermore

Day: Tuesday
 Date: 11/30/2021

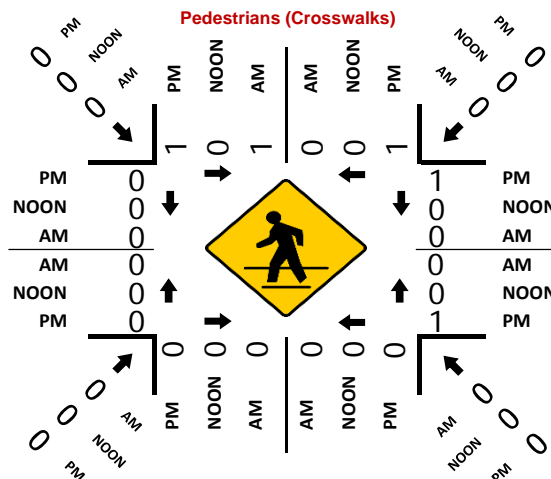
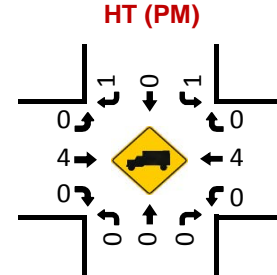
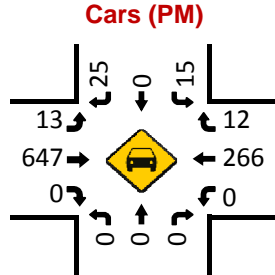
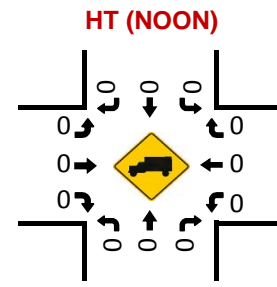
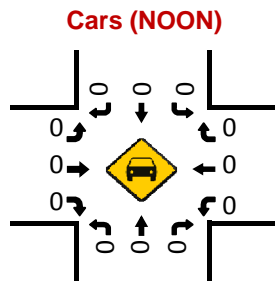
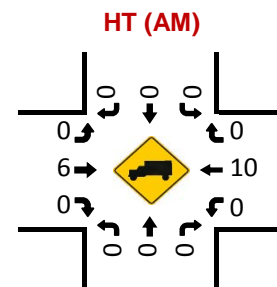
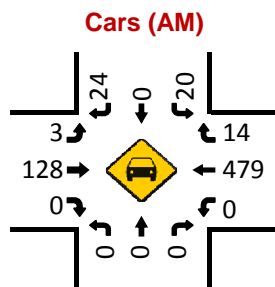
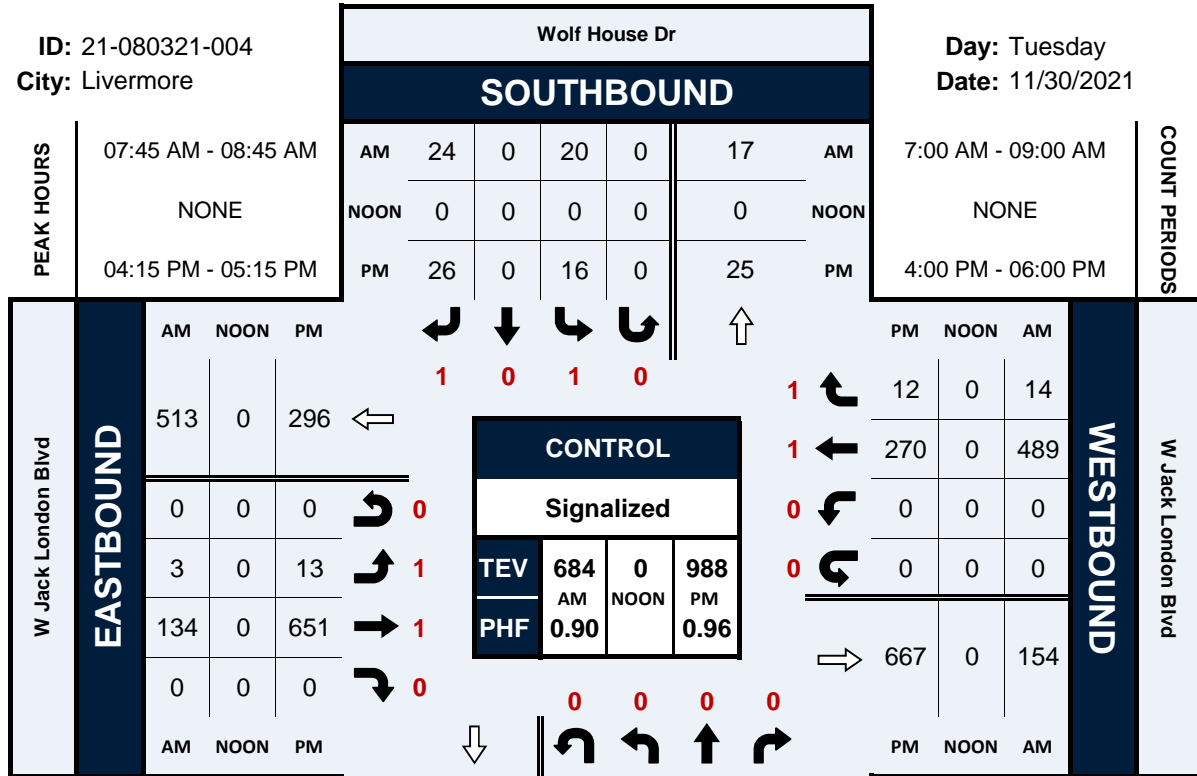


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Peak Hour Turning Movement Count

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City: Livermore

Day: Tuesday
Date: 11/30/2021

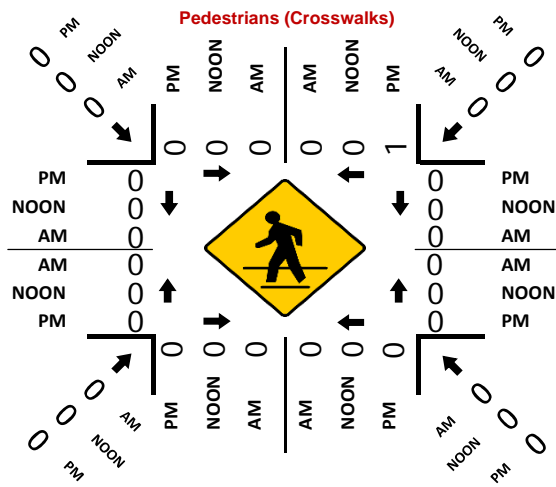
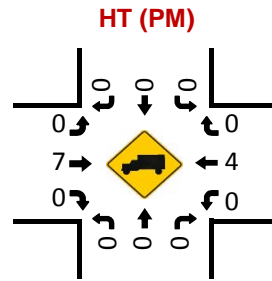
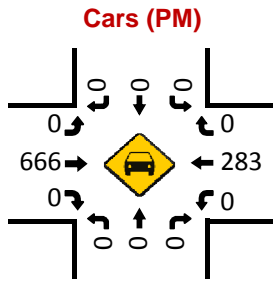
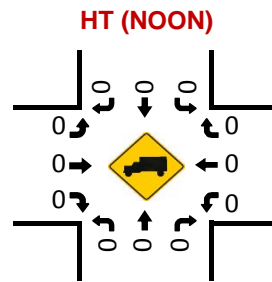
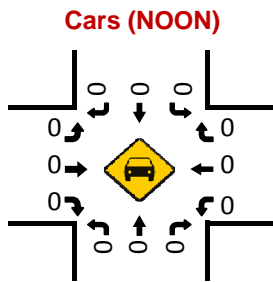
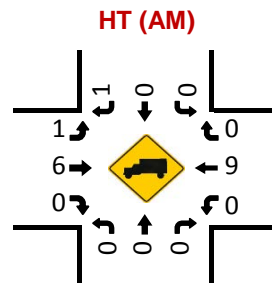
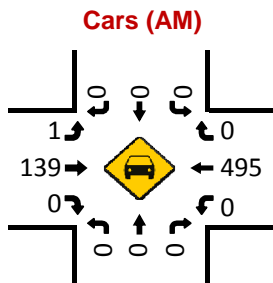
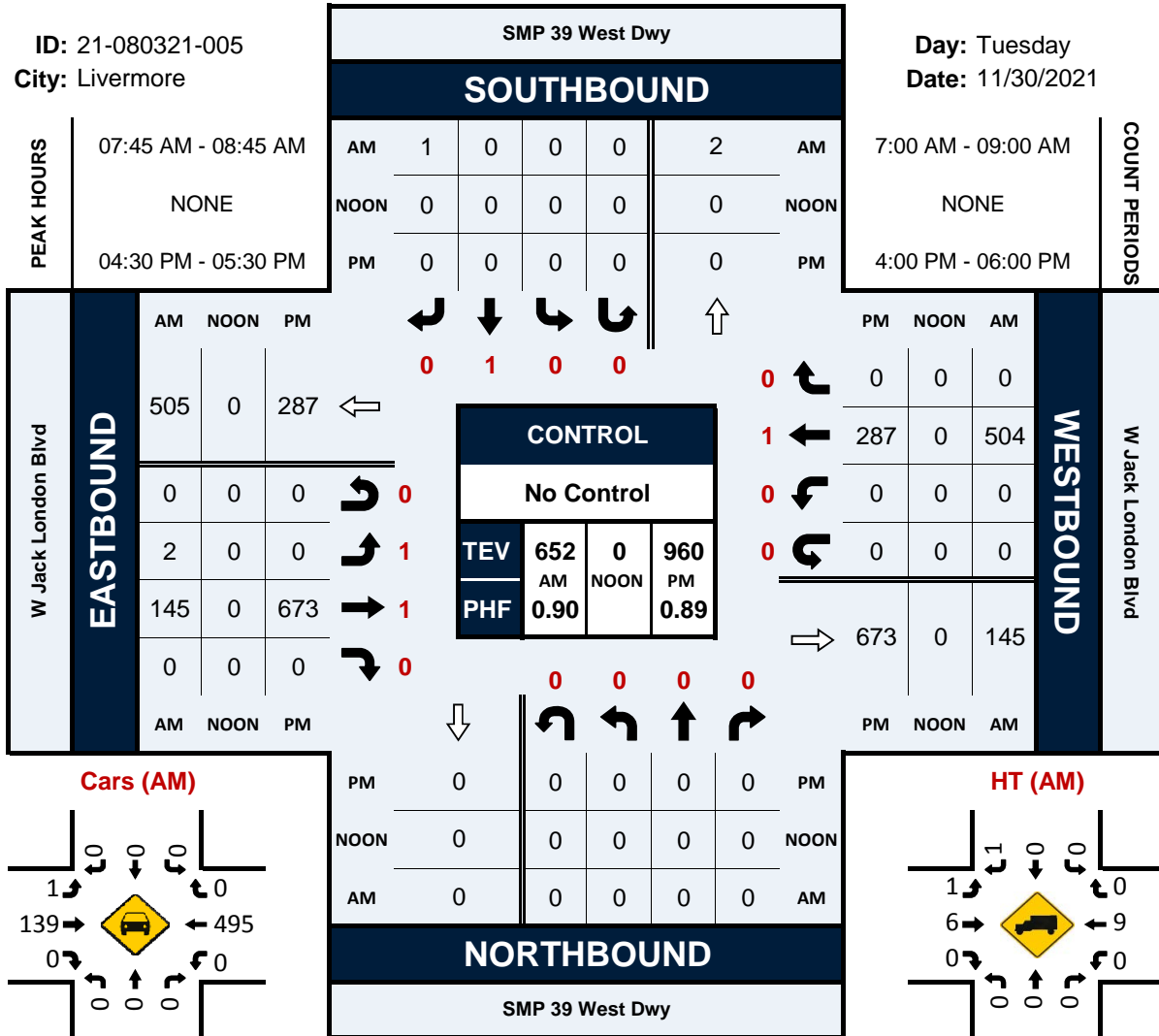


SMP 39 West Dwy & W Jack London Blvd

Peak Hour Turning Movement Count

ID: 21-080321-005
City: Livermore

Day: Tuesday
Date: 11/30/2021

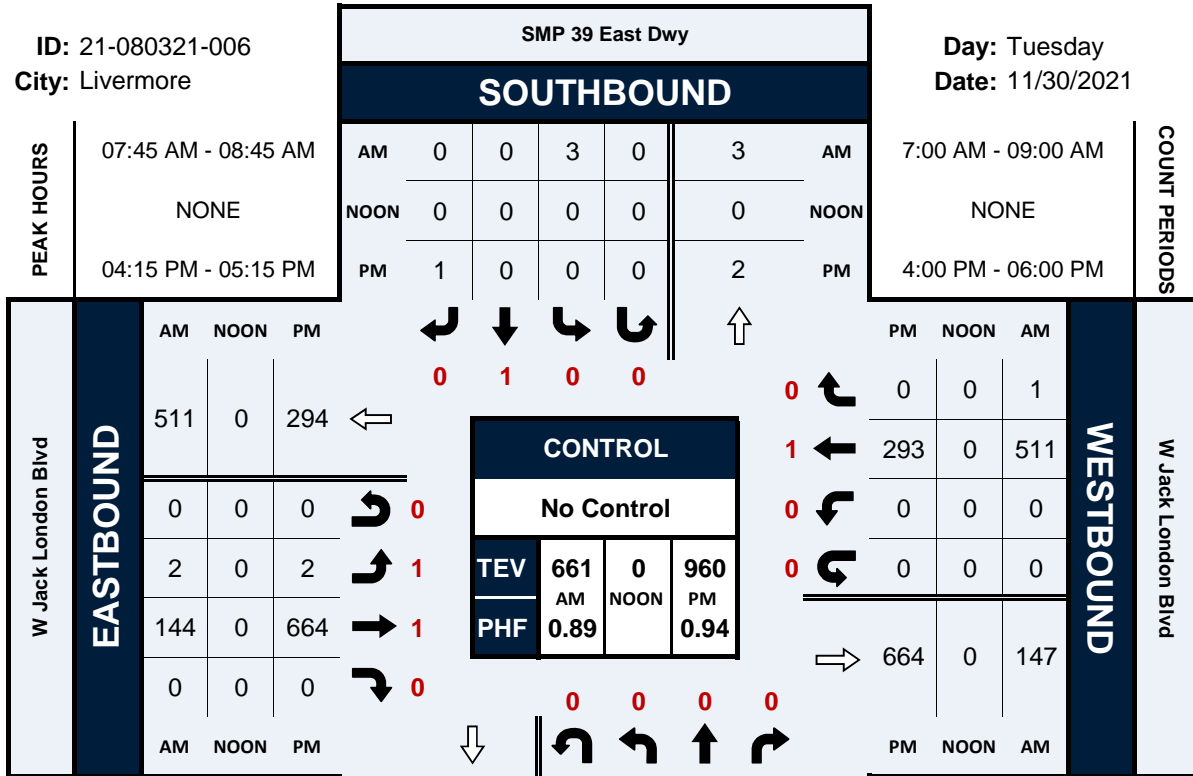


SMP 39 East Dwy & W Jack London Blvd

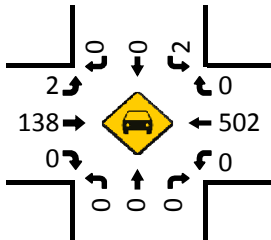
Peak Hour Turning Movement Count

ID: 21-080321-006
City: Livermore

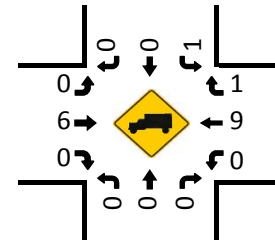
Day: Tuesday
Date: 11/30/2021



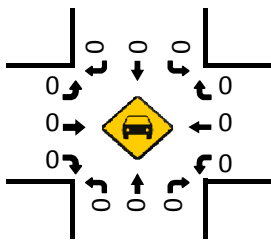
Cars (AM)



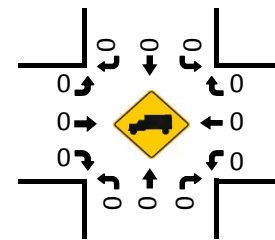
HT (AM)



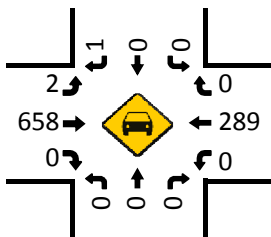
Cars (NOON)



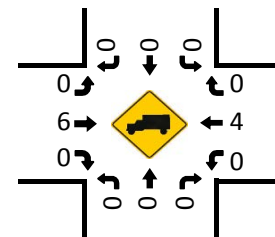
HT (NOON)



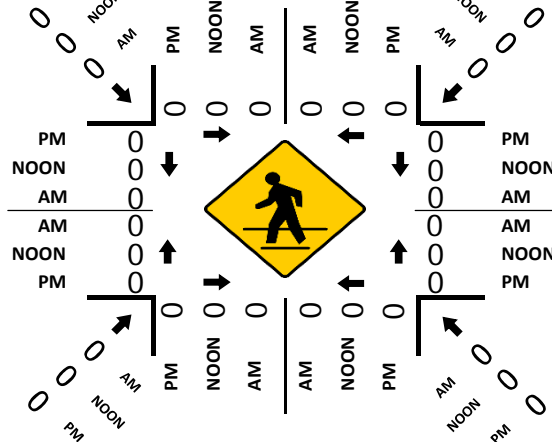
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)

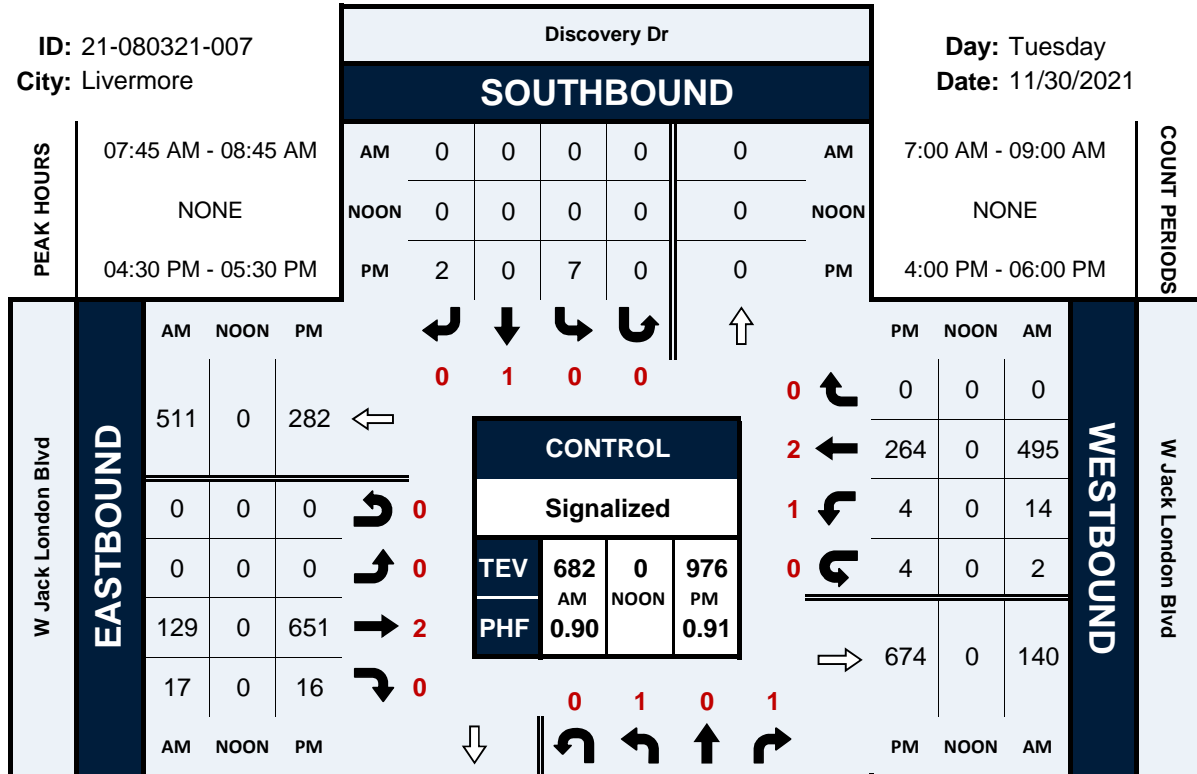


Discovery Dr & W Jack London Blvd

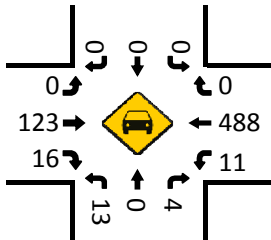
Peak Hour Turning Movement Count

ID: 21-080321-007
City: Livermore

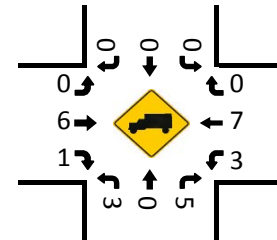
Day: Tuesday
Date: 11/30/2021



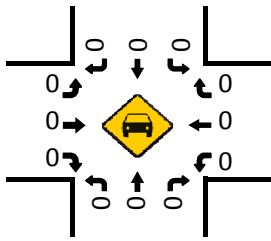
Cars (AM)



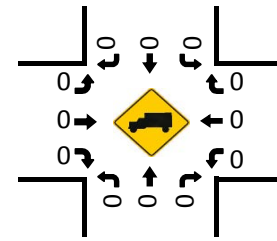
HT (AM)



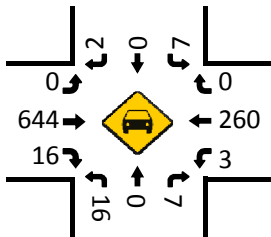
Cars (NOON)



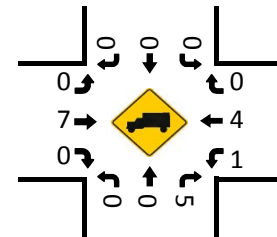
HT (NOON)



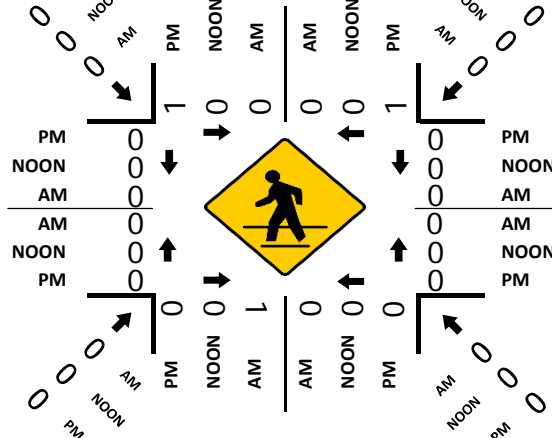
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)

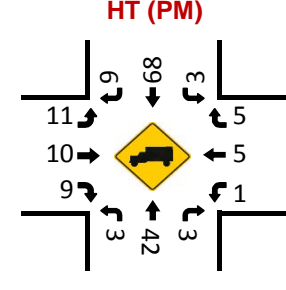
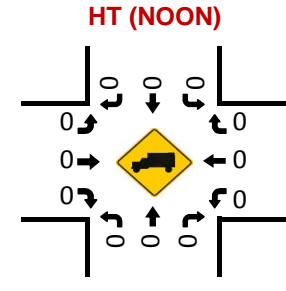
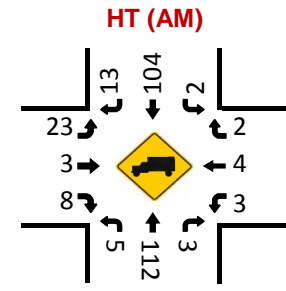
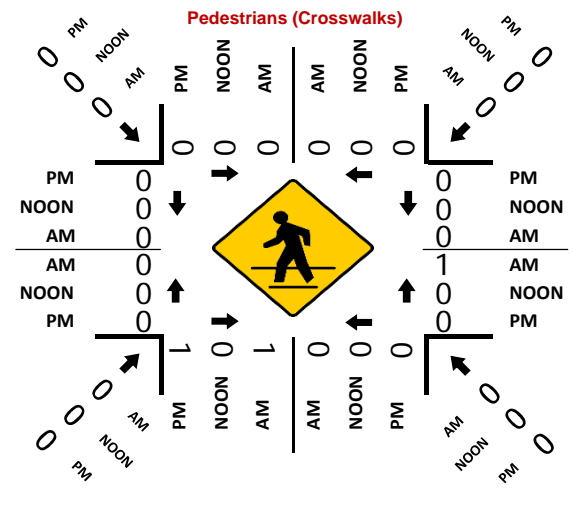
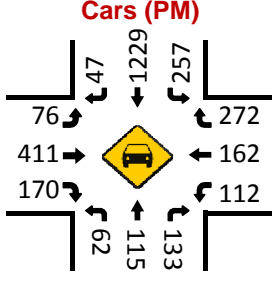
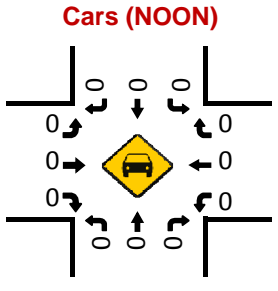
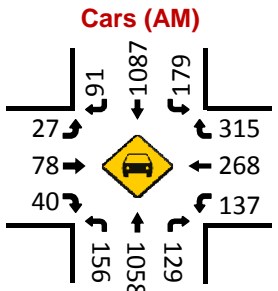
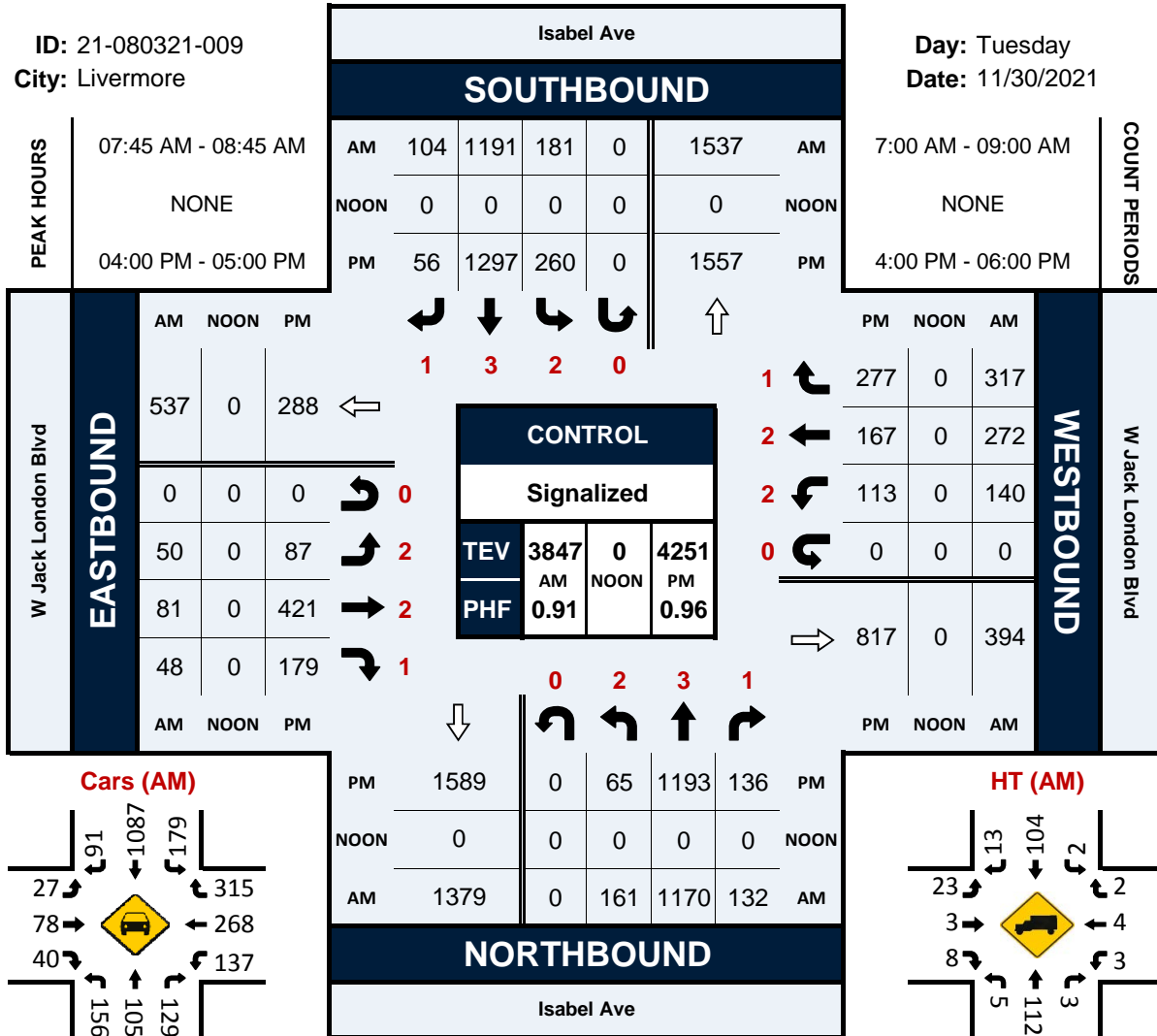


Isabel Ave & W Jack London Blvd

Peak Hour Turning Movement Count

ID: 21-080321-009
City: Livermore

Day: Tuesday
Date: 11/30/2021

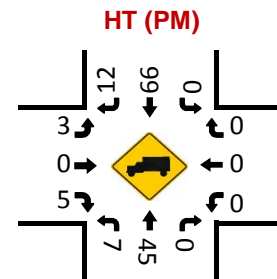
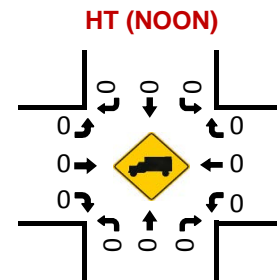
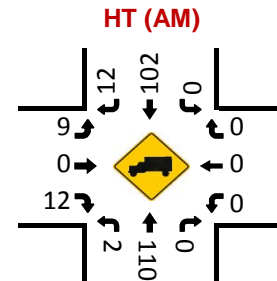
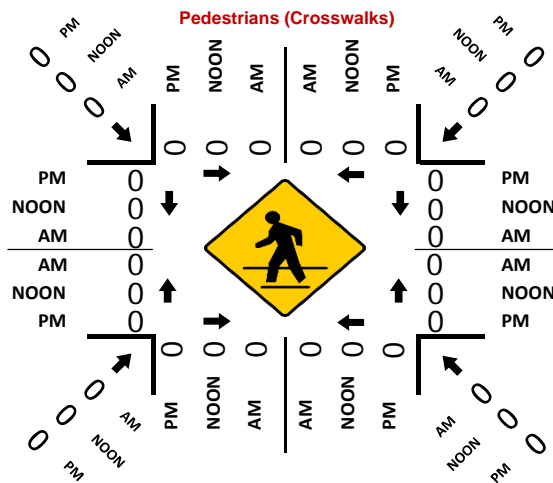
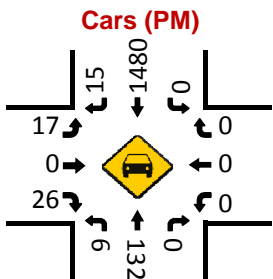
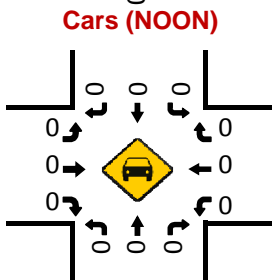
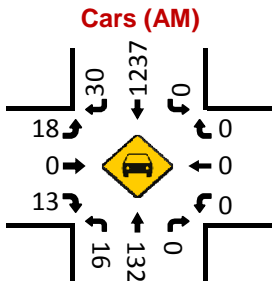
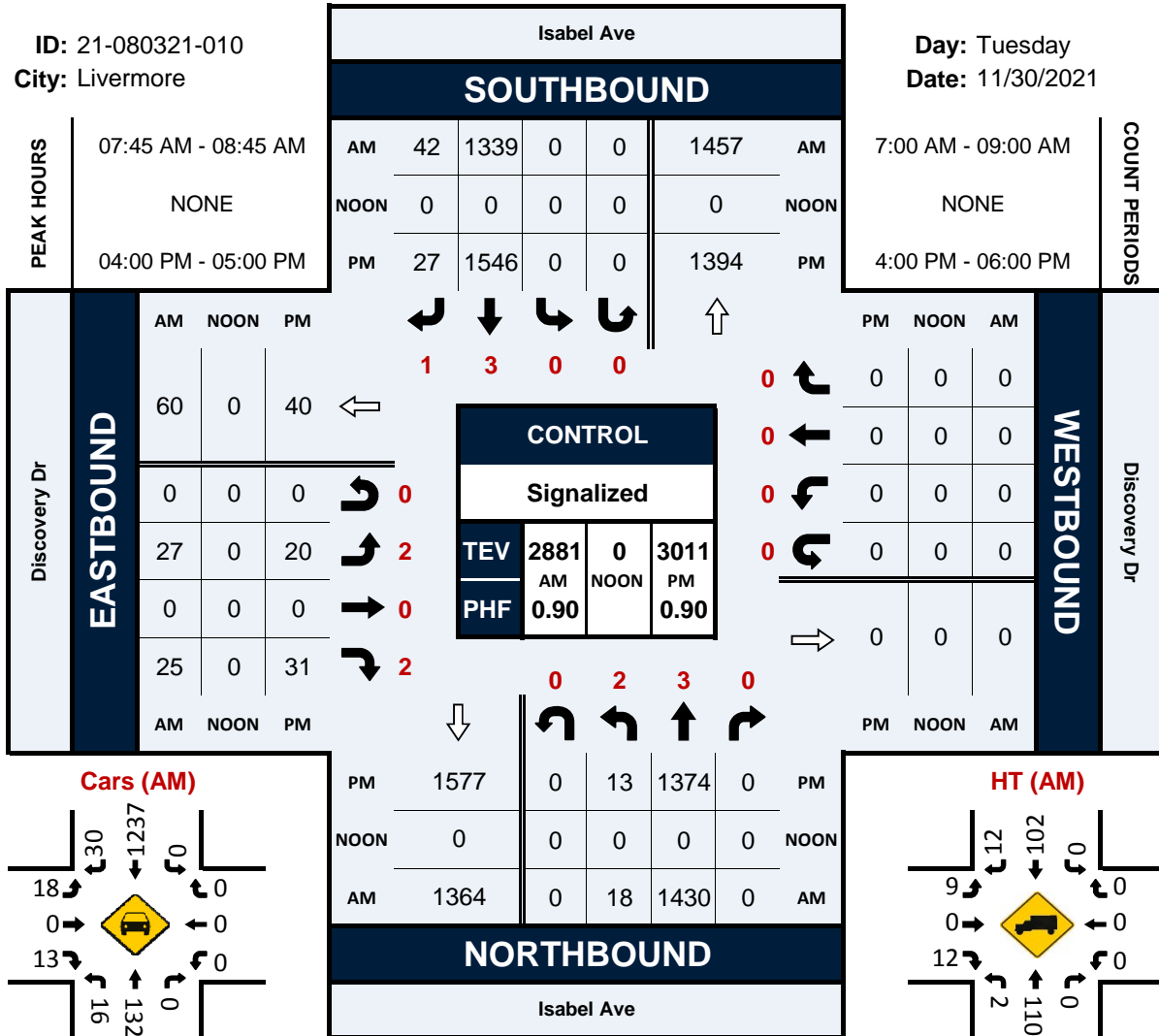


Isabel Ave & Discovery Dr

Peak Hour Turning Movement Count

ID: 21-080321-010
City: Livermore

Day: Tuesday
Date: 11/30/2021

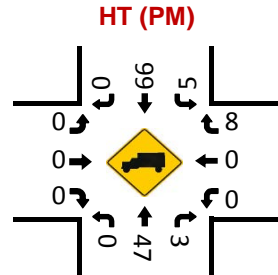
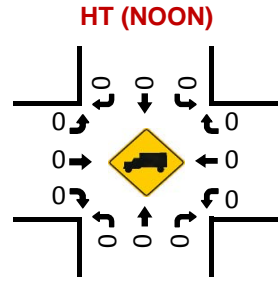
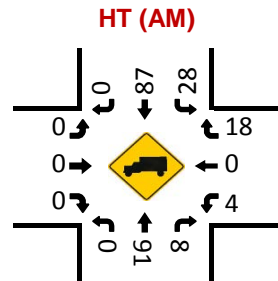
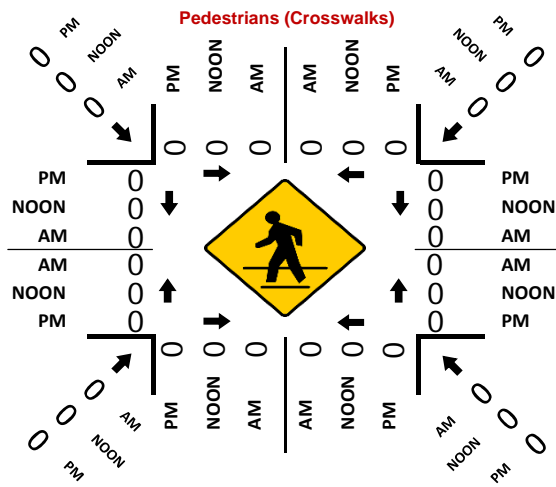
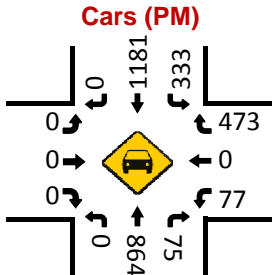
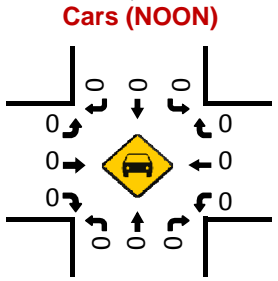
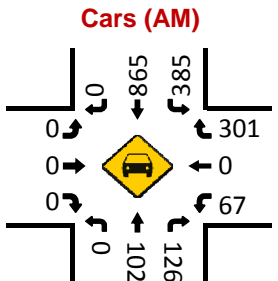
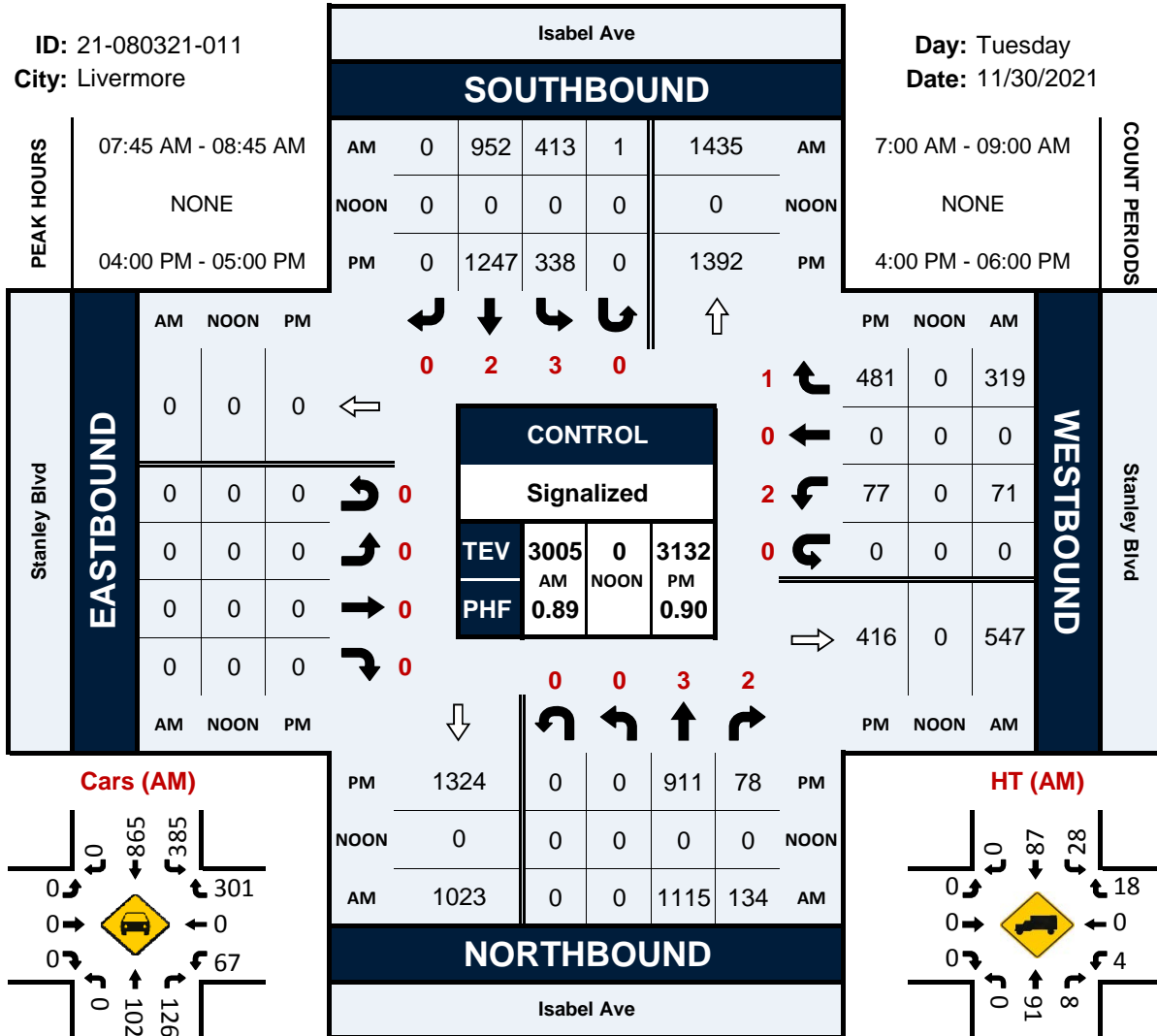


Isabel Ave & Stanley Blvd

Peak Hour Turning Movement Count

ID: 21-080321-011
City: Livermore

Day: Tuesday
Date: 11/30/2021

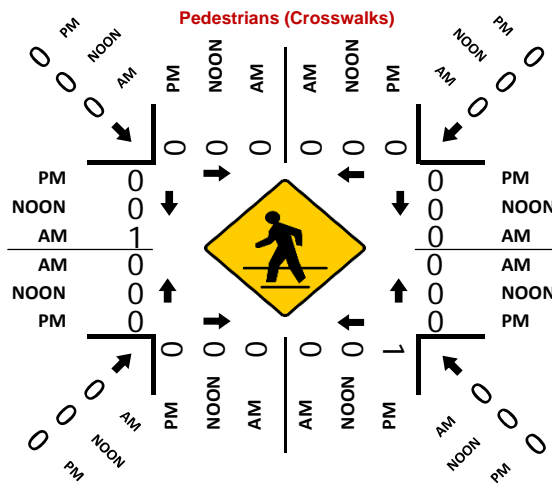
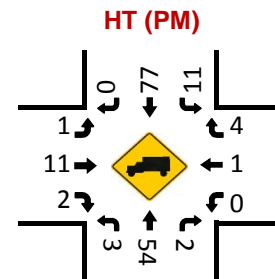
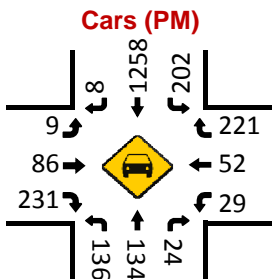
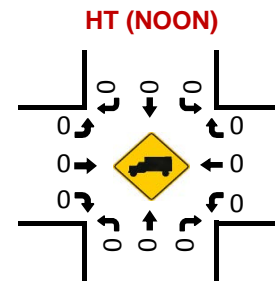
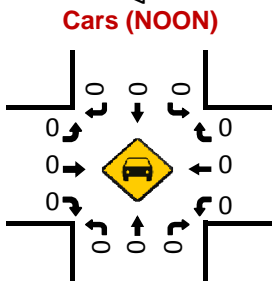
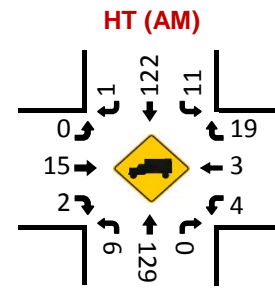
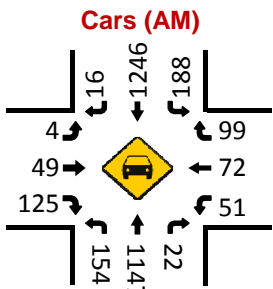
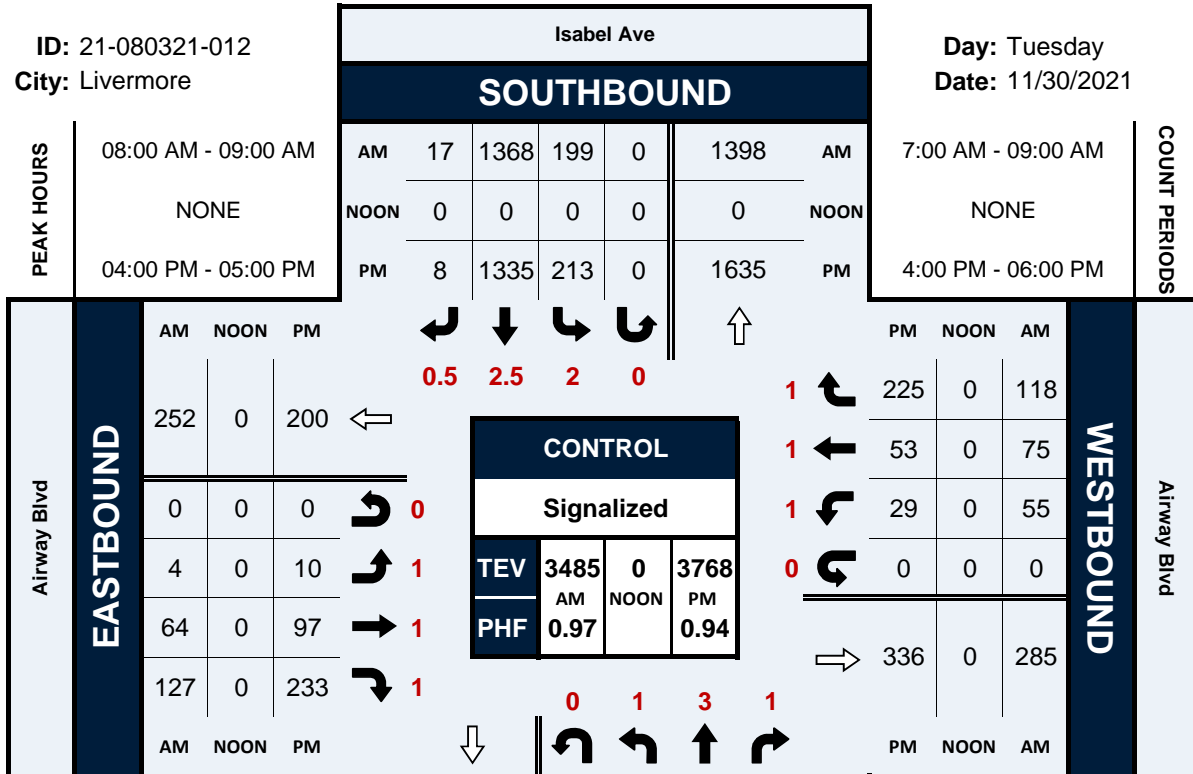


Isabel Ave & Airway Blvd

Peak Hour Turning Movement Count

ID: 21-080321-012
City: Livermore

Day: Tuesday
Date: 11/30/2021

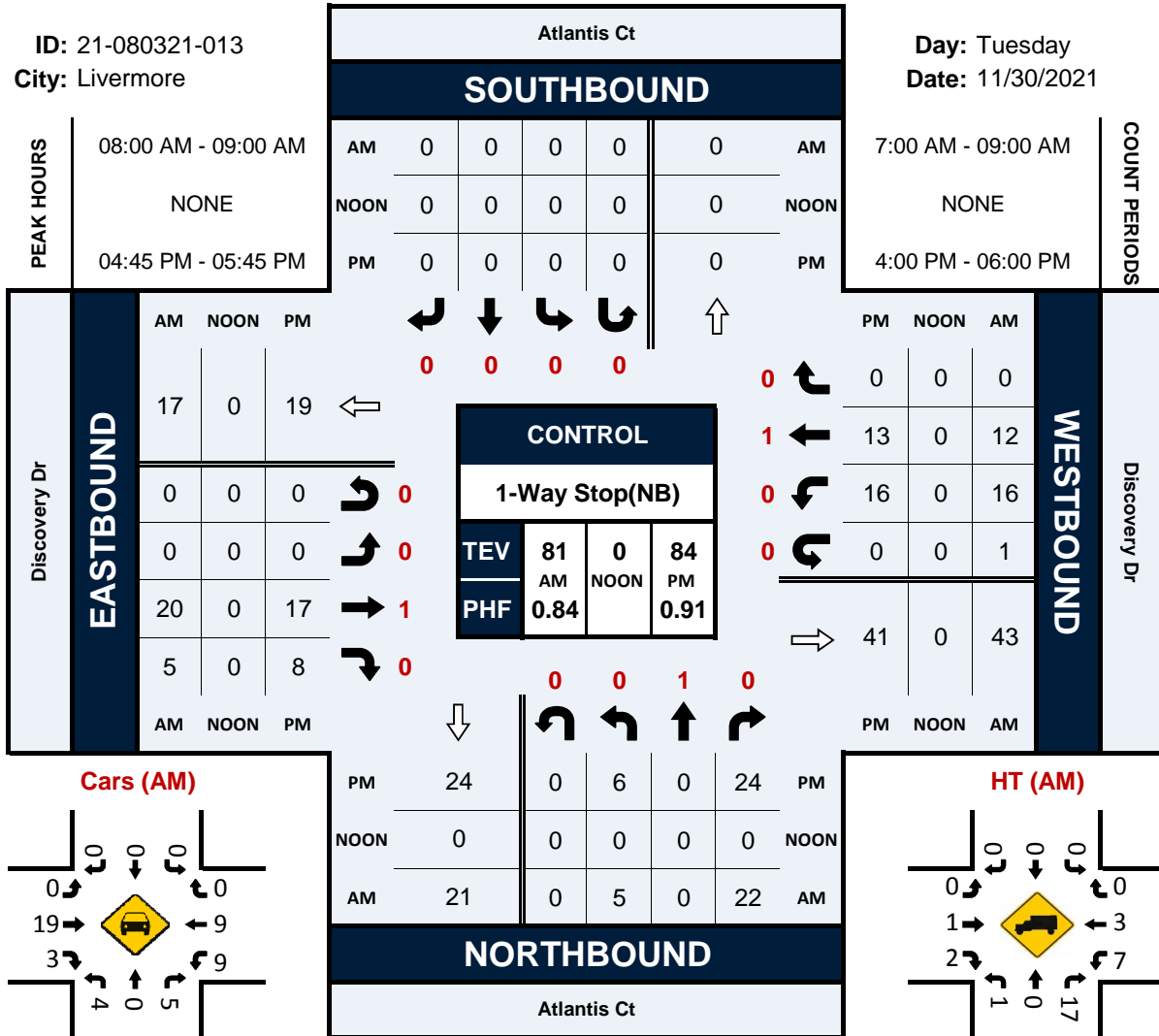


Atlantis Ct & Discovery Dr

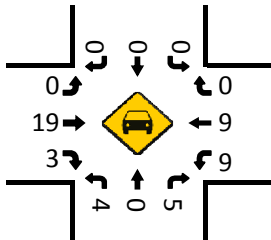
Peak Hour Turning Movement Count

ID: 21-080321-013
City: Livermore

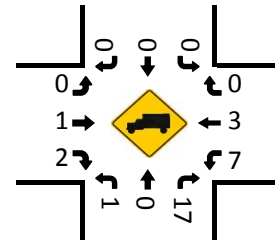
Day: Tuesday
Date: 11/30/2021



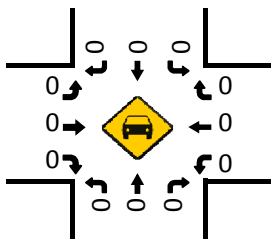
Cars (AM)



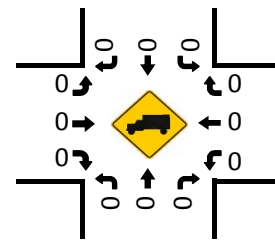
HT (AM)



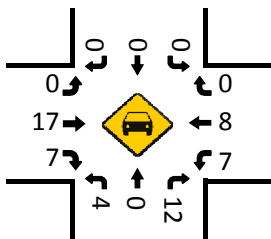
Cars (NOON)



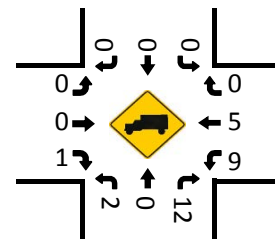
HT (NOON)



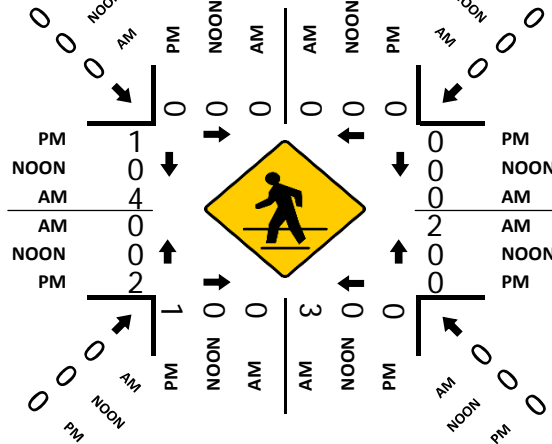
Cars (PM)



HT (PM)



Pedestrians (Crosswalks)

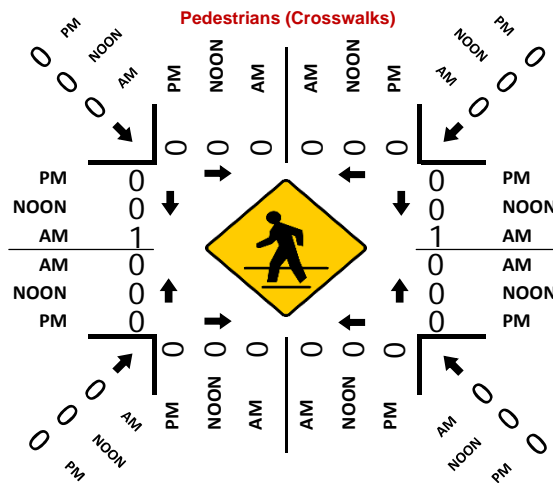
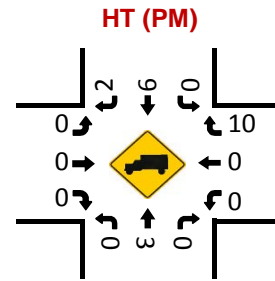
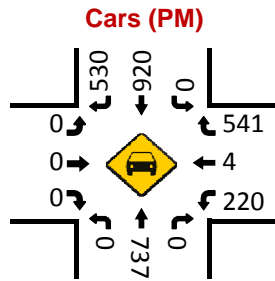
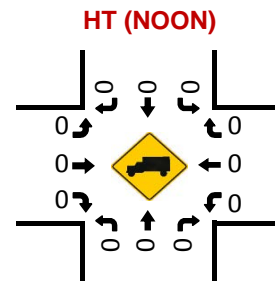
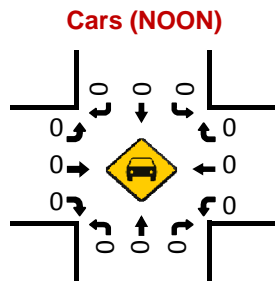
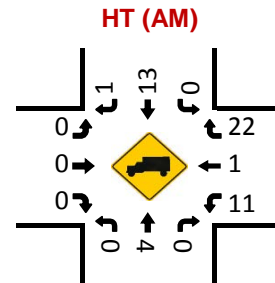
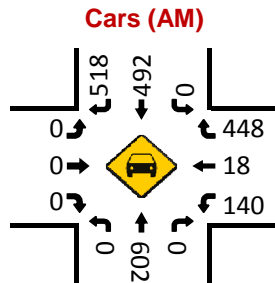
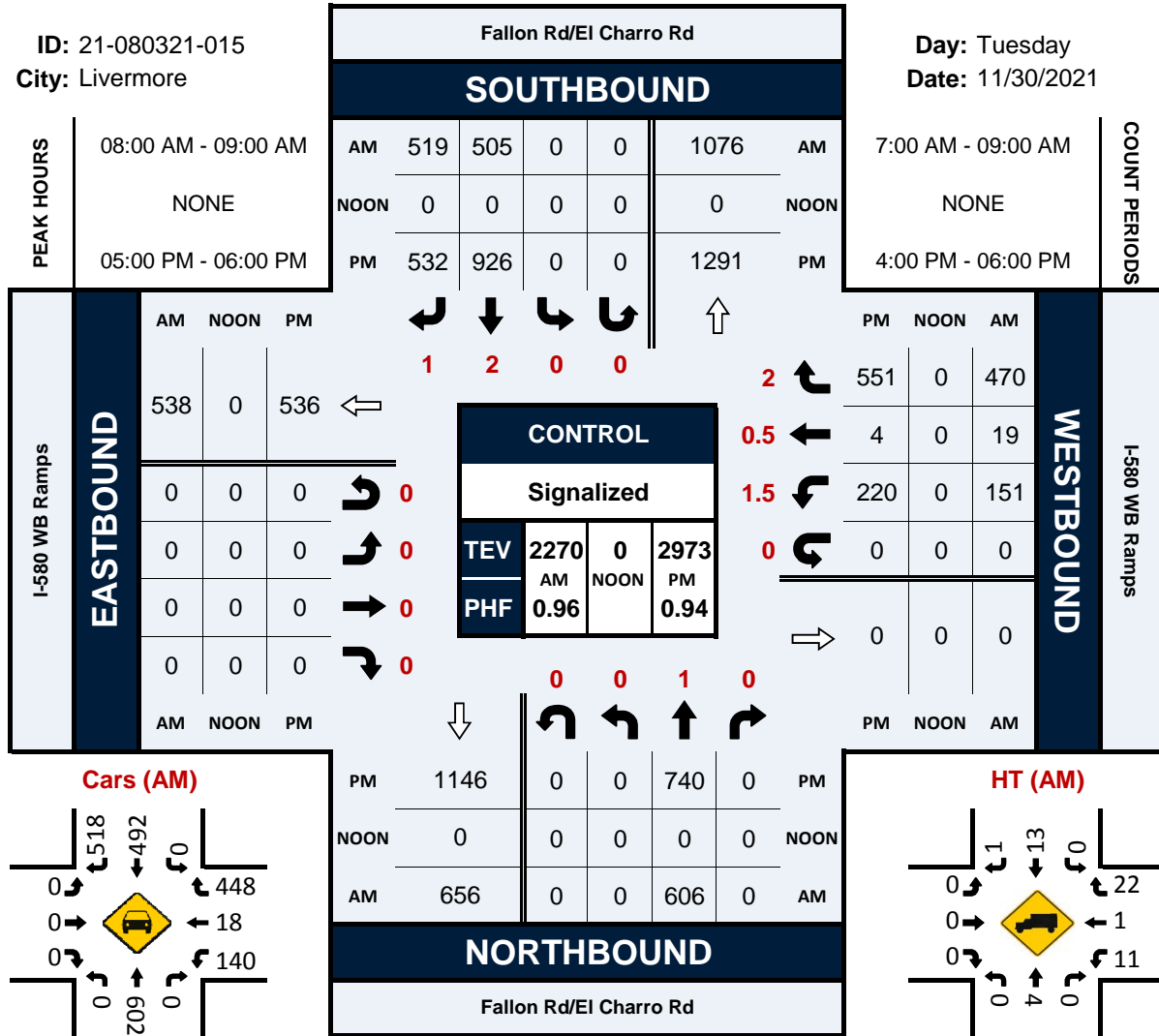


Fallon Rd/El Charro Rd & I-580 WB Ramps

Peak Hour Turning Movement Count

ID: 21-080321-015
City: Livermore

Day: Tuesday
Date: 11/30/2021

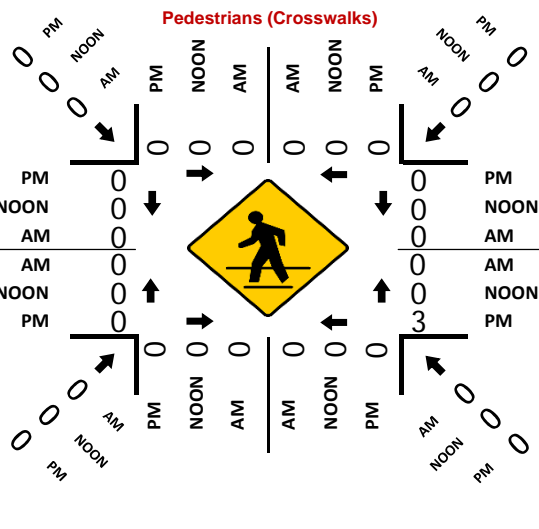
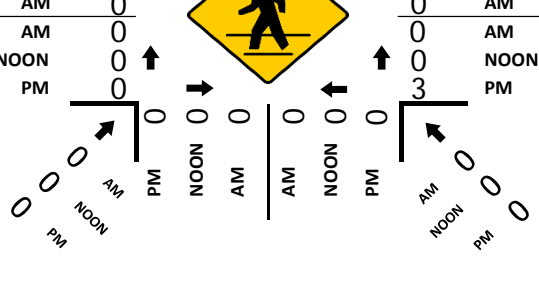
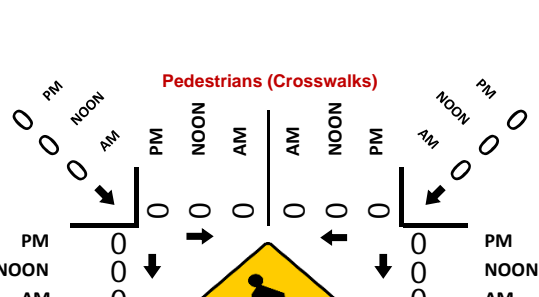
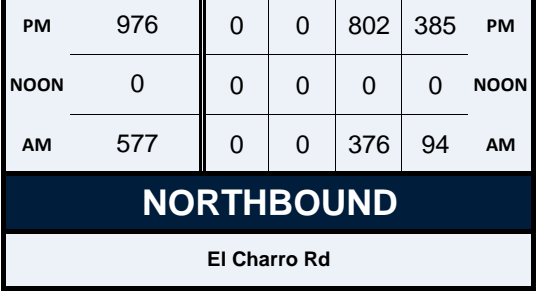
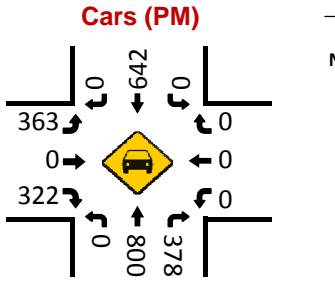
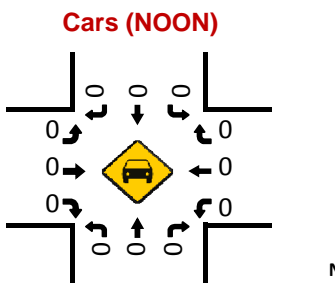
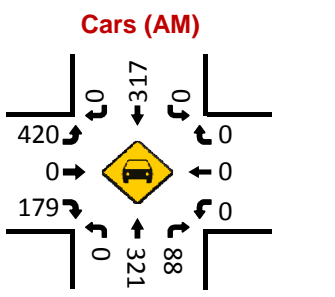
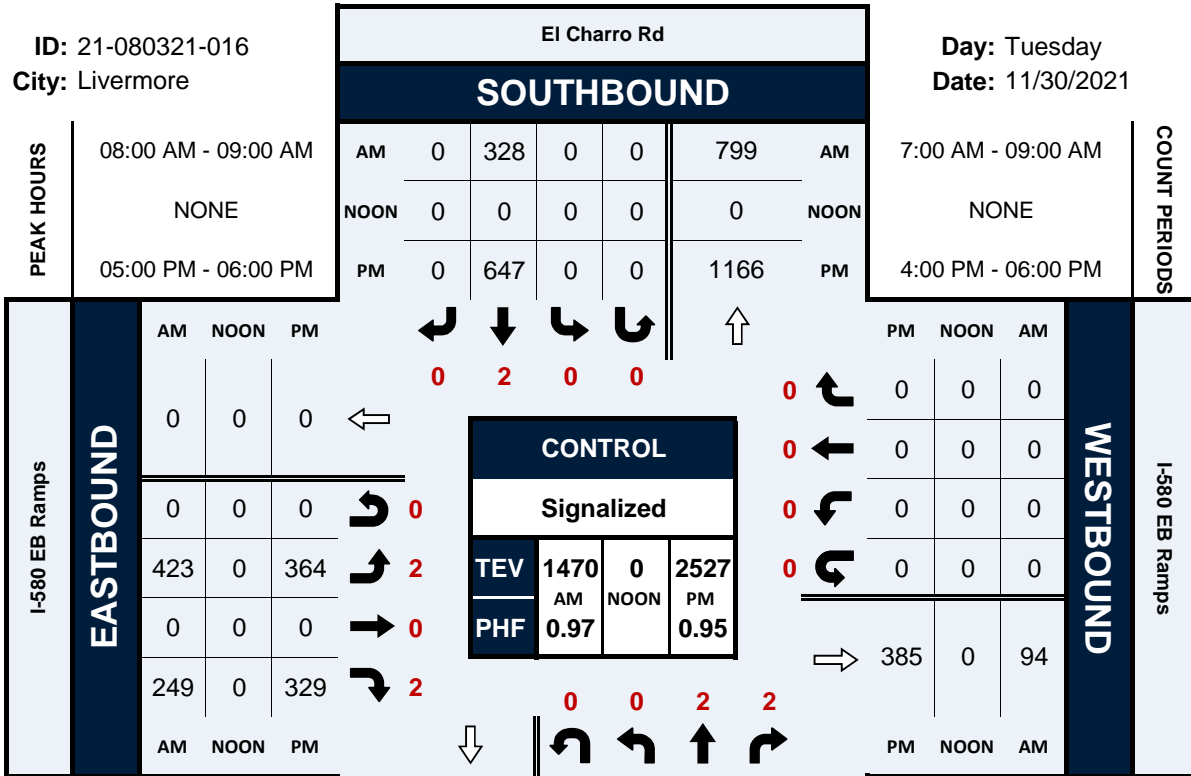


El Charro Rd & I-580 EB Ramps

Peak Hour Turning Movement Count

ID: 21-080321-016
City: Livermore

Day: Tuesday
Date: 11/30/2021



Appendix C – Existing Conditions Intersection Level of Service and Queuing Analysis Work Sheets

Queues

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Existing

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	166	43	4	210	307	5	88	222	101	325
v/c Ratio	0.26	0.03	0.03	0.28	0.24	0.04	0.18	0.28	0.28	0.20
Control Delay	29.3	15.3	35.2	21.7	2.3	35.3	22.0	27.4	17.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	15.3	35.2	21.7	2.3	35.3	22.0	27.4	17.6	0.3
Queue Length 50th (ft)	15	3	1	27	0	1	8	19	18	0
Queue Length 95th (ft)	52	20	14	84	25	12	20	74	87	0
Internal Link Dist (ft)		745		868			219		816	
Turn Bay Length (ft)	400		350			110		600		420
Base Capacity (vph)	2021	2480	438	2204	2654	357	1786	4385	977	1599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.01	0.10	0.12	0.01	0.05	0.05	0.10	0.20

Intersection Summary

HCM 6th Signalized Intersection Summary

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Existing
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔	↑↑	↔↔	↔	↑↑↔		↔↔↔	↑	↔
Traffic Volume (veh/h)	131	34	0	4	191	279	3	56	2	198	90	289
Future Volume (veh/h)	131	34	0	4	191	279	3	56	2	198	90	289
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		1.00	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	1870	1856	1870	1530	1870	1856	1411	522	522	1856	685	1885
Adj Flow Rate, veh/h	166	43	0	4	210	307	5	85	3	222	101	0
Peak Hour Factor	0.79	0.79	0.79	0.91	0.91	0.91	0.66	0.66	0.66	0.89	0.89	0.89
Percent Heavy Veh, %	2	3	2	25	2	3	33	93	93	3	82	1
Cap, veh/h	505	996	448	8	666	932	7	154	5	757	175	
Arrive On Green	0.10	0.28	0.00	0.01	0.19	0.19	0.01	0.11	0.11	0.15	0.26	0.00
Sat Flow, veh/h	5023	3526	1585	1457	3554	2731	1344	1413	49	4983	685	1598
Grp Volume(v), veh/h	166	43	0	4	210	307	5	57	31	222	101	0
Grp Sat Flow(s),veh/h/ln	1674	1763	1585	1457	1777	1366	1344	475	513	1661	685	1598
Q Serve(g_s), s	1.3	0.4	0.0	0.1	2.2	3.6	0.2	2.4	2.5	1.7	5.5	0.0
Cycle Q Clear(g_c), s	1.3	0.4	0.0	0.1	2.2	3.6	0.2	2.4	2.5	1.7	5.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	505	996	448	8	666	932	7	104	56	757	175	
V/C Ratio(X)	0.33	0.04	0.00	0.51	0.32	0.33	0.69	0.55	0.56	0.29	0.58	
Avail Cap(c_a), veh/h	2347	2941	1322	511	2549	2379	408	732	395	5822	1131	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.9	11.2	0.0	21.2	15.0	10.5	21.2	18.1	18.1	16.1	13.9	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.0	17.4	0.3	0.2	35.4	3.3	6.3	0.2	2.2	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.1	0.0	0.1	0.7	0.8	0.1	0.3	0.3	0.5	0.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.0	11.2	0.0	38.6	15.3	10.7	56.6	21.4	24.3	16.3	16.1	0.0
LnGrp LOS	B	B	A	D	B	B	E	C	C	B	B	
Approach Vol, veh/h		209			521			93			323	A
Approach Delay, s/veh		16.6			12.8			24.3			16.2	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.3	13.3	10.5	10.7	4.2	17.4	4.2	16.9				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	3.3	5.6	3.7	4.5	2.1	2.4	2.2	7.5				
Green Ext Time (p_c), s	0.3	2.4	0.6	0.4	0.0	0.2	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

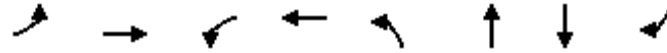
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Existing
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	51	170	13	595	8	7	14	14
v/c Ratio	0.03	0.04	0.02	0.13	0.01	0.01	0.02	0.01
Control Delay	22.8	10.4	28.6	12.4	17.3	14.4	27.1	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	10.4	28.6	12.4	17.3	14.4	27.1	0.0
Queue Length 50th (ft)	0	0	1	0	0	0	0	0
Queue Length 95th (ft)	35	48	26	109	11	8	20	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2635	4442	1195	5386	1132	1153	1082	2045
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.01	0.11	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Existing
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	164	1	11	483	11	7	1	3	6	3	9
Future Volume (vph)	49	164	1	11	483	11	7	1	3	6	3	9
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99			0.97	1.00
Satd. Flow (prot)	3367	4983		1656	6385		1504	1532			1500	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.99			0.97	1.00
Satd. Flow (perm)	3367	4983		1656	6385		1504	1532			1500	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.83	0.83	0.83	0.69	0.69	0.69	0.64	0.64	0.64
Adj. Flow (vph)	51	169	1	13	582	13	10	1	4	9	5	14
RTOR Reduction (vph)	0	1	0	0	2	0	0	4	0	0	0	13
Lane Group Flow (vph)	51	169	0	13	593	0	8	3	0	0	14	1
Confl. Peds. (#/hr)			2			2			2			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	4%	4%	2%	9%	2%	2%	14%	2%	2%	17%	33%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	3.0	22.4		0.7	20.1		2.7	2.7			2.7	2.7
Effective Green, g (s)	3.0	22.4		0.7	20.1		2.7	2.7			2.7	2.7
Actuated g/C Ratio	0.07	0.49		0.02	0.44		0.06	0.06			0.06	0.06
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	220	2437		25	2802		88	90			88	164
v/s Ratio Prot	c0.02	0.03		0.01	c0.09		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.23	0.07		0.52	0.21		0.09	0.04			0.16	0.01
Uniform Delay, d1	20.3	6.2		22.4	7.9		20.4	20.3			20.5	20.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.4	0.0		8.7	0.0		0.3	0.1			0.3	0.0
Delay (s)	20.7	6.2		31.1	8.0		20.7	20.4			20.8	20.3
Level of Service	C	A		C	A		C	C			C	C
Approach Delay (s)		9.5			8.5			20.6			20.5	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	17.3
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr

Existing
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	52	147	596	37	9	35
v/c Ratio	0.03	0.05	0.23	0.03	0.01	0.03
Control Delay	12.2	2.8	8.2	5.4	13.7	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	2.8	8.2	5.4	13.7	7.1
Queue Length 50th (ft)	0	0	0	0	0	0
Queue Length 95th (ft)	16	14	96	12	10	7
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2775	3438	3451	1525	1357	2145
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.17	0.02	0.01	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Existing
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	46	129	483	30	7	28
Future Volume (veh/h)	46	129	483	30	7	28
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1826	1870	1870	1870	1870
Adj Flow Rate, veh/h	52	147	596	37	9	35
Peak Hour Factor	0.88	0.88	0.81	0.81	0.80	0.80
Percent Heavy Veh, %	2	5	2	2	2	2
Cap, veh/h	406	2031	1186	517	182	286
Arrive On Green	0.12	0.59	0.33	0.33	0.10	0.10
Sat Flow, veh/h	3456	3561	3647	1550	1781	2790
Grp Volume(v), veh/h	52	147	596	37	9	35
Grp Sat Flow(s),veh/h/ln	1728	1735	1777	1550	1781	1395
Q Serve(g_s), s	0.4	0.5	4.0	0.5	0.1	0.3
Cycle Q Clear(g_c), s	0.4	0.5	4.0	0.5	0.1	0.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	406	2031	1186	517	182	286
V/C Ratio(X)	0.13	0.07	0.50	0.07	0.05	0.12
Avail Cap(c_a), veh/h	2899	4657	5367	2341	1196	1872
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	11.8	2.7	7.9	6.8	12.1	12.2
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.7	0.1	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.9	2.7	8.1	6.8	12.1	12.2
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		199	633		44	
Approach Delay, s/veh		5.1	8.0		12.2	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.5	15.2			22.7	7.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.4	6.0			2.5	2.3
Green Ext Time (p_c), s	0.1	2.5			0.5	0.0

Intersection Summary

HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues
4: W Jack London Blvd & Wolf House Dr

Existing
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	3	149	582	17	40	48
v/c Ratio	0.00	0.13	0.46	0.02	0.06	0.07
Control Delay	17.0	4.7	9.4	6.1	15.8	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	4.7	9.4	6.1	15.8	7.6
Queue Length 50th (ft)	0	15	78	1	5	0
Queue Length 95th (ft)	7	29	233	10	20	6
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1489	1827	1755	1456	1228	1113
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.08	0.33	0.01	0.03	0.04
Intersection Summary						

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Existing
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↶	↷	↶	↷
Traffic Volume (veh/h)	3	134	489	14	20	24
Future Volume (veh/h)	3	134	489	14	20	24
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1841	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	149	582	17	40	48
Peak Hour Factor	0.90	0.90	0.84	0.84	0.50	0.50
Percent Heavy Veh, %	2	4	2	2	2	2
Cap, veh/h	15	988	752	623	303	270
Arrive On Green	0.01	0.54	0.40	0.40	0.17	0.17
Sat Flow, veh/h	1781	1841	1870	1549	1781	1585
Grp Volume(v), veh/h	3	149	582	17	40	48
Grp Sat Flow(s),veh/h/ln	1781	1841	1870	1549	1781	1585
Q Serve(g_s), s	0.1	1.3	8.6	0.2	0.6	0.8
Cycle Q Clear(g_c), s	0.1	1.3	8.6	0.2	0.6	0.8
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	15	988	752	623	303	270
V/C Ratio(X)	0.20	0.15	0.77	0.03	0.13	0.18
Avail Cap(c_a), veh/h	1685	2612	2654	2198	1124	1000
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.6	3.7	8.2	5.7	11.2	11.3
Incr Delay (d2), s/veh	5.0	0.0	0.7	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	1.6	0.0	0.2	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.6	3.7	8.9	5.7	11.2	11.4
LnGrp LOS	C	A	A	A	B	B
Approach Vol, veh/h		152	599		88	
Approach Delay, s/veh		4.1	8.8		11.3	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	18.1			22.3	9.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	10.6			3.3	2.8
Green Ext Time (p_c), s	0.0	2.2			0.5	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
5: W Jack London Blvd & Ambassador Dwy

Existing
Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	145	504	0	0	1
Future Vol, veh/h	2	145	504	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	86	86	25	25
Heavy Vehicles, %	50	4	2	2	2	100
Mvmt Flow	2	177	586	0	0	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	586	0	-	0	767
Stage 1	-	-	-	-	586
Stage 2	-	-	-	-	181
Critical Hdwy	4.6	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.65	-	-	-	3.518
Pot Cap-1 Maneuver	791	-	-	-	370
Stage 1	-	-	-	-	556
Stage 2	-	-	-	-	850
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	791	-	-	-	369
Mov Cap-2 Maneuver	-	-	-	-	369
Stage 1	-	-	-	-	554
Stage 2	-	-	-	-	850

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	791	-	-	-	367
HCM Lane V/C Ratio	0.003	-	-	-	0.011
HCM Control Delay (s)	9.6	-	-	-	14.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC
6: W Jack London Blvd & Airport Dwy

Existing
Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	144	511	1	3	0
Future Vol, veh/h	2	144	511	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	86	86	75	75
Heavy Vehicles, %	2	4	2	100	33	2
Mvmt Flow	3	182	594	1	4	0

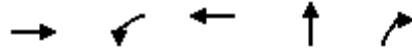
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	595	0	-	0	783
Stage 1	-	-	-	-	595
Stage 2	-	-	-	-	188
Critical Hdwy	4.12	-	-	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	2.218	-	-	-	3.797
Pot Cap-1 Maneuver	981	-	-	-	322
Stage 1	-	-	-	-	495
Stage 2	-	-	-	-	775
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	981	-	-	-	321
Mov Cap-2 Maneuver	-	-	-	-	321
Stage 1	-	-	-	-	494
Stage 2	-	-	-	-	775

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	981	-	-	-	321
HCM Lane V/C Ratio	0.003	-	-	-	0.012
HCM Control Delay (s)	8.7	-	-	-	16.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues
7: Discovery Dr & W Jack London Blvd

Existing
Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	172	18	569	21	12
v/c Ratio	0.06	0.02	0.17	0.03	0.02
Control Delay	3.3	11.6	1.3	10.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	11.6	1.3	10.9	0.1
Queue Length 50th (ft)	0	1	0	1	0
Queue Length 95th (ft)	27	19	44	18	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	3067	1358	3539	1325	917
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.01	0.16	0.02	0.01
Intersection Summary					

HCM 6th Signalized Intersection Summary

7: Discovery Dr & W Jack London Blvd

Existing
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	129	17	16	495	0	16	0	9	0	0	0
Future Volume (veh/h)	0	129	17	16	495	0	16	0	9	0	0	0
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		1.00	1.00		1.00	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	0	1826	1826	1589	1870	0	1870	1870	1070	1870	1870	1870
Adj Flow Rate, veh/h	0	152	20	18	569	0	21	0	12	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.87	0.87	0.87	0.78	0.78	0.78	0.25	0.25	0.25
Percent Heavy Veh, %	0	5	5	21	2	0	2	2	56	2	2	2
Cap, veh/h	0	1030	133	57	1912	0	132	0	67	0	8	0
Arrive On Green	0.00	0.33	0.33	0.04	0.54	0.00	0.07	0.00	0.07	0.00	0.00	0.00
Sat Flow, veh/h	0	3179	400	1513	3647	0	1781	0	907	0	1870	0
Grp Volume(v), veh/h	0	84	88	18	569	0	21	0	12	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1735	1753	1513	1777	0	1781	0	907	0	1870	0
Q Serve(g_s), s	0.0	0.8	0.8	0.3	2.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.8	0.8	0.3	2.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Prop In Lane	0.00		0.23	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	579	585	57	1912	0	132	0	67	0	8	0
V/C Ratio(X)	0.00	0.15	0.15	0.32	0.30	0.00	0.16	0.00	0.18	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2170	2194	1893	4446	0	1486	0	756	0	936	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.6	5.6	11.2	3.0	0.0	10.4	0.0	10.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	1.2	0.1	0.0	0.2	0.0	0.5	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	5.7	5.7	12.4	3.1	0.0	10.6	0.0	10.9	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		172			587			33				0
Approach Delay, s/veh		5.7			3.4			10.7				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	4.9	13.3		0.0		18.2		5.8				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	2.8		0.0		4.1		2.3				
Green Ext Time (p_c), s	0.0	0.7		0.0		2.9		0.0				

Intersection Summary

HCM 6th Ctrl Delay	4.2
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Existing
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	186	55	596	11	53
v/c Ratio	0.00	0.07	0.10	0.22	0.02	0.10
Control Delay	15.5	4.9	12.8	4.5	14.2	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	4.9	12.8	4.5	14.2	0.4
Queue Length 50th (ft)	0	0	0	0	0	0
Queue Length 95th (ft)	6	26	40	78	12	0
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	1154	3062	1058	3371	960	889
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.06	0.05	0.18	0.01	0.06
Intersection Summary						

HCM 6th Signalized Intersection Summary

8: Voyager St & W Jack London Blvd

Existing
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↕		↰	↕			↕	↕		↕	
Traffic Volume (veh/h)	2	136	7	46	495	0	8	0	38	0	0	0
Future Volume (veh/h)	2	136	7	46	495	0	8	0	38	0	0	0
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		1.00	1.00		1.00	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	1870	1796	1796	1322	1870	1870	1870	1870	996	1870	1870	1870
Adj Flow Rate, veh/h	3	177	9	55	596	0	11	0	53	0	0	0
Peak Hour Factor	0.77	0.77	0.77	0.83	0.83	0.83	0.72	0.72	0.72	0.92	0.92	0.92
Percent Heavy Veh, %	2	7	7	39	2	2	2	2	61	2	2	2
Cap, veh/h	10	980	49	126	1390	0	201	0	95	0	7	0
Arrive On Green	0.01	0.30	0.30	0.10	0.39	0.00	0.11	0.00	0.11	0.00	0.00	0.00
Sat Flow, veh/h	1781	3301	167	1259	3647	0	1781	0	844	0	1870	0
Grp Volume(v), veh/h	3	91	95	55	596	0	11	0	53	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1706	1762	1259	1777	0	1781	0	844	0	1870	0
Q Serve(g_s), s	0.0	1.1	1.1	1.1	3.3	0.0	0.1	0.0	1.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.1	1.1	1.1	3.3	0.0	0.1	0.0	1.6	0.0	0.0	0.0
Prop In Lane	1.00		0.09	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	506	523	126	1390	0	201	0	95	0	7	0
V/C Ratio(X)	0.29	0.18	0.18	0.44	0.43	0.00	0.05	0.00	0.56	0.00	0.00	0.00
Avail Cap(c_a), veh/h	788	2202	2273	928	4586	0	1642	0	778	0	828	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	13.4	7.1	7.1	11.5	6.0	0.0	10.7	0.0	11.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.1	0.1	0.9	0.2	0.0	0.0	0.0	1.9	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.2	0.4	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.1	7.2	7.2	12.4	6.2	0.0	10.8	0.0	13.3	0.0	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		189			651			64				0
Approach Delay, s/veh		7.4			6.7			12.8				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	13.3		0.0	4.2	15.9		7.1				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.1	3.1		0.0	2.0	5.3		3.6				
Green Ext Time (p_c), s	0.0	0.7		0.0	0.0	3.1		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Existing
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	96	57	159	309	360	196	1427	161	210	1385	121
v/c Ratio	0.19	0.13	0.15	0.32	0.63	0.54	0.45	0.89	0.26	0.51	0.88	0.22
Control Delay	52.9	37.9	0.8	51.0	47.0	23.5	54.3	44.6	7.2	56.3	44.1	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	37.9	0.8	51.0	47.0	23.5	54.3	44.6	7.2	56.3	44.1	5.1
Queue Length 50th (ft)	20	29	0	53	209	150	68	348	8	73	338	0
Queue Length 95th (ft)	49	57	0	113	352	280	126	459	47	141	473	32
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	322	1713	737	616	1003	689	610	2962	1034	462	2776	887
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.06	0.08	0.26	0.31	0.52	0.32	0.48	0.16	0.45	0.50	0.14

Intersection Summary

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Existing
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	50	81	48	140	272	317	161	1170	132	181	1191	104
Future Volume (veh/h)	50	81	48	140	272	317	161	1170	132	181	1191	104
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		0.99	1.00		1.00	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	1218	1841	1648	1870	1870	1870	1856	1752	1870	1870	1767	1707
Adj Flow Rate, veh/h	60	96	57	159	309	360	196	1427	161	210	1385	121
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	46	4	17	2	2	2	3	10	2	2	9	13
Cap, veh/h	272	635	250	542	406	544	474	1554	514	444	1520	456
Arrive On Green	0.12	0.18	0.18	0.16	0.22	0.22	0.14	0.32	0.32	0.13	0.32	0.32
Sat Flow, veh/h	2251	3497	1376	3456	1870	1564	3428	4782	1584	3456	4823	1447
Grp Volume(v), veh/h	60	96	57	159	309	360	196	1427	161	210	1385	121
Grp Sat Flow(s),veh/h/ln	1125	1749	1376	1728	1870	1564	1714	1594	1584	1728	1608	1447
Q Serve(g_s), s	2.4	2.3	3.6	4.1	15.6	19.7	5.3	29.0	7.7	5.7	27.8	6.3
Cycle Q Clear(g_c), s	2.4	2.3	3.6	4.1	15.6	19.7	5.3	29.0	7.7	5.7	27.8	6.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	272	635	250	542	406	544	474	1554	514	444	1520	456
V/C Ratio(X)	0.22	0.15	0.23	0.29	0.76	0.66	0.41	0.92	0.31	0.47	0.91	0.27
Avail Cap(c_a), veh/h	335	635	250	685	1113	1135	680	3320	1099	514	2631	789
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	40.0	34.7	35.2	37.6	37.0	28.0	39.7	32.8	25.6	40.8	33.2	25.8
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.1	1.1	0.5	0.2	1.0	0.1	0.3	1.5	0.1
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	0.7	1.0	1.2	1.7	6.9	7.0	2.1	10.4	2.8	2.3	10.3	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	34.8	35.4	37.7	38.1	28.5	39.9	33.8	25.7	41.1	34.7	25.9
LnGrp LOS	D	C	D	D	D	C	D	C	C	D	C	C
Approach Vol, veh/h		213			828			1784			1716	
Approach Delay, s/veh		36.5			33.9			33.7			34.8	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	38.6	20.5	24.1	18.6	37.6	16.9	27.7				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	7.7	31.0	6.1	5.6	7.3	29.8	4.4	21.7				
Green Ext Time (p_c), s	0.0	1.7	0.0	0.1	0.0	1.8	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	34.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Existing
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	38	35	21	1702	1594	50
v/c Ratio	0.10	0.11	0.04	0.45	0.45	0.05
Control Delay	20.2	9.8	19.9	4.0	6.2	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	9.8	19.9	4.0	6.2	3.4
Queue Length 50th (ft)	5	0	3	80	72	1
Queue Length 95th (ft)	13	7	10	94	177	14
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1398	1036	1675	4803	3682	970
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.03	0.01	0.35	0.43	0.05
Intersection Summary						

HCM 6th Signalized Intersection Summary

10: Isabel Ave & Discovery Dr

Existing
Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶↶	↷↷	↶↶	↶↶↶	↶↶↶	↶
Traffic Volume (veh/h)	27	25	18	1430	1339	42
Future Volume (veh/h)	27	25	18	1430	1339	42
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1411	1189	1737	1781	1781	1470
Adj Flow Rate, veh/h	38	35	21	1702	1594	50
Peak Hour Factor	0.72	0.72	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	33	48	11	8	8	29
Cap, veh/h	263	179	118	2900	1951	500
Arrive On Green	0.10	0.10	0.04	0.60	0.40	0.40
Sat Flow, veh/h	2607	1773	3209	5024	5024	1246
Grp Volume(v), veh/h	38	35	21	1702	1594	50
Grp Sat Flow(s),veh/h/ln	1303	886	1605	1621	1621	1246
Q Serve(g_s), s	0.5	0.7	0.2	7.8	10.5	0.9
Cycle Q Clear(g_c), s	0.5	0.7	0.2	7.8	10.5	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	263	179	118	2900	1951	500
V/C Ratio(X)	0.14	0.20	0.18	0.59	0.82	0.10
Avail Cap(c_a), veh/h	1811	1232	2229	4054	4054	1039
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.8	14.8	16.8	4.5	9.6	6.7
Incr Delay (d2), s/veh	0.1	0.2	0.3	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.3	0.1	0.3	1.8	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.9	15.0	17.1	4.6	9.9	6.8
LnGrp LOS	B	B	B	A	A	A
Approach Vol, veh/h	73			1723	1644	
Approach Delay, s/veh	14.9			4.7	9.8	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		27.7		8.3	7.0	20.6
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		9.8		2.7	2.2	12.5
Green Ext Time (p_c), s		2.1		0.0	0.0	1.9

Intersection Summary

HCM 6th Ctrl Delay	7.4
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Existing
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	86	384	1297	156	481	1107
v/c Ratio	0.18	0.70	0.61	0.09	0.54	0.48
Control Delay	27.6	11.1	16.1	2.0	27.9	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	11.1	16.1	2.0	27.9	5.5
Queue Length 50th (ft)	15	0	126	3	59	68
Queue Length 95th (ft)	34	50	224	13	106	159
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1290	829	2627	2469	1487	2953
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.46	0.49	0.06	0.32	0.37
Intersection Summary						

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Existing
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶↷	↶	↶↷↶	↶↷	↶↷↶	↶↷
Traffic Volume (veh/h)	71	319	1115	134	414	952
Future Volume (veh/h)	71	319	1115	134	414	952
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1811	1811	1781	1811	1796	1767
Adj Flow Rate, veh/h	86	384	1297	156	481	1107
Peak Hour Factor	0.83	0.83	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	6	6	8	6	7	9
Cap, veh/h	931	427	1888	1800	675	1974
Arrive On Green	0.28	0.28	0.39	0.39	0.14	0.59
Sat Flow, veh/h	3346	1535	5024	2701	4824	3445
Grp Volume(v), veh/h	86	384	1297	156	481	1107
Grp Sat Flow(s),veh/h/ln	1673	1535	1621	1351	1608	1678
Q Serve(g_s), s	1.4	18.0	16.7	1.5	7.1	15.2
Cycle Q Clear(g_c), s	1.4	18.0	16.7	1.5	7.1	15.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	931	427	1888	1800	675	1974
V/C Ratio(X)	0.09	0.90	0.69	0.09	0.71	0.56
Avail Cap(c_a), veh/h	1117	512	2272	2014	1288	1974
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	20.0	26.0	19.1	4.4	30.8	9.5
Incr Delay (d2), s/veh	0.0	16.6	0.8	0.0	1.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	8.1	5.4	0.3	2.6	4.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.1	42.7	20.0	4.5	32.2	9.9
LnGrp LOS	C	D	B	A	C	A
Approach Vol, veh/h	470		1453			1588
Approach Delay, s/veh	38.5		18.3			16.7
Approach LOS	D		B			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	15.0	34.6			49.6	25.4
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	9.1	18.7			17.2	20.0
Green Ext Time (p_c), s	1.4	10.4			9.1	0.8

Intersection Summary

HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Existing
Timing Plan: AM Peak



























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	74	146	63	86	136	176	1402	24	224	1556
v/c Ratio	0.01	0.21	0.23	0.19	0.14	0.19	0.64	0.81	0.04	0.45	0.91
Control Delay	45.0	38.9	4.6	46.4	27.7	4.0	58.5	33.5	0.1	49.9	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	38.9	4.6	46.4	27.7	4.0	58.5	33.5	0.1	49.9	40.6
Queue Length 50th (ft)	3	45	0	38	40	0	113	282	0	74	344
Queue Length 95th (ft)	16	82	33	94	92	33	#299	#542	0	139	#640
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	376	517	686	336	727	739	322	2386	862	570	2333
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.14	0.21	0.19	0.12	0.18	0.55	0.59	0.03	0.39	0.67

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Existing
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	64	127	55	75	118	160	1276	22	199	1368	17
Future Volume (veh/h)	4	64	127	55	75	118	160	1276	22	199	1368	17
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		1.00	1.00		1.00	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	1870	1559	1870	1796	1841	1663	1841	1752	1870	1811	1767	1767
Adj Flow Rate, veh/h	5	74	146	63	86	136	176	1402	24	224	1537	19
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.91	0.91	0.91	0.89	0.89	0.89
Percent Heavy Veh, %	2	23	2	7	4	16	4	10	2	6	9	9
Cap, veh/h	37	248	442	230	501	560	210	1602	531	418	1672	21
Arrive On Green	0.02	0.16	0.16	0.13	0.27	0.27	0.12	0.33	0.33	0.13	0.34	0.34
Sat Flow, veh/h	1781	1559	1585	1711	1841	1409	1753	4782	1585	3346	4910	61
Grp Volume(v), veh/h	5	74	146	63	86	136	176	1402	24	224	1006	550
Grp Sat Flow(s),veh/h/ln	1781	1559	1585	1711	1841	1409	1753	1594	1585	1673	1608	1756
Q Serve(g_s), s	0.2	3.7	6.4	2.9	3.1	5.6	8.6	24.2	0.9	5.5	26.3	26.3
Cycle Q Clear(g_c), s	0.2	3.7	6.4	2.9	3.1	5.6	8.6	24.2	0.9	5.5	26.3	26.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	37	248	442	230	501	560	210	1602	531	418	1095	598
V/C Ratio(X)	0.13	0.30	0.33	0.27	0.17	0.24	0.84	0.88	0.05	0.54	0.92	0.92
Avail Cap(c_a), veh/h	325	409	606	293	501	560	280	2129	706	497	1432	782
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	42.1	32.5	25.1	34.1	24.3	17.6	37.7	27.4	19.7	35.9	27.7	27.7
Incr Delay (d2), s/veh	0.6	0.2	0.2	0.2	0.1	0.1	12.1	2.8	0.0	0.4	7.1	11.8
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	0.1	1.3	2.3	1.2	1.3	1.7	4.2	8.8	0.3	2.2	10.2	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.7	32.8	25.3	34.3	24.4	17.7	49.9	30.2	19.7	36.3	34.8	39.5
LnGrp LOS	D	C	C	C	C	B	D	C	B	D	C	D
Approach Vol, veh/h		225			285			1602			1780	
Approach Delay, s/veh		28.1			23.4			32.2			36.5	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	35.1	16.8	19.7	15.5	35.6	6.8	29.7				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	7.5	26.2	4.9	8.4	10.6	28.3	2.2	7.6				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	1.5	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	5	17	12	5	22
Future Vol, veh/h	20	5	17	12	5	22
Conflicting Peds, #/hr	0	3	3	0	4	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	60	60	68	68
Heavy Vehicles, %	5	40	44	25	20	77
Mvmt Flow	29	7	28	20	7	32

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	39	0	116 38
Stage 1	-	-	-	-	36 -
Stage 2	-	-	-	-	80 -
Critical Hdwy	-	-	4.54	-	6.6 6.97
Critical Hdwy Stg 1	-	-	-	-	5.6 -
Critical Hdwy Stg 2	-	-	-	-	5.6 -
Follow-up Hdwy	-	-	2.596	-	3.68 3.993
Pot Cap-1 Maneuver	-	-	1339	-	839 855
Stage 1	-	-	-	-	942 -
Stage 2	-	-	-	-	900 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1335	-	816 851
Mov Cap-2 Maneuver	-	-	-	-	816 -
Stage 1	-	-	-	-	939 -
Stage 2	-	-	-	-	878 -

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	844	-	-	1335	-
HCM Lane V/C Ratio	0.047	-	-	0.021	-
HCM Control Delay (s)	9.5	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

HCM 6th TWSC
14: Challenger St/Driveway & Discovery Dr

Existing
Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	32	8	23	20	12	7	0	17	4	0	3
Future Vol, veh/h	4	32	8	23	20	12	7	0	17	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	10	10	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	72	72	72	75	75	75	44	44	44
Heavy Vehicles, %	25	53	13	22	45	33	33	2	35	2	2	2
Mvmt Flow	6	46	12	32	28	17	9	0	23	9	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	45	0	0	58	0	0	168	173	62	187	171	37
Stage 1	-	-	-	-	-	-	64	64	-	101	101	-
Stage 2	-	-	-	-	-	-	104	109	-	86	70	-
Critical Hdwy	4.35	-	-	4.32	-	-	7.43	6.52	6.55	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.425	-	-	2.398	-	-	3.797	4.018	3.615	3.518	4.018	3.318
Pot Cap-1 Maneuver	1427	-	-	1428	-	-	731	720	918	774	722	1035
Stage 1	-	-	-	-	-	-	875	842	-	905	811	-
Stage 2	-	-	-	-	-	-	831	805	-	922	837	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1427	-	-	1428	-	-	711	701	909	732	703	1035
Mov Cap-2 Maneuver	-	-	-	-	-	-	711	701	-	732	703	-
Stage 1	-	-	-	-	-	-	872	839	-	901	792	-
Stage 2	-	-	-	-	-	-	807	786	-	887	834	-

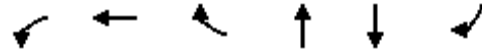
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			3.2			9.5			9.4		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	841	1427	-	-	1428	-	-	837
HCM Lane V/C Ratio	0.038	0.004	-	-	0.022	-	-	0.019
HCM Control Delay (s)	9.5	7.5	0	-	7.6	0	-	9.4
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Existing
Timing Plan: AM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	91	91	505	739	631	649
v/c Ratio	0.35	0.34	0.50	0.79	0.27	0.52
Control Delay	24.0	23.8	10.9	18.1	4.1	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	23.8	10.9	18.1	4.1	2.1
Queue Length 50th (ft)	25	25	38	150	27	0
Queue Length 95th (ft)	69	69	95	285	59	15
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	667	678	1579	1356	3373	1529
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.32	0.54	0.19	0.42

Intersection Summary

HCM Signalized Intersection Capacity Analysis

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Existing
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↖	↖	↖↖		↑			↑↑	↖	
Traffic Volume (vph)	0	0	0	151	19	470	0	606	0	0	505	519	
Future Volume (vph)	0	0	0	151	19	470	0	606	0	0	505	519	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1630	2707		1863			3505	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1630	2707		1863			3505	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.82	0.82	0.82	0.80	0.80	0.80	
Adj. Flow (vph)	0	0	0	162	20	505	0	739	0	0	631	649	
RTOR Reduction (vph)	0	0	0	0	0	130	0	0	0	0	0	218	
Lane Group Flow (vph)	0	0	0	91	91	375	0	739	0	0	631	431	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	5%	5%	2%	2%	2%	2%	3%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				8.1	8.1	15.9		25.1			32.9	32.9	
Effective Green, g (s)				8.1	8.1	15.9		25.1			32.9	32.9	
Actuated g/C Ratio				0.16	0.16	0.32		0.51			0.66	0.66	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				262	266	869		944			2329	1039	
v/s Ratio Prot								c0.40			0.18		
v/s Ratio Perm				0.06	0.06	c0.14						0.28	
v/c Ratio				0.35	0.34	0.43		0.78			0.27	0.42	
Uniform Delay, d1				18.4	18.3	13.2		10.0			3.4	3.8	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.3	0.3	0.1		4.0			0.0	0.1	
Delay (s)				18.6	18.6	13.4		13.9			3.4	3.9	
Level of Service				B	B	B		B			A	A	
Approach Delay (s)		0.0			14.8			13.9			3.7		
Approach LOS		A			B			B			A		
Intersection Summary													
HCM 2000 Control Delay			9.3		HCM 2000 Level of Service						A		
HCM 2000 Volume to Capacity ratio			0.71										
Actuated Cycle Length (s)			49.5		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			55.7%		ICU Level of Service					B			
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Existing






















Timing Plan: AM Peak



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	481	283	402	88	357
v/c Ratio	0.56	0.37	0.32	0.14	0.25
Control Delay	10.4	2.8	5.8	2.2	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.4	2.8	5.8	2.2	5.4
Queue Length 50th (ft)	24	0	14	0	11
Queue Length 95th (ft)	39	10	31	9	25
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3433	2221	3001	1386	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.13	0.06	0.10
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Existing
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					 			 	
Traffic Volume (vph)	423	0	249	0	0	0	0	376	94	0	328	0
Future Volume (vph)	423	0	249	0	0	0	0	376	94	0	328	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3002	1386		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3002	1386		3505	
Peak-hour factor, PHF	0.88	0.88	0.88	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	481	0	283	0	0	0	0	392	98	0	357	0
RTOR Reduction (vph)	0	0	211	0	0	0	0	3	51	0	0	0
Lane Group Flow (vph)	481	0	72	0	0	0	0	399	37	0	357	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	6%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	6.1		6.1					10.0	10.0		10.0	
Effective Green, g (s)	6.1		6.1					10.0	10.0		10.0	
Actuated g/C Ratio	0.25		0.25					0.41	0.41		0.41	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	868		562					1245	575		1454	
v/s Ratio Prot								c0.13			0.10	
v/s Ratio Perm	c0.14		0.03						0.03			
v/c Ratio	0.55		0.13					0.32	0.06		0.25	
Uniform Delay, d1	7.8		6.9					4.8	4.2		4.6	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.4		0.0					0.1	0.0		0.0	
Delay (s)	8.3		7.0					4.8	4.3		4.6	
Level of Service	A		A					A	A		A	
Approach Delay (s)		7.8			0.0			4.7			4.6	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.1					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			24.1					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			30.1%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	518	349	9	15	190	694	13	55	688	21	348
v/c Ratio	0.55	0.23	0.01	0.09	0.28	0.39	0.09	0.09	0.53	0.04	0.22
Control Delay	31.5	18.2	0.0	43.2	30.4	2.1	43.4	24.3	26.6	15.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	18.2	0.0	43.2	30.4	2.1	43.4	24.3	26.6	15.5	0.3
Queue Length 50th (ft)	66	44	0	6	34	0	5	5	82	5	0
Queue Length 95th (ft)	177	159	0	35	105	36	24	15	217	25	0
Internal Link Dist (ft)		745			868			219		816	
Turn Bay Length (ft)	400		305	350			110		600		420
Base Capacity (vph)	1683	1626	772	447	1206	2610	387	2012	3887	1374	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.21	0.01	0.03	0.16	0.27	0.03	0.03	0.18	0.02	0.22

Intersection Summary

HCM 6th Signalized Intersection Summary

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Existing
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	↑↑	→	←	↑↑	→	←	↑↑	→	←←←	↑	→
Traffic Volume (veh/h)	487	328	8	14	182	666	9	28	10	633	19	320
Future Volume (veh/h)	487	328	8	14	182	666	9	28	10	633	19	320
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		0.99	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	1870	1870	1870	1870	1870	1870	1870	1796	1796	1870	1589	1870
Adj Flow Rate, veh/h	518	349	9	15	190	694	13	41	14	688	21	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.69	0.69	0.69	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	7	7	2	21	2
Cap, veh/h	738	1376	610	33	920	1258	23	273	84	981	407	
Arrive On Green	0.15	0.39	0.39	0.02	0.26	0.26	0.01	0.07	0.07	0.20	0.26	0.00
Sat Flow, veh/h	5023	3554	1575	1781	3554	2754	1781	3707	1139	5023	1589	1585
Grp Volume(v), veh/h	518	349	9	15	190	694	13	36	19	688	21	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1575	1781	1777	1377	1781	1635	1577	1674	1589	1585
Q Serve(g_s), s	5.8	4.0	0.2	0.5	2.5	10.9	0.4	0.6	0.7	7.6	0.6	0.0
Cycle Q Clear(g_c), s	5.8	4.0	0.2	0.5	2.5	10.9	0.4	0.6	0.7	7.6	0.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.72	1.00		1.00
Lane Grp Cap(c), veh/h	738	1376	610	33	920	1258	23	241	116	981	407	
V/C Ratio(X)	0.70	0.25	0.01	0.46	0.21	0.55	0.56	0.15	0.17	0.70	0.05	
Avail Cap(c_a), veh/h	1693	1497	663	450	1198	1473	390	1377	664	4233	535	
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	0.00
Uniform Delay (d), s/veh	24.1	12.4	11.2	28.8	17.2	11.8	29.1	25.7	25.8	22.3	16.6	0.0
Incr Delay (d2), s/veh	0.5	0.1	0.0	3.6	0.1	0.4	7.7	0.2	0.5	0.7	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	2.1	1.3	0.1	0.2	0.9	2.7	0.2	0.2	0.2	2.7	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.5	12.4	11.2	32.5	17.3	12.2	36.8	25.9	26.3	22.9	16.7	0.0
LnGrp LOS	C	B	B	C	B	B	D	C	C	C	B	
Approach Vol, veh/h		876			899			68			709	A
Approach Delay, s/veh		19.6			13.6			28.1			22.8	
Approach LOS		B			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	12.7	20.7	15.6	10.4	5.1	28.3	4.8	21.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	7.8	12.9	9.6	2.7	2.5	6.0	2.4	2.6				
Green Ext Time (p_c), s	0.9	2.4	2.0	0.2	0.0	2.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	18.6
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.

User approved ignoring U-Turning movement.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

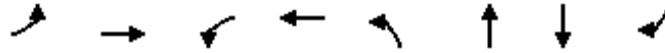
Existing
Timing Plan: PM Peak

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	346	669	31	385	94	89	74	476
v/c Ratio	0.53	0.35	0.13	0.32	0.28	0.26	0.25	0.55
Control Delay	32.6	19.2	38.0	24.7	28.4	22.9	34.9	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	19.2	38.0	24.7	28.4	22.9	34.9	6.7
Queue Length 50th (ft)	59	57	10	33	32	23	24	0
Queue Length 95th (ft)	181	176	55	82	105	86	104	53
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1502	3692	516	3664	536	529	528	1149
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.18	0.06	0.11	0.18	0.17	0.14	0.41
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Existing
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	332	623	19	27	283	48	130	15	33	41	31	466
Future Volume (vph)	332	623	19	27	283	48	130	15	33	41	31	466
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5058		1770	6255		1681	1614			1811	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5058		1770	6255		1681	1614			1811	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	346	649	20	31	329	56	134	15	34	42	32	476
RTOR Reduction (vph)	0	3	0	0	28	0	0	17	0	0	0	398
Lane Group Flow (vph)	346	666	0	31	357	0	94	72	0	0	74	78
Confl. Peds. (#/hr)							1		8			
Confl. Bikes (#/hr)							2		1			1
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	14.2	27.6		3.2	16.6		15.0	15.0			12.4	12.4
Effective Green, g (s)	14.2	27.6		3.2	16.6		15.0	15.0			12.4	12.4
Actuated g/C Ratio	0.19	0.37		0.04	0.22		0.20	0.20			0.16	0.16
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	645	1849		75	1375		333	320			297	457
v/s Ratio Prot	c0.10	c0.13		0.02	0.06		c0.06	0.04			c0.04	0.03
v/s Ratio Perm												
v/c Ratio	0.54	0.36		0.41	0.26		0.28	0.23			0.25	0.17
Uniform Delay, d1	27.7	17.5		35.2	24.4		25.7	25.4			27.5	27.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.7	0.0		1.3	0.0		0.3	0.3			0.2	0.1
Delay (s)	28.3	17.5		36.6	24.4		26.0	25.6			27.7	27.2
Level of Service	C	B		D	C		C	C			C	C
Approach Delay (s)		21.2			25.3			25.8			27.3	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	75.5	Sum of lost time (s)	17.3
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
3: W Jack London Blvd & Livermore Outlets Dr

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	99	652	267	37	39	121
v/c Ratio	0.09	0.29	0.16	0.05	0.07	0.12
Control Delay	17.3	5.0	11.0	4.5	18.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	5.0	11.0	4.5	18.5	5.8
Queue Length 50th (ft)	9	38	28	0	8	0
Queue Length 95th (ft)	37	55	47	12	38	22
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2328	3539	3319	1451	1031	1674
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.18	0.08	0.03	0.04	0.07
Intersection Summary						

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Existing
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	95	626	259	36	37	114
Future Volume (veh/h)	95	626	259	36	37	114
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	99	652	267	37	39	121
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	3	2	2
Cap, veh/h	592	1911	926	399	384	601
Arrive On Green	0.17	0.54	0.26	0.26	0.22	0.22
Sat Flow, veh/h	3456	3647	3647	1531	1781	2790
Grp Volume(v), veh/h	99	652	267	37	39	121
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1531	1781	1395
Q Serve(g_s), s	0.9	3.9	2.3	0.7	0.7	1.3
Cycle Q Clear(g_c), s	0.9	3.9	2.3	0.7	0.7	1.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	592	1911	926	399	384	601
V/C Ratio(X)	0.17	0.34	0.29	0.09	0.10	0.20
Avail Cap(c_a), veh/h	2291	3770	4241	1827	945	1480
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.3	4.9	11.1	10.6	11.9	12.1
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.5	0.6	0.2	0.2	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.4	5.0	11.2	10.6	11.9	12.2
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		751	304		160	
Approach Delay, s/veh		6.1	11.1		12.1	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.5	15.1			25.6	12.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.9	4.3			5.9	3.3
Green Ext Time (p_c), s	0.2	1.1			2.7	0.3

Intersection Summary

HCM 6th Ctrl Delay	8.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
4: W Jack London Blvd & Wolf House Dr

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	13	671	290	13	23	37
v/c Ratio	0.02	0.52	0.24	0.01	0.03	0.05
Control Delay	19.5	9.7	10.2	8.0	13.3	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.5	9.7	10.2	8.0	13.3	6.1
Queue Length 50th (ft)	2	97	32	0	3	0
Queue Length 95th (ft)	21	334	172	12	16	11
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1417	1863	1719	1424	1164	1073
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.36	0.17	0.01	0.02	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Existing
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑	↗	↖	↘	↘
Traffic Volume (veh/h)	13	651	270	12	16	26
Future Volume (veh/h)	13	651	270	12	16	26
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1811	1841
Adj Flow Rate, veh/h	13	671	290	13	23	37
Peak Hour Factor	0.97	0.97	0.93	0.93	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	6	4
Cap, veh/h	61	973	631	521	232	209
Arrive On Green	0.03	0.52	0.34	0.34	0.13	0.13
Sat Flow, veh/h	1781	1870	1870	1546	1725	1560
Grp Volume(v), veh/h	13	671	290	13	23	37
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1546	1725	1560
Q Serve(g_s), s	0.2	7.2	3.3	0.2	0.3	0.6
Cycle Q Clear(g_c), s	0.2	7.2	3.3	0.2	0.3	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	61	973	631	521	232	209
V/C Ratio(X)	0.21	0.69	0.46	0.02	0.10	0.18
Avail Cap(c_a), veh/h	1985	3127	3127	2585	1282	1159
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.6	4.8	7.0	6.0	10.2	10.3
Incr Delay (d2), s/veh	1.3	0.3	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.5	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.9	5.2	7.2	6.0	10.3	10.5
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		684	303		60	
Approach Delay, s/veh		5.3	7.1		10.4	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.9	14.4			19.3	7.6
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.2	5.3			9.2	2.6
Green Ext Time (p_c), s	0.0	1.0			2.7	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
5: W Jack London Blvd & Ambassador Dwy

Existing
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	673	287	0	0	0
Future Vol, veh/h	0	673	287	0	0	0
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	94	94	25	25
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	783	305	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	306	0	0 1089 306
Stage 1	-	-	- 306 -
Stage 2	-	-	- 783 -
Critical Hdwy	4.12	-	- 6.42 6.22
Critical Hdwy Stg 1	-	-	- 5.42 -
Critical Hdwy Stg 2	-	-	- 5.42 -
Follow-up Hdwy	2.218	-	- 3.518 3.318
Pot Cap-1 Maneuver	1255	-	- 238 734
Stage 1	-	-	- 747 -
Stage 2	-	-	- 450 -
Platoon blocked, %		-	- -
Mov Cap-1 Maneuver	1254	-	- 238 733
Mov Cap-2 Maneuver	-	-	- 238 -
Stage 1	-	-	- 746 -
Stage 2	-	-	- 450 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1254	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC
6: W Jack London Blvd & Airport Dwy

Existing
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	664	293	0	0	1
Future Vol, veh/h	2	664	293	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	90	90	25	25
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	755	326	0	0	4

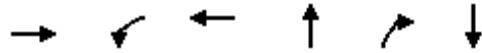
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	326	0	-	0	1085 326
Stage 1	-	-	-	-	326 -
Stage 2	-	-	-	-	759 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1234	-	-	-	240 715
Stage 1	-	-	-	-	731 -
Stage 2	-	-	-	-	462 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1234	-	-	-	240 715
Mov Cap-2 Maneuver	-	-	-	-	240 -
Stage 1	-	-	-	-	730 -
Stage 2	-	-	-	-	462 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1234	-	-	-	715
HCM Lane V/C Ratio	0.002	-	-	-	0.006
HCM Control Delay (s)	7.9	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues
7: Discovery Dr & W Jack London Blvd

Existing
Timing Plan: PM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	766	9	287	25	19	17
v/c Ratio	0.28	0.02	0.10	0.03	0.03	0.03
Control Delay	6.8	17.1	3.9	15.6	0.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	17.1	3.9	15.6	0.1	0.1
Queue Length 50th (ft)	0	1	0	0	0	0
Queue Length 95th (ft)	166	15	41	19	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	3068	1292	3539	1382	910	1097
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.01	0.08	0.02	0.02	0.02
Intersection Summary						

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Existing
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	651	16	8	264	0	16	0	12	7	0	2
Future Volume (veh/h)	0	651	16	8	264	0	16	0	12	7	0	2
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		1.00	1.00		1.00	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	0	1870	1870	1530	1870	0	1870	1870	1278	1870	1870	1870
Adj Flow Rate, veh/h	0	748	18	9	287	0	25	0	19	12	0	4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.64	0.64	0.64	0.56	0.56	0.56
Percent Heavy Veh, %	0	2	2	25	2	0	2	2	42	2	2	2
Cap, veh/h	0	1208	29	28	1711	0	161	0	98	32	0	11
Arrive On Green	0.00	0.34	0.34	0.02	0.48	0.00	0.09	0.00	0.09	0.02	0.00	0.02
Sat Flow, veh/h	0	3638	85	1457	3647	0	1781	0	1083	1296	0	432
Grp Volume(v), veh/h	0	375	391	9	287	0	25	0	19	16	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1853	1457	1777	0	1781	0	1083	1728	0	0
Q Serve(g_s), s	0.0	5.8	5.8	0.2	1.5	0.0	0.4	0.0	0.5	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.8	5.8	0.2	1.5	0.0	0.4	0.0	0.5	0.3	0.0	0.0
Prop In Lane	0.00		0.05	1.00		0.00	1.00		1.00	0.75		0.25
Lane Grp Cap(c), veh/h	0	606	632	28	1711	0	161	0	98	43	0	0
V/C Ratio(X)	0.00	0.62	0.62	0.32	0.17	0.00	0.16	0.00	0.19	0.37	0.00	0.00
Avail Cap(c_a), veh/h	0	1616	1685	1325	3232	0	1080	0	656	629	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.1	9.1	16.0	4.8	0.0	13.8	0.0	13.9	15.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.7	2.4	0.0	0.0	0.2	0.0	0.4	2.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.3	1.4	0.1	0.2	0.0	0.2	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	9.8	9.8	18.4	4.9	0.0	14.0	0.0	14.2	17.8	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	B	A	A
Approach Vol, veh/h		766			296			44				16
Approach Delay, s/veh		9.8			5.3			14.1				17.8
Approach LOS		A			A			B				B
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	4.6	16.5		4.8		21.2		7.0				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.2	7.8		2.3		3.5		2.5				
Green Ext Time (p_c), s	0.0	3.4		0.0		1.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	747	20	296	6	66
v/c Ratio	0.01	0.33	0.05	0.13	0.01	0.14
Control Delay	14.3	6.8	13.9	5.8	13.6	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	6.8	13.9	5.8	13.6	1.2
Queue Length 50th (ft)	0	38	2	13	1	0
Queue Length 95th (ft)	6	123	19	46	8	2
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	952	3321	768	3472	1471	937
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.22	0.03	0.09	0.00	0.07
Intersection Summary						

HCM 6th Signalized Intersection Summary

8: Voyager St & W Jack London Blvd

Existing
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	3	671	9	18	269	0	5	0	55	0	0	0
Future Volume (veh/h)	3	671	9	18	269	0	5	0	55	0	0	0
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		1.00	1.00		1.00	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	1870	1870	1870	788	1870	1870	1870	1870	1203	1870	1870	1870
Adj Flow Rate, veh/h	3	737	10	20	296	0	6	0	66	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.83	0.83	0.83	0.25	0.25	0.25
Percent Heavy Veh, %	2	2	2	75	2	2	2	2	47	2	2	2
Cap, veh/h	10	1293	18	31	1407	0	218	0	125	0	7	0
Arrive On Green	0.01	0.36	0.36	0.04	0.40	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3588	49	751	3647	0	1781	0	1020	0	1870	0
Grp Volume(v), veh/h	3	365	382	20	296	0	6	0	66	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1860	751	1777	0	1781	0	1020	0	1870	0
Q Serve(g_s), s	0.0	4.6	4.6	0.7	1.5	0.0	0.1	0.0	1.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.6	4.6	0.7	1.5	0.0	0.1	0.0	1.7	0.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	640	671	31	1407	0	218	0	125	0	7	0
V/C Ratio(X)	0.29	0.57	0.57	0.65	0.21	0.00	0.03	0.00	0.53	0.00	0.00	0.00
Avail Cap(c_a), veh/h	765	2225	2329	537	4450	0	1593	0	912	0	803	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	13.8	7.2	7.2	13.2	5.6	0.0	10.8	0.0	11.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.6	0.6	8.1	0.1	0.0	0.0	0.0	1.3	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.7	0.8	0.1	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	7.8	7.8	21.3	5.6	0.0	10.8	0.0	12.8	0.0	0.0	0.0
LnGrp LOS	B	A	A	C	A	A	B	A	B	A	A	A
Approach Vol, veh/h		750			316			72				0
Approach Delay, s/veh		7.8			6.6			12.6				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.2	15.4		0.0	4.2	16.4		7.4				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	2.7	6.6		0.0	2.0	3.5		3.7				
Green Ext Time (p_c), s	0.0	3.5		0.0	0.0	1.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	95	458	195	127	188	311	68	1243	142	289	1441	62
v/c Ratio	0.20	0.81	0.48	0.23	0.60	0.48	0.14	0.80	0.24	0.55	0.80	0.11
Control Delay	40.6	53.5	10.0	39.5	48.2	21.2	41.1	35.6	5.2	44.9	33.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	53.5	10.0	39.5	48.2	21.2	41.1	35.6	5.2	44.9	33.5	0.4
Queue Length 50th (ft)	27	148	0	36	111	109	19	256	0	87	310	0
Queue Length 95th (ft)	58	225	63	71	197	212	45	330	42	149	395	0
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	473	1984	947	699	1128	649	679	3559	1170	524	3273	966
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.23	0.21	0.18	0.17	0.48	0.10	0.35	0.12	0.55	0.44	0.06

Intersection Summary

HCM 6th Signalized Intersection Summary

9: Isabel Ave & W Jack London Blvd

Existing
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑	↖	↖↗	↑↑↑	↖	↖↗	↑↑↑	↖
Traffic Volume (veh/h)	87	421	179	113	167	277	65	1193	136	260	1297	56
Future Volume (veh/h)	87	421	179	113	167	277	65	1193	136	260	1297	56
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		1.00	1.00		1.00	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	1707	1870	1826	1870	1856	1870	1826	1841	1870	1870	1826	1663
Adj Flow Rate, veh/h	95	458	195	127	188	311	68	1243	142	289	1441	62
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.96	0.96	0.96	0.90	0.90	0.90
Percent Heavy Veh, %	13	2	5	2	3	2	5	4	2	2	5	16
Cap, veh/h	462	601	262	568	347	516	418	1526	481	479	1587	449
Arrive On Green	0.15	0.17	0.17	0.16	0.19	0.19	0.12	0.30	0.30	0.14	0.32	0.32
Sat Flow, veh/h	3155	3554	1547	3456	1856	1585	3374	5025	1585	3456	4985	1409
Grp Volume(v), veh/h	95	458	195	127	188	311	68	1243	142	289	1441	62
Grp Sat Flow(s),veh/h/ln	1577	1777	1547	1728	1856	1585	1687	1675	1585	1728	1662	1409
Q Serve(g_s), s	2.5	11.5	11.2	3.0	8.6	15.4	1.7	21.5	6.4	7.4	26.0	2.9
Cycle Q Clear(g_c), s	2.5	11.5	11.2	3.0	8.6	15.4	1.7	21.5	6.4	7.4	26.0	2.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	462	601	262	568	347	516	418	1526	481	479	1587	449
V/C Ratio(X)	0.21	0.76	0.74	0.22	0.54	0.60	0.16	0.81	0.29	0.60	0.91	0.14
Avail Cap(c_a), veh/h	505	601	262	737	1188	1234	720	3752	1184	553	2924	827
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	35.2	37.1	37.0	34.0	34.5	26.5	36.7	30.2	25.0	38.0	30.6	22.8
Incr Delay (d2), s/veh	0.1	5.1	9.8	0.1	0.5	0.4	0.1	0.4	0.1	0.7	0.9	0.1
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	0.9	5.2	4.7	1.2	3.7	5.5	0.7	7.9	2.3	3.0	9.7	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.3	42.3	46.8	34.0	35.0	26.9	36.8	30.6	25.1	38.6	31.5	22.8
LnGrp LOS	D	D	D	C	C	C	D	C	C	D	C	C
Approach Vol, veh/h		748			626			1453			1792	
Approach Delay, s/veh		42.6			30.8			30.4			32.4	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	34.3	20.1	21.7	16.3	35.7	18.4	23.3				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	9.4	23.5	5.0	13.5	3.7	28.0	4.5	17.4				
Green Ext Time (p_c), s	0.0	1.4	0.0	0.1	0.0	1.9	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	33.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	30	46	14	1477	1777	31
v/c Ratio	0.07	0.12	0.04	0.37	0.48	0.04
Control Delay	20.4	8.8	20.4	3.5	6.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	8.8	20.4	3.5	6.3	4.0
Queue Length 50th (ft)	4	0	2	63	83	1
Queue Length 95th (ft)	11	7	9	83	212	12
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1495	1226	1117	5036	3898	882
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.01	0.29	0.46	0.04
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Existing
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	20	31	13	1374	1546	27
Future Volume (veh/h)	20	31	13	1374	1546	27
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1678	1663	1100	1856	1841	1248
Adj Flow Rate, veh/h	30	46	14	1477	1777	31
Peak Hour Factor	0.67	0.67	0.93	0.93	0.87	0.87
Percent Heavy Veh, %	15	16	54	3	4	44
Cap, veh/h	317	254	51	3064	2143	451
Arrive On Green	0.10	0.10	0.03	0.60	0.43	0.43
Sat Flow, veh/h	3100	2480	2032	5233	5191	1058
Grp Volume(v), veh/h	30	46	14	1477	1777	31
Grp Sat Flow(s),veh/h/ln	1550	1240	1016	1689	1675	1058
Q Serve(g_s), s	0.3	0.6	0.3	6.1	11.7	0.6
Cycle Q Clear(g_c), s	0.3	0.6	0.3	6.1	11.7	0.6
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	317	254	51	3064	2143	451
V/C Ratio(X)	0.09	0.18	0.27	0.48	0.83	0.07
Avail Cap(c_a), veh/h	2081	1665	1364	4082	4049	852
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.1	15.3	17.8	4.1	9.5	6.3
Incr Delay (d2), s/veh	0.0	0.1	1.0	0.0	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	0.2	2.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.2	15.4	18.8	4.1	9.8	6.3
LnGrp LOS	B	B	B	A	A	A
Approach Vol, veh/h	76			1491	1808	
Approach Delay, s/veh	15.3			4.3	9.7	
Approach LOS	B			A	A	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		28.7		8.5	6.6	22.1
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		8.1		2.6	2.3	13.7
Green Ext Time (p_c), s		1.8		0.0	0.0	2.2

Intersection Summary

HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Existing
Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	85	529	1001	86	380	1401
v/c Ratio	0.12	0.80	0.55	0.05	0.44	0.66
Control Delay	21.6	16.6	17.5	0.9	27.1	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	16.6	17.5	0.9	27.1	10.2
Queue Length 50th (ft)	12	35	96	0	42	133
Queue Length 95th (ft)	35	166	194	5	96	316
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1475	917	2972	2434	1715	3100
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.58	0.34	0.04	0.22	0.45
Intersection Summary						

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Existing
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶↶	↶	↑↑↑	↷↷	↶↶↶	↑↑
Traffic Volume (veh/h)	77	481	911	78	338	1247
Future Volume (veh/h)	77	481	911	78	338	1247
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1826	1841	1870	1826
Adj Flow Rate, veh/h	85	529	1001	86	380	1401
Peak Hour Factor	0.91	0.91	0.91	0.91	0.89	0.89
Percent Heavy Veh, %	2	2	5	4	2	5
Cap, veh/h	1218	559	1631	1866	583	1758
Arrive On Green	0.35	0.35	0.33	0.33	0.12	0.51
Sat Flow, veh/h	3456	1585	5149	2745	5023	3561
Grp Volume(v), veh/h	85	529	1001	86	380	1401
Grp Sat Flow(s),veh/h/ln	1728	1585	1662	1373	1674	1735
Q Serve(g_s), s	1.2	23.0	12.0	0.7	5.1	23.7
Cycle Q Clear(g_c), s	1.2	23.0	12.0	0.7	5.1	23.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1218	559	1631	1866	583	1758
V/C Ratio(X)	0.07	0.95	0.61	0.05	0.65	0.80
Avail Cap(c_a), veh/h	1218	559	2459	2322	1416	1758
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.3	22.3	20.1	3.8	30.0	14.5
Incr Delay (d2), s/veh	0.0	25.5	0.5	0.0	1.2	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	11.6	4.0	0.1	1.9	7.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.3	47.8	20.6	3.8	31.2	17.3
LnGrp LOS	B	D	C	A	C	B
Approach Vol, veh/h	614		1087			1781
Approach Delay, s/veh	43.3		19.3			20.3
Approach LOS	D		B			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.7	28.7			41.4	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	7.1	14.0			25.7	25.0
Green Ext Time (p_c), s	1.1	9.2			6.9	0.0
Intersection Summary						
HCM 6th Ctrl Delay			24.0			
HCM 6th LOS			C			

Queues
12: Isabel Ave & Airway Blvd

Existing
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	11	108	259	32	58	247	153	1538	29	245	1543
v/c Ratio	0.03	0.27	0.39	0.09	0.10	0.32	0.56	0.83	0.05	0.47	0.85
Control Delay	44.4	36.9	6.6	44.0	26.8	3.7	53.0	32.9	0.2	46.3	34.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.4	36.9	6.6	44.0	26.8	3.7	53.0	32.9	0.2	46.3	34.3
Queue Length 50th (ft)	6	62	14	17	24	0	92	314	0	76	323
Queue Length 95th (ft)	28	115	64	59	70	47	#246	#604	0	#148	#593
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	361	591	716	365	717	793	341	2750	880	597	2626
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.18	0.36	0.09	0.08	0.31	0.45	0.56	0.03	0.41	0.59

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Existing
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	97	233	29	53	225	139	1400	26	213	1335	8
Future Volume (veh/h)	10	97	233	29	53	225	139	1400	26	213	1335	8
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		1.00	1.00		1.00	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	1752	1737	1870	1870	1870	1870	1870	1841	1781	1826	1811	1811
Adj Flow Rate, veh/h	11	108	259	32	58	247	153	1538	29	245	1534	9
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87
Percent Heavy Veh, %	10	11	2	2	2	2	2	4	8	5	6	6
Cap, veh/h	72	297	457	168	416	563	210	1705	512	449	1798	11
Arrive On Green	0.04	0.17	0.17	0.09	0.22	0.22	0.12	0.34	0.34	0.13	0.35	0.35
Sat Flow, veh/h	1668	1737	1582	1781	1870	1585	1781	5025	1510	3374	5072	30
Grp Volume(v), veh/h	11	108	259	32	58	247	153	1538	29	245	997	546
Grp Sat Flow(s),veh/h/ln	1668	1737	1582	1781	1870	1585	1781	1675	1510	1687	1648	1806
Q Serve(g_s), s	0.5	4.5	11.5	1.4	2.1	9.8	6.8	24.0	1.1	5.6	23.1	23.1
Cycle Q Clear(g_c), s	0.5	4.5	11.5	1.4	2.1	9.8	6.8	24.0	1.1	5.6	23.1	23.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	72	297	457	168	416	563	210	1705	512	449	1169	640
V/C Ratio(X)	0.15	0.36	0.57	0.19	0.14	0.44	0.73	0.90	0.06	0.55	0.85	0.85
Avail Cap(c_a), veh/h	324	485	628	324	477	615	303	2378	715	532	1560	855
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	38.0	30.2	24.9	34.4	25.7	20.3	35.1	25.9	18.3	33.4	24.6	24.6
Incr Delay (d2), s/veh	0.4	0.3	0.4	0.2	0.1	0.2	2.1	3.2	0.0	0.4	2.9	5.1
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	0.2	1.8	4.1	0.6	0.9	3.4	2.9	9.0	0.4	2.2	8.5	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.3	30.5	25.3	34.6	25.8	20.5	37.1	29.1	18.4	33.8	27.5	29.7
LnGrp LOS	D	C	C	C	C	C	D	C	B	C	C	C
Approach Vol, veh/h		378			337			1720			1788	
Approach Delay, s/veh		27.2			22.7			29.6			29.0	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	33.8	12.8	19.9	14.7	35.0	8.6	24.1				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	7.6	26.0	3.4	13.5	8.8	25.1	2.5	11.8				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.1	0.0	1.5	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	28.6
HCM 6th LOS	C

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
13: Atlantis Ct & Discovery Dr

Existing
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Vol, veh/h	17	8	16	13	6	24
Future Vol, veh/h	17	8	16	13	6	24
Conflicting Peds, #/hr	0	1	1	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	73	73	68	68
Heavy Vehicles, %	2	13	56	38	33	50
Mvmt Flow	22	10	22	18	9	35

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	33	0	93
Stage 1	-	-	-	-	28
Stage 2	-	-	-	-	65
Critical Hdwy	-	-	4.66	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.704	-	3.797
Pot Cap-1 Maneuver	-	-	1292	-	837
Stage 1	-	-	-	-	920
Stage 2	-	-	-	-	885
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1291	-	819
Mov Cap-2 Maneuver	-	-	-	-	819
Stage 1	-	-	-	-	919
Stage 2	-	-	-	-	867

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	901	-	-	1291	-
HCM Lane V/C Ratio	0.049	-	-	0.017	-
HCM Control Delay (s)	9.2	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
14: Challenger St/Driveway & Discovery Dr

Existing
Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	39	1	7	22	17	3	5	23	11	2	3
Future Vol, veh/h	3	39	1	7	22	17	3	5	23	11	2	3
Conflicting Peds, #/hr	1	0	0	0	0	1	13	0	6	6	0	13
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	77	77	77	71	71	71	67	67	67
Heavy Vehicles, %	2	31	2	2	55	65	67	2	13	2	2	2
Mvmt Flow	3	40	1	9	29	22	4	7	32	16	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	52	0	0	41	0	0	122	117	47	131	106	54
Stage 1	-	-	-	-	-	-	47	47	-	59	59	-
Stage 2	-	-	-	-	-	-	75	70	-	72	47	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.77	6.52	6.33	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	4.103	4.018	3.417	3.518	4.018	3.318
Pot Cap-1 Maneuver	1554	-	-	1568	-	-	722	773	992	841	784	1013
Stage 1	-	-	-	-	-	-	825	856	-	953	846	-
Stage 2	-	-	-	-	-	-	795	837	-	938	856	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1553	-	-	1568	-	-	703	766	986	797	777	1000
Mov Cap-2 Maneuver	-	-	-	-	-	-	703	766	-	797	777	-
Stage 1	-	-	-	-	-	-	823	854	-	950	840	-
Stage 2	-	-	-	-	-	-	774	831	-	893	854	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			1.1			9.2			9.5		
HCM LOS							A			A		

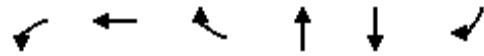
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	909	1553	-	-	1568	-	-	826
HCM Lane V/C Ratio	0.048	0.002	-	-	0.006	-	-	0.029
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	9.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Existing

Timing Plan: PM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	126	125	619	831	1018	585
v/c Ratio	0.38	0.37	0.63	0.82	0.43	0.47
Control Delay	25.0	24.9	16.8	22.0	6.3	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	24.9	16.8	22.0	6.3	2.0
Queue Length 50th (ft)	45	44	86	234	76	0
Queue Length 95th (ft)	87	87	134	#542	158	35
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	525	527	1416	1019	2971	1422
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	0.44	0.82	0.34	0.41



















Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Existing
Timing Plan: PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	220	4	551	0	740	0	0	926	532	
Future Volume (vph)	0	0	0	220	4	551	0	740	0	0	926	532	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1681	1688	2787		1863			3539	1583	
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1681	1688	2787		1863			3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.91	0.91	0.91	
Adj. Flow (vph)	0	0	0	247	4	619	0	831	0	0	1018	585	
RTOR Reduction (vph)	0	0	0	0	0	97	0	0	0	0	0	194	
Lane Group Flow (vph)	0	0	0	126	125	522	0	831	0	0	1018	391	
Confl. Bikes (#/hr)									1				
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				12.8	12.8	20.5		35.2			42.9	42.9	
Effective Green, g (s)				12.8	12.8	20.5		35.2			42.9	42.9	
Actuated g/C Ratio				0.20	0.20	0.32		0.55			0.67	0.67	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				335	336	889		1021			2364	1057	
v/s Ratio Prot								c0.45			0.29		
v/s Ratio Perm				0.07	0.07	c0.19						0.25	
v/c Ratio				0.38	0.37	0.59		0.81			0.43	0.37	
Uniform Delay, d1				22.2	22.2	18.3		11.8			5.0	4.7	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.3	0.3	0.6		4.8			0.0	0.1	
Delay (s)				22.5	22.5	18.9		16.6			5.0	4.8	
Level of Service				C	C	B		B			A	A	
Approach Delay (s)		0.0			20.0			16.6			4.9		
Approach LOS		A			B			B			A		
Intersection Summary													
HCM 2000 Control Delay			11.8		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.78										
Actuated Cycle Length (s)			64.2		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			65.6%		ICU Level of Service					C			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Existing

Timing Plan: PM Peak
























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	455	411	875	361	752
v/c Ratio	0.53	0.44	0.57	0.43	0.46
Control Delay	12.5	4.9	7.4	2.6	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	4.9	7.4	2.6	6.5
Queue Length 50th (ft)	22	5	37	0	30
Queue Length 95th (ft)	64	27	94	28	69
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3051	2511	3352	1417	3527
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.16	0.26	0.25	0.21

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Existing
 Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					 			 	
Traffic Volume (vph)	364	0	329	0	0	0	0	802	385	0	647	0
Future Volume (vph)	364	0	329	0	0	0	0	802	385	0	647	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frbp, ped/bikes	1.00		1.00					1.00	0.99		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					0.99	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2787					3365	1420		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2787					3365	1420		3539	
Peak-hour factor, PHF	0.80	0.80	0.80	0.92	0.92	0.92	0.96	0.96	0.96	0.86	0.86	0.86
Adj. Flow (vph)	455	0	411	0	0	0	0	835	401	0	752	0
RTOR Reduction (vph)	0	0	230	0	0	0	0	5	194	0	0	0
Lane Group Flow (vph)	455	0	181	0	0	0	0	870	167	0	752	0
Confl. Peds. (#/hr)									3			
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	7.2		7.2					13.1	13.1		13.1	
Effective Green, g (s)	7.2		7.2					13.1	13.1		13.1	
Actuated g/C Ratio	0.25		0.25					0.46	0.46		0.46	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	873		709					1557	657		1638	
v/s Ratio Prot								c0.26			0.21	
v/s Ratio Perm	c0.13		0.06						0.12			
v/c Ratio	0.52		0.25					0.56	0.25		0.46	
Uniform Delay, d1	9.1		8.4					5.5	4.6		5.2	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.3		0.1					0.2	0.1		0.1	
Delay (s)	9.3		8.5					5.8	4.7		5.3	
Level of Service	A		A					A	A		A	
Approach Delay (s)		8.9			0.0			5.4			5.3	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.5					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			28.3					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			47.5%					ICU Level of Service			A	
Analysis Period (min)			15									
c	Critical Lane Group											

Appendix D – Background Conditions Intersection Level of Service and Queuing Work Sheets

Queues

Background (2025)

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	180	47	4	227	332	5	95	240	109	352
v/c Ratio	0.28	0.03	0.03	0.30	0.26	0.04	0.20	0.30	0.30	0.22
Control Delay	29.5	15.4	35.8	22.0	2.3	35.7	22.5	27.6	18.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	15.4	35.8	22.0	2.3	35.7	22.5	27.6	18.0	0.3
Queue Length 50th (ft)	17	4	1	30	0	1	9	22	21	0
Queue Length 95th (ft)	56	21	14	92	26	12	21	79	94	0
Internal Link Dist (ft)		745		868			220		816	
Turn Bay Length (ft)	400		350			110		600		420
Base Capacity (vph)	1978	2436	429	2154	2652	349	1747	4348	976	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.02	0.01	0.11	0.13	0.01	0.05	0.06	0.11	0.22

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background (2025)
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↗	↖	↑↑	↗↗	↖	↑↑↔		↖↖↖	↑	↗
Traffic Volume (veh/h)	142	37	0	4	207	302	3	61	2	214	97	313
Future Volume (veh/h)	142	37	0	4	207	302	3	61	2	214	97	313
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		1.00	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	1870	1856	1870	1530	1870	1856	1411	522	522	1856	685	1870
Adj Flow Rate, veh/h	180	47	0	4	227	332	5	92	3	240	109	0
Peak Hour Factor	0.79	0.79	0.79	0.91	0.91	0.91	0.66	0.66	0.66	0.89	0.89	0.89
Percent Heavy Veh, %	2	3	2	25	2	3	33	93	93	3	82	2
Cap, veh/h	508	1029	463	8	697	953	7	159	5	752	176	
Arrive On Green	0.10	0.29	0.00	0.01	0.20	0.20	0.01	0.11	0.11	0.15	0.26	0.00
Sat Flow, veh/h	5023	3526	1585	1457	3554	2731	1344	1417	46	4983	685	1585
Grp Volume(v), veh/h	180	47	0	4	227	332	5	61	34	240	109	0
Grp Sat Flow(s),veh/h/ln	1674	1763	1585	1457	1777	1366	1344	475	513	1661	685	1585
Q Serve(g_s), s	1.5	0.4	0.0	0.1	2.4	4.0	0.2	2.7	2.7	1.9	6.2	0.0
Cycle Q Clear(g_c), s	1.5	0.4	0.0	0.1	2.4	4.0	0.2	2.7	2.7	1.9	6.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	508	1029	463	8	697	953	7	107	58	752	176	
V/C Ratio(X)	0.35	0.05	0.00	0.51	0.33	0.35	0.69	0.58	0.58	0.32	0.62	
Avail Cap(c_a), veh/h	2287	2866	1288	497	2484	2327	398	713	386	5673	1102	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.4	11.2	0.0	21.8	15.2	10.7	21.8	18.5	18.5	16.6	14.4	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	17.4	0.3	0.2	35.5	3.6	6.8	0.2	2.6	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.1	0.0	0.1	0.8	0.9	0.1	0.3	0.4	0.6	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.6	11.2	0.0	39.2	15.4	10.9	57.3	22.1	25.3	16.8	17.0	0.0
LnGrp LOS	B	B	A	D	B	B	E	C	C	B	B	
Approach Vol, veh/h		227			563			100			349	A
Approach Delay, s/veh		17.0			12.9			24.9			16.9	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	13.9	10.6	10.9	4.2	18.1	4.2	17.3				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	3.5	6.0	3.9	4.7	2.1	2.4	2.2	8.2				
Green Ext Time (p_c), s	0.3	2.7	0.7	0.4	0.0	0.2	0.0	0.5				

Intersection Summary

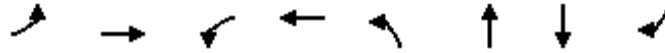
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 User approved changes to right turn type.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background (2025)
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	55	185	14	644	9	8	14	16
v/c Ratio	0.03	0.05	0.02	0.14	0.01	0.01	0.02	0.01
Control Delay	22.8	10.2	28.9	12.3	17.5	14.8	27.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	10.2	28.9	12.3	17.5	14.8	27.3	0.0
Queue Length 50th (ft)	0	0	1	0	0	0	0	0
Queue Length 95th (ft)	38	51	28	118	12	9	20	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2621	4419	1191	5353	1128	1148	1078	2038
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.01	0.12	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background (2025)

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	178	1	12	523	12	8	1	3	6	3	10
Future Volume (vph)	53	178	1	12	523	12	8	1	3	6	3	10
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	4958		1656	6385		1504	1529			1500	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	4958		1656	6385		1504	1529			1500	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.83	0.83	0.83	0.69	0.69	0.69	0.64	0.64	0.64
Adj. Flow (vph)	55	184	1	14	630	14	12	1	4	9	5	16
RTOR Reduction (vph)	0	1	0	0	2	0	0	4	0	0	0	15
Lane Group Flow (vph)	55	184	0	14	642	0	9	4	0	0	14	1
Confl. Peds. (#/hr)			2			2			2			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	4%	4%	100%	9%	2%	2%	14%	2%	2%	17%	33%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	2.9	22.6		0.7	20.4		2.8	2.8			2.7	2.7
Effective Green, g (s)	2.9	22.6		0.7	20.4		2.8	2.8			2.7	2.7
Actuated g/C Ratio	0.06	0.49		0.02	0.44		0.06	0.06			0.06	0.06
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	211	2430		25	2825		91	92			87	163
v/s Ratio Prot	c0.02	0.04		0.01	c0.10		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.26	0.08		0.56	0.23		0.10	0.05			0.16	0.01
Uniform Delay, d1	20.6	6.2		22.5	8.0		20.5	20.4			20.6	20.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.0		15.9	0.0		0.3	0.2			0.3	0.0
Delay (s)	21.1	6.2		38.5	8.0		20.8	20.5			20.9	20.4
Level of Service	C	A		D	A		C	C			C	C
Approach Delay (s)		9.6			8.6			20.7			20.7	
Approach LOS		A			A			C			C	

Intersection Summary

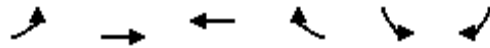
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	17.3
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr

Background (2025)

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	57	159	646	40	10	38
v/c Ratio	0.04	0.05	0.25	0.03	0.01	0.03
Control Delay	12.5	2.8	8.1	5.1	14.1	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	2.8	8.1	5.1	14.1	7.1
Queue Length 50th (ft)	0	0	0	0	1	0
Queue Length 95th (ft)	18	15	104	13	10	8
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2761	3438	3425	1514	1351	2137
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.05	0.19	0.03	0.01	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Background (2025)
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	50	140	523	32	8	30
Future Volume (veh/h)	50	140	523	32	8	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1826	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	159	646	40	10	38
Peak Hour Factor	0.88	0.88	0.81	0.81	0.80	0.80
Percent Heavy Veh, %	2	5	2	2	2	2
Cap, veh/h	434	2029	1164	508	195	306
Arrive On Green	0.13	0.58	0.33	0.33	0.11	0.11
Sat Flow, veh/h	3456	3561	3647	1550	1781	2790
Grp Volume(v), veh/h	57	159	646	40	10	38
Grp Sat Flow(s),veh/h/ln	1728	1735	1777	1550	1781	1395
Q Serve(g_s), s	0.4	0.6	4.5	0.5	0.2	0.4
Cycle Q Clear(g_c), s	0.4	0.6	4.5	0.5	0.2	0.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	434	2029	1164	508	195	306
V/C Ratio(X)	0.13	0.08	0.55	0.08	0.05	0.12
Avail Cap(c_a), veh/h	2839	4561	5256	2292	1171	1834
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	11.8	2.7	8.4	7.1	12.1	12.2
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.9	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.9	2.8	8.6	7.1	12.2	12.3
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		216	686		48	
Approach Delay, s/veh		5.2	8.5		12.3	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.8	15.3			23.1	7.3
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.4	6.5			2.6	2.4
Green Ext Time (p_c), s	0.1	2.8			0.6	0.1

Intersection Summary

HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues
4: W Jack London Blvd & Wolf House Dr

Background (2025)
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	3	161	630	18	44	52
v/c Ratio	0.00	0.12	0.49	0.02	0.07	0.08
Control Delay	18.3	4.1	9.3	5.9	17.1	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	4.1	9.3	5.9	17.1	7.9
Queue Length 50th (ft)	1	16	88	1	6	0
Queue Length 95th (ft)	8	31	257	10	23	6
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1436	1827	1742	1445	1193	1084
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.09	0.36	0.01	0.04	0.05
Intersection Summary						

HCM 6th Signalized Intersection Summary
 4: W Jack London Blvd & Wolf House Dr

Background (2025)
 Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↕	↑	↑	↕	↕	↕
Traffic Volume (veh/h)	3	145	529	15	22	26
Future Volume (veh/h)	3	145	529	15	22	26
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1841	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	161	630	18	44	52
Peak Hour Factor	0.90	0.90	0.84	0.84	0.50	0.50
Percent Heavy Veh, %	2	4	2	2	2	2
Cap, veh/h	15	1013	793	657	313	278
Arrive On Green	0.01	0.55	0.42	0.42	0.18	0.18
Sat Flow, veh/h	1781	1841	1870	1549	1781	1585
Grp Volume(v), veh/h	3	161	630	18	44	52
Grp Sat Flow(s),veh/h/ln	1781	1841	1870	1549	1781	1585
Q Serve(g_s), s	0.1	1.5	9.9	0.2	0.7	0.9
Cycle Q Clear(g_c), s	0.1	1.5	9.9	0.2	0.7	0.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	15	1013	793	657	313	278
V/C Ratio(X)	0.20	0.16	0.79	0.03	0.14	0.19
Avail Cap(c_a), veh/h	1576	2442	2482	2055	1050	935
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.7	3.8	8.5	5.7	11.8	11.9
Incr Delay (d2), s/veh	5.0	0.0	0.7	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	1.9	0.0	0.2	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.7	3.8	9.2	5.7	11.9	12.0
LnGrp LOS	C	A	A	A	B	B
Approach Vol, veh/h		164	648		96	
Approach Delay, s/veh		4.1	9.1		12.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	19.7			24.0	10.0
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	11.9			3.5	2.9
Green Ext Time (p_c), s	0.0	2.4			0.5	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	157	546	0	0	1
Future Vol, veh/h	2	157	546	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	86	86	25	25
Heavy Vehicles, %	50	4	2	2	2	100
Mvmt Flow	2	191	635	0	0	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	635	0	-	0	830
Stage 1	-	-	-	-	635
Stage 2	-	-	-	-	195
Critical Hdwy	4.6	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.65	-	-	-	3.518
Pot Cap-1 Maneuver	755	-	-	-	340
Stage 1	-	-	-	-	528
Stage 2	-	-	-	-	838
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	755	-	-	-	339
Mov Cap-2 Maneuver	-	-	-	-	339
Stage 1	-	-	-	-	526
Stage 2	-	-	-	-	838

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	755	-	-	-	341
HCM Lane V/C Ratio	0.003	-	-	-	0.012
HCM Control Delay (s)	9.8	-	-	-	15.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	156	553	1	3	0
Future Vol, veh/h	2	156	553	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	86	86	75	75
Heavy Vehicles, %	2	4	2	100	33	2
Mvmt Flow	3	197	643	1	4	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	644	0	-	0	847
Stage 1	-	-	-	-	644
Stage 2	-	-	-	-	203
Critical Hdwy	4.12	-	-	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	2.218	-	-	-	3.797
Pot Cap-1 Maneuver	941	-	-	-	294
Stage 1	-	-	-	-	469
Stage 2	-	-	-	-	762
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	941	-	-	-	293
Mov Cap-2 Maneuver	-	-	-	-	293
Stage 1	-	-	-	-	468
Stage 2	-	-	-	-	762

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	17.5
HCM LOS			C

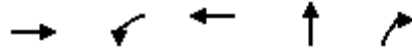
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	941	-	-	-	293
HCM Lane V/C Ratio	0.003	-	-	-	0.014
HCM Control Delay (s)	8.8	-	-	-	17.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues

7: Discovery Dr & W Jack London Blvd

Background (2025)

Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	186	20	616	22	13
v/c Ratio	0.06	0.03	0.19	0.03	0.02
Control Delay	3.3	11.7	1.3	11.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	11.7	1.3	11.0	0.1
Queue Length 50th (ft)	0	1	0	1	0
Queue Length 95th (ft)	29	21	48	19	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	3068	1358	3539	1325	917
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.01	0.17	0.02	0.01

Intersection Summary

HCM 6th Signalized Intersection Summary
7: Discovery Dr & W Jack London Blvd

Background (2025)
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	140	18	17	536	0	17	0	10	0	0	0
Future Volume (veh/h)	0	140	18	17	536	0	17	0	10	0	0	0
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		1.00	1.00		1.00	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	0	1826	1826	1589	1870	0	1870	1870	1070	1870	1870	1870
Adj Flow Rate, veh/h	0	165	21	20	616	0	22	0	13	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.87	0.87	0.87	0.78	0.78	0.78	0.25	0.25	0.25
Percent Heavy Veh, %	0	5	5	21	2	0	2	2	56	2	2	2
Cap, veh/h	0	1027	129	63	1912	0	139	0	71	0	8	0
Arrive On Green	0.00	0.33	0.33	0.04	0.54	0.00	0.08	0.00	0.08	0.00	0.00	0.00
Sat Flow, veh/h	0	3192	389	1513	3647	0	1781	0	907	0	1870	0
Grp Volume(v), veh/h	0	91	95	20	616	0	22	0	13	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1735	1755	1513	1777	0	1781	0	907	0	1870	0
Q Serve(g_s), s	0.0	0.9	0.9	0.3	2.3	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.9	0.9	0.3	2.3	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Prop In Lane	0.00		0.22	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	574	581	63	1912	0	139	0	71	0	8	0
V/C Ratio(X)	0.00	0.16	0.16	0.32	0.32	0.00	0.16	0.00	0.18	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2149	2175	1875	4403	0	1471	0	749	0	927	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.7	5.7	11.3	3.1	0.0	10.4	0.0	10.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	1.1	0.1	0.0	0.2	0.0	0.5	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	5.8	5.8	12.3	3.2	0.0	10.6	0.0	10.9	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		186			636			35				0
Approach Delay, s/veh		5.8			3.5			10.7				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.0	13.3		0.0		18.3		5.9				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	2.9		0.0		4.3		2.3				
Green Ext Time (p_c), s	0.0	0.7		0.0		3.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background (2025)
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	201	60	646	13	57
v/c Ratio	0.00	0.08	0.11	0.23	0.03	0.12
Control Delay	17.0	6.7	14.4	4.1	15.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	6.7	14.4	4.1	15.9	0.5
Queue Length 50th (ft)	0	0	1	0	1	0
Queue Length 95th (ft)	6	28	43	85	13	0
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	1082	3018	1010	3368	910	850
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.07	0.06	0.19	0.01	0.07
Intersection Summary						

HCM 6th Signalized Intersection Summary

8: Voyager St & W Jack London Blvd

Background (2025)
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕			↕	↗		↕	
Traffic Volume (veh/h)	2	147	8	50	536	0	9	0	41	0	0	0
Future Volume (veh/h)	2	147	8	50	536	0	9	0	41	0	0	0
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		1.00	1.00		1.00	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	1870	1796	1796	1322	1870	1870	1870	1870	996	1870	1870	1870
Adj Flow Rate, veh/h	3	191	10	60	646	0	12	0	57	0	0	0
Peak Hour Factor	0.77	0.77	0.77	0.83	0.83	0.83	0.72	0.72	0.72	0.92	0.92	0.92
Percent Heavy Veh, %	2	7	7	39	2	2	2	2	61	2	2	2
Cap, veh/h	10	962	50	135	1397	0	212	0	101	0	7	0
Arrive On Green	0.01	0.29	0.29	0.11	0.39	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3296	171	1259	3647	0	1781	0	844	0	1870	0
Grp Volume(v), veh/h	3	98	103	60	646	0	12	0	57	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1706	1761	1259	1777	0	1781	0	844	0	1870	0
Q Serve(g_s), s	0.0	1.2	1.2	1.2	3.7	0.0	0.2	0.0	1.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.2	1.2	1.2	3.7	0.0	0.2	0.0	1.8	0.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	498	514	135	1397	0	212	0	101	0	7	0
V/C Ratio(X)	0.29	0.20	0.20	0.45	0.46	0.00	0.06	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	775	2164	2233	913	4508	0	1614	0	765	0	813	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	13.7	7.3	7.3	11.6	6.2	0.0	10.8	0.0	11.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.1	0.1	0.9	0.2	0.0	0.0	0.0	1.9	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.2	0.5	0.0	0.1	0.0	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.4	7.5	7.5	12.4	6.4	0.0	10.8	0.0	13.3	0.0	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		204			706			69			0	
Approach Delay, s/veh		7.7			6.9			12.9			0.0	
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	13.4		0.0	4.2	16.1		7.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	3.2		0.0	2.0	5.7		3.8				
Green Ext Time (p_c), s	0.1	0.8		0.0	0.0	3.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background (2025)
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	64	105	62	173	334	390	212	1544	174	228	1499	131
v/c Ratio	0.21	0.14	0.16	0.38	0.68	0.60	0.51	0.90	0.26	0.58	0.89	0.22
Control Delay	57.6	40.4	0.9	55.9	51.7	27.9	59.4	45.8	8.1	62.1	45.0	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	40.4	0.9	55.9	51.7	27.9	59.4	45.8	8.1	62.1	45.0	5.8
Queue Length 50th (ft)	23	34	0	63	246	192	80	410	15	88	396	1
Queue Length 95th (ft)	54	64	0	127	405	341	140	507	55	159	531	40
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	302	1604	699	577	939	672	571	2774	978	433	2600	839
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.09	0.30	0.36	0.58	0.37	0.56	0.18	0.53	0.58	0.16

Intersection Summary

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Background (2025)
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↔	↔↔	↑	↔	↔↔	↑↑↑	↔	↔↔	↑↑↑	↔
Traffic Volume (veh/h)	54	88	52	152	294	343	174	1266	143	196	1289	113
Future Volume (veh/h)	54	88	52	152	294	343	174	1266	143	196	1289	113
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		0.99	1.00		1.00	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	1218	1841	1648	1870	1870	1870	1856	1752	1870	1870	1767	1707
Adj Flow Rate, veh/h	64	105	62	173	334	390	212	1544	174	228	1499	131
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	46	4	17	2	2	2	3	10	2	2	9	13
Cap, veh/h	260	730	287	491	440	552	428	1655	548	401	1626	488
Arrive On Green	0.12	0.21	0.21	0.14	0.24	0.24	0.12	0.35	0.35	0.12	0.34	0.34
Sat Flow, veh/h	2251	3497	1376	3456	1870	1565	3428	4782	1584	3456	4823	1447
Grp Volume(v), veh/h	64	105	62	173	334	390	212	1544	174	228	1499	131
Grp Sat Flow(s),veh/h/ln	1125	1749	1376	1728	1870	1565	1714	1594	1584	1728	1608	1447
Q Serve(g_s), s	2.9	2.7	4.2	5.1	18.6	24.1	6.5	34.9	9.0	7.0	33.5	7.4
Cycle Q Clear(g_c), s	2.9	2.7	4.2	5.1	18.6	24.1	6.5	34.9	9.0	7.0	33.5	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	260	730	287	491	440	552	428	1655	548	401	1626	488
V/C Ratio(X)	0.25	0.14	0.22	0.35	0.76	0.71	0.50	0.93	0.32	0.57	0.92	0.27
Avail Cap(c_a), veh/h	301	730	287	617	1001	1021	612	2987	989	463	2367	710
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	45.1	36.2	36.7	43.4	39.9	31.4	45.8	35.4	26.9	46.9	35.7	27.1
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.2	1.0	0.6	0.3	1.6	0.1	0.5	3.8	0.1
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	0.8	1.1	1.4	2.1	8.4	8.7	2.7	12.8	3.3	2.9	13.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.3	36.2	36.9	43.6	40.9	32.1	46.1	37.0	27.1	47.4	39.6	27.2
LnGrp LOS	D	D	D	D	D	C	D	D	C	D	D	C
Approach Vol, veh/h		231			897			1930			1858	
Approach Delay, s/veh		38.9			37.6			37.1			39.6	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	44.6	20.6	29.2	18.7	43.6	17.7	32.2				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	9.0	36.9	7.1	6.2	8.5	35.5	4.9	26.1				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.1	0.0	1.9	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	38.2
HCM 6th LOS	D

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background (2025)
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	40	38	23	1843	1725	54
v/c Ratio	0.11	0.13	0.05	0.48	0.48	0.06
Control Delay	22.0	10.1	21.4	3.9	6.2	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	10.1	21.4	3.9	6.2	3.3
Queue Length 50th (ft)	5	0	3	90	81	1
Queue Length 95th (ft)	14	8	11	105	196	15
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1254	935	1503	4803	3656	963
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.02	0.38	0.47	0.06
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background (2025)
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	27	19	1548	1449	45
Future Volume (veh/h)	29	27	19	1548	1449	45
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1411	1189	1737	1781	1781	1470
Adj Flow Rate, veh/h	40	38	23	1843	1725	54
Peak Hour Factor	0.72	0.72	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	33	48	11	8	8	29
Cap, veh/h	269	183	127	2979	2063	528
Arrive On Green	0.10	0.10	0.04	0.61	0.42	0.42
Sat Flow, veh/h	2607	1773	3209	5024	5024	1246
Grp Volume(v), veh/h	40	38	23	1843	1725	54
Grp Sat Flow(s),veh/h/ln	1303	886	1605	1621	1621	1246
Q Serve(g_s), s	0.5	0.8	0.3	9.1	12.1	1.0
Cycle Q Clear(g_c), s	0.5	0.8	0.3	9.1	12.1	1.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	269	183	127	2979	2063	528
V/C Ratio(X)	0.15	0.21	0.18	0.62	0.84	0.10
Avail Cap(c_a), veh/h	1701	1157	2094	3807	3807	975
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.7	15.8	17.8	4.6	9.8	6.6
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.1	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	0.3	2.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.7	16.0	18.0	4.7	10.2	6.7
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	78			1866	1779	
Approach Delay, s/veh	15.9			4.9	10.1	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		29.7		8.6	7.2	22.5
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		11.1		2.8	2.3	14.1
Green Ext Time (p_c), s		2.4		0.0	0.0	2.1

Intersection Summary

HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Background (2025)
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	93	416	1403	169	521	1198
v/c Ratio	0.19	0.73	0.65	0.09	0.58	0.51
Control Delay	28.2	12.6	17.7	2.6	29.6	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	12.6	17.7	2.6	29.6	6.2
Queue Length 50th (ft)	19	6	144	6	71	78
Queue Length 95th (ft)	37	57	273	17	119	204
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1220	815	2483	2414	1405	2848
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.51	0.57	0.07	0.37	0.42
Intersection Summary						

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background (2025)
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶↶	↶	↶↶↶	↶↶	↶↶↶	↶↶
Traffic Volume (veh/h)	77	345	1207	145	448	1030
Future Volume (veh/h)	77	345	1207	145	448	1030
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1811	1811	1781	1811	1796	1767
Adj Flow Rate, veh/h	93	416	1403	169	521	1198
Peak Hour Factor	0.83	0.83	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	6	6	8	6	7	9
Cap, veh/h	977	448	1875	1830	700	1966
Arrive On Green	0.29	0.29	0.39	0.39	0.15	0.59
Sat Flow, veh/h	3346	1535	5024	2701	4824	3445
Grp Volume(v), veh/h	93	416	1403	169	521	1198
Grp Sat Flow(s),veh/h/ln	1673	1535	1621	1351	1608	1678
Q Serve(g_s), s	1.7	21.5	20.3	1.8	8.5	18.8
Cycle Q Clear(g_c), s	1.7	21.5	20.3	1.8	8.5	18.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	977	448	1875	1830	700	1966
V/C Ratio(X)	0.10	0.93	0.75	0.09	0.74	0.61
Avail Cap(c_a), veh/h	1024	470	2085	1946	1182	1966
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.1	28.1	21.7	4.5	33.5	10.9
Incr Delay (d2), s/veh	0.0	24.4	1.5	0.0	1.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	10.4	6.9	0.4	3.1	5.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.1	52.4	23.2	4.6	35.1	11.6
LnGrp LOS	C	D	C	A	D	B
Approach Vol, veh/h	509		1572			1719
Approach Delay, s/veh	46.7		21.2			18.7
Approach LOS	D		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	16.3	37.0			53.3	28.3
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	10.5	22.3			20.8	23.5
Green Ext Time (p_c), s	1.4	9.1			8.5	0.3

Intersection Summary

HCM 6th Ctrl Delay	23.5
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Background (2025)
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	79	157	69	93	147	190	1518	26	242	1684
v/c Ratio	0.02	0.25	0.25	0.24	0.16	0.21	0.77	0.78	0.04	0.56	0.89
Control Delay	45.0	40.1	4.6	47.6	28.4	4.0	67.4	32.5	0.1	52.4	38.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	40.1	4.6	47.6	28.4	4.0	67.4	32.5	0.1	52.4	38.6
Queue Length 50th (ft)	3	48	0	41	43	0	124	316	0	80	388
Queue Length 95th (ft)	16	86	35	101	98	34	#329	#617	0	#157	#723
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	324	452	652	290	649	708	278	2208	807	492	2125
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.17	0.24	0.24	0.14	0.21	0.68	0.69	0.03	0.49	0.79

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Background (2025)
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	4	69	137	60	81	128	173	1381	24	215	1481	18
Future Volume (veh/h)	4	69	137	60	81	128	173	1381	24	215	1481	18
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		1.00	1.00		1.00	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	1870	1559	1870	1796	1841	1663	1841	1752	1870	1811	1767	1767
Adj Flow Rate, veh/h	5	79	157	69	93	147	190	1518	26	242	1664	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.91	0.91	0.91	0.89	0.89	0.89
Percent Heavy Veh, %	2	23	2	7	4	16	4	10	2	6	9	9
Cap, veh/h	37	231	436	228	480	531	222	1783	591	390	1781	21
Arrive On Green	0.02	0.15	0.15	0.13	0.26	0.26	0.13	0.37	0.37	0.12	0.36	0.36
Sat Flow, veh/h	1781	1559	1585	1711	1841	1409	1753	4782	1585	3346	4912	59
Grp Volume(v), veh/h	5	79	157	69	93	147	190	1518	26	242	1089	595
Grp Sat Flow(s),veh/h/ln	1781	1559	1585	1711	1841	1409	1753	1594	1585	1673	1608	1756
Q Serve(g_s), s	0.3	4.3	7.5	3.4	3.7	6.8	10.0	27.5	1.0	6.5	30.8	30.8
Cycle Q Clear(g_c), s	0.3	4.3	7.5	3.4	3.7	6.8	10.0	27.5	1.0	6.5	30.8	30.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	37	231	436	228	480	531	222	1783	591	390	1166	637
V/C Ratio(X)	0.13	0.34	0.36	0.30	0.19	0.28	0.86	0.85	0.04	0.62	0.93	0.93
Avail Cap(c_a), veh/h	303	381	588	272	480	531	261	1980	656	462	1331	727
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	45.3	36.0	27.5	36.9	27.1	20.4	40.3	27.1	18.8	39.6	28.9	28.9
Incr Delay (d2), s/veh	0.6	0.3	0.2	0.3	0.1	0.1	18.7	3.2	0.0	0.9	10.7	17.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.1	1.6	2.7	1.4	1.6	2.1	5.3	10.0	0.3	2.6	12.5	14.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.9	36.3	27.7	37.2	27.2	20.5	59.0	30.3	18.9	40.6	39.6	45.9
LnGrp LOS	D	D	C	D	C	C	E	C	B	D	D	D
Approach Vol, veh/h		241			309			1734			1926	
Approach Delay, s/veh		30.9			26.2			33.3			41.7	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	40.9	17.5	19.8	16.9	40.0	7.0	30.3				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	8.5	29.5	5.4	9.5	12.0	32.8	2.3	8.8				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	1.4	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	22	5	18	13	5	24
Future Vol, veh/h	22	5	18	13	5	24
Conflicting Peds, #/hr	0	3	3	0	4	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	60	60	68	68
Heavy Vehicles, %	5	40	44	25	20	77
Mvmt Flow	32	7	30	22	7	35

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	42	0	125
Stage 1	-	-	-	-	39
Stage 2	-	-	-	-	86
Critical Hdwy	-	-	4.54	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.596	-	3.68
Pot Cap-1 Maneuver	-	-	1335	-	829
Stage 1	-	-	-	-	939
Stage 2	-	-	-	-	894
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1331	-	804
Mov Cap-2 Maneuver	-	-	-	-	804
Stage 1	-	-	-	-	936
Stage 2	-	-	-	-	870

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	840	-	-	1331	-
HCM Lane V/C Ratio	0.051	-	-	0.023	-
HCM Control Delay (s)	9.5	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Background (2025)
 Timing Plan: AM Peak

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	4	35	9	25	22	13	7	0	18	4	0	3
Future Vol, veh/h	4	35	9	25	22	13	7	0	18	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	11	11	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	72	72	72	75	75	75	44	44	44
Heavy Vehicles, %	25	53	13	22	45	33	33	2	35	2	2	2
Mvmt Flow	6	51	13	35	31	18	9	0	24	9	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	49	0	0	64	0	0	184	189	69	203	186	40
Stage 1	-	-	-	-	-	-	70	70	-	110	110	-
Stage 2	-	-	-	-	-	-	114	119	-	93	76	-
Critical Hdwy	4.35	-	-	4.32	-	-	7.43	6.52	6.55	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.425	-	-	2.398	-	-	3.797	4.018	3.615	3.518	4.018	3.318
Pot Cap-1 Maneuver	1422	-	-	1420	-	-	714	706	909	755	708	1031
Stage 1	-	-	-	-	-	-	868	837	-	895	804	-
Stage 2	-	-	-	-	-	-	821	797	-	914	832	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1422	-	-	1420	-	-	693	686	899	711	687	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	693	686	-	711	687	-
Stage 1	-	-	-	-	-	-	865	834	-	891	784	-
Stage 2	-	-	-	-	-	-	795	777	-	877	829	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			3.2			9.5			9.5		
HCM LOS							A			A		

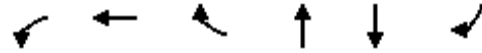
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	830	1422	-	-	1420	-	-	820
HCM Lane V/C Ratio	0.04	0.004	-	-	0.024	-	-	0.019
HCM Control Delay (s)	9.5	7.5	0	-	7.6	0	-	9.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background (2025)

Timing Plan: AM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	98	100	547	800	684	703
v/c Ratio	0.35	0.35	0.58	0.78	0.29	0.55
Control Delay	25.0	24.9	14.8	19.1	4.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	24.9	14.8	19.1	4.7	2.3
Queue Length 50th (ft)	32	32	62	197	38	0
Queue Length 95th (ft)	72	73	114	362	76	17
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	543	553	1405	1106	3168	1481
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.18	0.39	0.72	0.22	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background (2025)
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↙	↖	↗		↑			↕	↘	
Traffic Volume (vph)	0	0	0	163	21	509	0	656	0	0	547	562	
Future Volume (vph)	0	0	0	163	21	509	0	656	0	0	547	562	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1631	2707		1863			3505	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1631	2707		1863			3505	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.82	0.82	0.82	0.80	0.80	0.80	
Adj. Flow (vph)	0	0	0	175	23	547	0	800	0	0	684	702	
RTOR Reduction (vph)	0	0	0	0	0	109	0	0	0	0	0	225	
Lane Group Flow (vph)	0	0	0	98	100	438	0	800	0	0	684	478	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	5%	5%	2%	2%	2%	2%	3%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				10.5	10.5	18.2		32.7			40.4	40.4	
Effective Green, g (s)				10.5	10.5	18.2		32.7			40.4	40.4	
Actuated g/C Ratio				0.18	0.18	0.31		0.55			0.68	0.68	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				283	288	829		1025			2383	1063	
v/s Ratio Prot								c0.43			0.20		
v/s Ratio Perm				0.06	0.06	c0.16						0.31	
v/c Ratio				0.35	0.35	0.53		0.78			0.29	0.45	
Uniform Delay, d1				21.4	21.4	17.0		10.5			3.8	4.4	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.3	0.3	0.3		3.6			0.0	0.1	
Delay (s)				21.7	21.7	17.3		14.1			3.8	4.5	
Level of Service				C	C	B		B			A	A	
Approach Delay (s)		0.0			18.5			14.1			4.1		
Approach LOS		A			B			B			A		
Intersection Summary													
HCM 2000 Control Delay			10.5		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.74										
Actuated Cycle Length (s)			59.4		Sum of lost time (s)						12.2		
Intersection Capacity Utilization			59.7%		ICU Level of Service						B		
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background (2025)

Timing Plan: AM Peak



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	520	307	435	95	386
v/c Ratio	0.58	0.38	0.35	0.15	0.27
Control Delay	10.6	2.7	6.2	2.3	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	2.7	6.2	2.3	5.7
Queue Length 50th (ft)	26	0	15	0	13
Queue Length 95th (ft)	42	10	35	10	30
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3415	2211	3001	1386	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.14	0.14	0.07	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background (2025)
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	458	0	270	0	0	0	0	407	102	0	355	0
Future Volume (vph)	458	0	270	0	0	0	0	407	102	0	355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3001	1386		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3001	1386		3505	
Peak-hour factor, PHF	0.88	0.88	0.88	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	520	0	307	0	0	0	0	424	106	0	386	0
RTOR Reduction (vph)	0	0	226	0	0	0	0	3	56	0	0	0
Lane Group Flow (vph)	520	0	81	0	0	0	0	432	39	0	386	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	6%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	6.4		6.4					10.0	10.0		10.0	
Effective Green, g (s)	6.4		6.4					10.0	10.0		10.0	
Actuated g/C Ratio	0.26		0.26					0.41	0.41		0.41	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	900		582					1229	568		1436	
v/s Ratio Prot								c0.14			0.11	
v/s Ratio Perm	c0.15		0.04						0.03			
v/c Ratio	0.58		0.14					0.35	0.07		0.27	
Uniform Delay, d1	7.8		6.9					5.0	4.4		4.8	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.6		0.0					0.1	0.0		0.0	
Delay (s)	8.4		6.9					5.0	4.4		4.8	
Level of Service	A		A					A	A		A	
Approach Delay (s)		7.8			0.0			4.9			4.8	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.3					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			24.4					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			32.1%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background (2025)

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	561	378	10	17	205	751	14	59	745	23	376
v/c Ratio	0.61	0.26	0.01	0.12	0.31	0.42	0.10	0.10	0.57	0.04	0.24
Control Delay	34.8	19.9	0.0	45.3	32.5	2.0	45.8	25.6	28.4	15.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	19.9	0.0	45.3	32.5	2.0	45.8	25.6	28.4	15.7	0.4
Queue Length 50th (ft)	77	51	0	7	39	0	6	6	96	6	0
Queue Length 95th (ft)	197	177	0	39	115	36	26	16	235	26	0
Internal Link Dist (ft)		745			868			219		816	
Turn Bay Length (ft)	400		305	350			110		600		420
Base Capacity (vph)	1524	1544	739	405	1095	2577	351	1821	3579	1331	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.24	0.01	0.04	0.19	0.29	0.04	0.03	0.21	0.02	0.24

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background (2025)
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔	↑↑	↔↔	↔	↑↑↔		↔↔↔	↑	↔
Traffic Volume (veh/h)	527	355	9	16	197	721	10	30	11	685	21	346
Future Volume (veh/h)	527	355	9	16	197	721	10	30	11	685	21	346
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		0.99	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	1870	1870	1870	1870	1870	1870	1870	1796	1796	1870	1589	1870
Adj Flow Rate, veh/h	561	378	10	17	205	751	14	43	16	745	23	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.69	0.69	0.69	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	7	7	2	21	2
Cap, veh/h	769	1413	626	36	941	1300	25	265	88	1028	419	
Arrive On Green	0.15	0.40	0.40	0.02	0.26	0.26	0.01	0.07	0.07	0.20	0.26	0.00
Sat Flow, veh/h	5023	3554	1575	1781	3554	2754	1781	3628	1204	5023	1589	1585
Grp Volume(v), veh/h	561	378	10	17	205	751	14	38	21	745	23	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1575	1781	1777	1377	1781	1635	1563	1674	1589	1585
Q Serve(g_s), s	6.8	4.5	0.2	0.6	2.9	12.6	0.5	0.7	0.8	8.8	0.7	0.0
Cycle Q Clear(g_c), s	6.8	4.5	0.2	0.6	2.9	12.6	0.5	0.7	0.8	8.8	0.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	769	1413	626	36	941	1300	25	239	114	1028	419	
V/C Ratio(X)	0.73	0.27	0.02	0.47	0.22	0.58	0.57	0.16	0.18	0.72	0.05	
Avail Cap(c_a), veh/h	1584	1413	626	421	1120	1439	365	1288	616	3959	501	
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	0.00
Uniform Delay (d), s/veh	25.6	12.9	11.6	30.7	18.2	12.3	31.1	27.6	27.6	23.6	17.4	0.0
Incr Delay (d2), s/veh	0.5	0.1	0.0	3.4	0.1	0.5	7.5	0.2	0.6	0.7	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	2.5	1.6	0.1	0.3	1.0	3.2	0.2	0.3	0.3	3.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.1	13.0	11.6	34.2	18.3	12.7	38.6	27.8	28.2	24.3	17.5	0.0
LnGrp LOS	C	B	B	C	B	B	D	C	C	C	B	
Approach Vol, veh/h		949			973			73			768	A
Approach Delay, s/veh		20.7			14.3			30.0			24.1	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.7	22.1	17.0	10.6	5.3	30.5	4.9	22.7				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	8.8	14.6	10.8	2.8	2.6	6.5	2.5	2.7				
Green Ext Time (p_c), s	1.0	2.2	2.2	0.2	0.0	2.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Notes

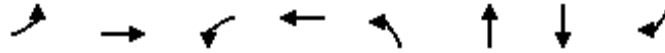
- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background (2025)
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	374	724	34	416	101	97	80	514
v/c Ratio	0.56	0.38	0.15	0.35	0.30	0.28	0.26	0.57
Control Delay	33.1	19.4	38.4	25.5	29.2	24.1	35.4	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	19.4	38.4	25.5	29.2	24.1	35.4	6.7
Queue Length 50th (ft)	64	62	11	37	34	26	26	0
Queue Length 95th (ft)	196	194	58	91	114	95	111	55
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1494	3668	513	3645	533	526	526	1173
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.20	0.07	0.11	0.19	0.18	0.15	0.44
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background (2025)

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	359	674	21	29	306	52	141	16	36	44	34	504
Future Volume (vph)	359	674	21	29	306	52	141	16	36	44	34	504
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5058		1770	6256		1681	1614			1812	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5058		1770	6256		1681	1614			1812	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	374	702	22	34	356	60	145	16	37	45	35	514
RTOR Reduction (vph)	0	3	0	0	27	0	0	17	0	0	0	430
Lane Group Flow (vph)	374	721	0	34	389	0	101	80	0	0	80	84
Confl. Peds. (#/hr)							1		9			
Confl. Bikes (#/hr)							2		1			1
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	14.6	28.1		3.2	16.7		15.0	15.0			12.5	12.5
Effective Green, g (s)	14.6	28.1		3.2	16.7		15.0	15.0			12.5	12.5
Actuated g/C Ratio	0.19	0.37		0.04	0.22		0.20	0.20			0.16	0.16
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	658	1867		74	1372		331	318			297	457
v/s Ratio Prot	c0.11	c0.14		0.02	0.06		c0.06	0.05			c0.04	0.03
v/s Ratio Perm												
v/c Ratio	0.57	0.39		0.46	0.28		0.31	0.25			0.27	0.18
Uniform Delay, d1	27.9	17.7		35.6	24.7		26.1	25.8			27.8	27.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.9	0.0		1.6	0.0		0.4	0.3			0.2	0.1
Delay (s)	28.8	17.7		37.2	24.8		26.5	26.1			28.0	27.5
Level of Service	C	B		D	C		C	C			C	C
Approach Delay (s)		21.5			25.7			26.3			27.5	
Approach LOS		C			C			C			C	

Intersection Summary

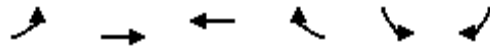
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	76.1	Sum of lost time (s)	17.3
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr

Background (2025)

Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	106	706	289	40	43	131
v/c Ratio	0.10	0.30	0.19	0.06	0.08	0.14
Control Delay	18.0	4.7	12.1	4.3	18.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	4.7	12.1	4.3	18.8	5.7
Queue Length 50th (ft)	10	43	31	0	8	0
Queue Length 95th (ft)	39	61	51	13	41	22
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2139	3539	3319	1451	953	1560
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.20	0.09	0.03	0.05	0.08

Intersection Summary

HCM 6th Signalized Intersection Summary
 3: W Jack London Blvd & Livermore Outlets Dr

Background (2025)
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↖	↑↑	↗↗	↖	↘	↘↘
Traffic Volume (veh/h)	102	678	280	39	40	123
Future Volume (veh/h)	102	678	280	39	40	123
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	106	706	289	40	43	131
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	3	2	2
Cap, veh/h	609	1915	919	396	391	612
Arrive On Green	0.18	0.54	0.26	0.26	0.22	0.22
Sat Flow, veh/h	3456	3647	3647	1531	1781	2790
Grp Volume(v), veh/h	106	706	289	40	43	131
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1531	1781	1395
Q Serve(g_s), s	1.0	4.4	2.5	0.8	0.7	1.5
Cycle Q Clear(g_c), s	1.0	4.4	2.5	0.8	0.7	1.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	609	1915	919	396	391	612
V/C Ratio(X)	0.17	0.37	0.31	0.10	0.11	0.21
Avail Cap(c_a), veh/h	2246	3696	4158	1791	926	1451
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.5	5.1	11.5	10.9	12.0	12.3
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.7	0.2	0.3	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	5.2	11.6	10.9	12.1	12.4
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		812	329		174	
Approach Delay, s/veh		6.2	11.5		12.3	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.8	15.2			26.0	12.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.0	4.5			6.4	3.5
Green Ext Time (p_c), s	0.2	1.2			3.0	0.3

Intersection Summary

HCM 6th Ctrl Delay	8.4
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
4: W Jack London Blvd & Wolf House Dr

Background (2025)
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	14	727	314	14	24	40
v/c Ratio	0.02	0.54	0.25	0.01	0.04	0.06
Control Delay	21.3	9.7	9.6	7.6	14.9	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	9.7	9.6	7.6	14.9	6.6
Queue Length 50th (ft)	2	110	35	1	4	0
Queue Length 95th (ft)	22	375	184	12	18	12
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1374	1863	1705	1412	1114	1029
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.39	0.18	0.01	0.02	0.04
Intersection Summary						

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Background (2025)
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	705	292	13	17	28
Future Volume (veh/h)	14	705	292	13	17	28
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1811	1841
Adj Flow Rate, veh/h	14	727	314	14	24	40
Peak Hour Factor	0.97	0.97	0.93	0.93	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	6	4
Cap, veh/h	66	974	633	523	243	219
Arrive On Green	0.04	0.52	0.34	0.34	0.14	0.14
Sat Flow, veh/h	1781	1870	1870	1546	1725	1560
Grp Volume(v), veh/h	14	727	314	14	24	40
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1546	1725	1560
Q Serve(g_s), s	0.2	8.4	3.7	0.2	0.3	0.6
Cycle Q Clear(g_c), s	0.2	8.4	3.7	0.2	0.3	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	66	974	633	523	243	219
V/C Ratio(X)	0.21	0.75	0.50	0.03	0.10	0.18
Avail Cap(c_a), veh/h	1945	3063	3063	2532	1256	1136
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.8	5.2	7.2	6.1	10.3	10.4
Incr Delay (d2), s/veh	1.2	0.4	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	0.6	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.0	5.6	7.5	6.1	10.4	10.6
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		741	328		64	
Approach Delay, s/veh		5.8	7.4		10.5	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.0	14.6			19.6	7.9
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.2	5.7			10.4	2.6
Green Ext Time (p_c), s	0.0	1.1			3.0	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.5
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
5: W Jack London Blvd & Ambassador Dwy

Background (2025)
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	728	311	0	0	0
Future Vol, veh/h	0	728	311	0	0	0
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	94	94	25	25
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	847	331	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	332	0	-	0	1179 332
Stage 1	-	-	-	-	332 -
Stage 2	-	-	-	-	847 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1227	-	-	-	211 710
Stage 1	-	-	-	-	727 -
Stage 2	-	-	-	-	420 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1226	-	-	-	211 709
Mov Cap-2 Maneuver	-	-	-	-	211 -
Stage 1	-	-	-	-	726 -
Stage 2	-	-	-	-	420 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1226	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC
6: W Jack London Blvd & Airport Dwy

Background (2025)
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	719	317	0	0	1
Future Vol, veh/h	2	719	317	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	90	90	25	25
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	817	352	0	0	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	352	0	-	0	1173 352
Stage 1	-	-	-	-	352 -
Stage 2	-	-	-	-	821 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1207	-	-	-	212 692
Stage 1	-	-	-	-	712 -
Stage 2	-	-	-	-	432 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1207	-	-	-	212 692
Mov Cap-2 Maneuver	-	-	-	-	212 -
Stage 1	-	-	-	-	711 -
Stage 2	-	-	-	-	432 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

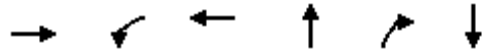
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1207	-	-	-	692
HCM Lane V/C Ratio	0.002	-	-	-	0.006
HCM Control Delay (s)	8	-	-	-	10.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues

7: Discovery Dr & W Jack London Blvd

Background (2025)

Timing Plan: PM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	830	9	311	27	20	18
v/c Ratio	0.30	0.02	0.11	0.04	0.04	0.03
Control Delay	6.7	18.0	3.7	16.4	0.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	18.0	3.7	16.4	0.2	0.1
Queue Length 50th (ft)	0	1	0	1	0	0
Queue Length 95th (ft)	181	15	44	21	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	3013	1235	3526	1363	899	1053
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.01	0.09	0.02	0.02	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Background (2025)
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	705	17	8	286	0	17	0	13	8	0	2
Future Volume (veh/h)	0	705	17	8	286	0	17	0	13	8	0	2
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		1.00	1.00		1.00	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	0	1870	1870	1530	1870	0	1870	1870	1278	1870	1870	1870
Adj Flow Rate, veh/h	0	810	20	9	311	0	27	0	20	14	0	4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.64	0.64	0.64	0.56	0.56	0.56
Percent Heavy Veh, %	0	2	2	25	2	0	2	2	42	2	2	2
Cap, veh/h	0	1266	31	28	1750	0	168	0	102	37	0	11
Arrive On Green	0.00	0.36	0.36	0.02	0.49	0.00	0.09	0.00	0.09	0.03	0.00	0.03
Sat Flow, veh/h	0	3635	87	1457	3647	0	1781	0	1083	1348	0	385
Grp Volume(v), veh/h	0	406	424	9	311	0	27	0	20	18	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1852	1457	1777	0	1781	0	1083	1734	0	0
Q Serve(g_s), s	0.0	6.6	6.6	0.2	1.7	0.0	0.5	0.0	0.6	0.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.6	6.6	0.2	1.7	0.0	0.5	0.0	0.6	0.4	0.0	0.0
Prop In Lane	0.00		0.05	1.00		0.00	1.00		1.00	0.78		0.22
Lane Grp Cap(c), veh/h	0	635	662	28	1750	0	168	0	102	48	0	0
V/C Ratio(X)	0.00	0.64	0.64	0.32	0.18	0.00	0.16	0.00	0.20	0.38	0.00	0.00
Avail Cap(c_a), veh/h	0	1544	1610	1266	3089	0	1032	0	627	603	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	16.7	4.9	0.0	14.4	0.0	14.4	16.5	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.8	2.4	0.0	0.0	0.2	0.0	0.3	1.8	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	1.6	0.1	0.2	0.0	0.2	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.0	10.0	19.1	4.9	0.0	14.5	0.0	14.8	18.3	0.0	0.0
LnGrp LOS	A	B	B	B	A	A	B	A	B	B	A	A
Approach Vol, veh/h		830			320			47			18	
Approach Delay, s/veh		10.0			5.3			14.6			18.3	
Approach LOS		B			A			B			B	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	4.7	17.6		5.0		22.3		7.3				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.2	8.6		2.4		3.7		2.6				
Green Ext Time (p_c), s	0.0	3.8		0.0		1.5		0.1				

Intersection Summary

HCM 6th Ctrl Delay	9.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background (2025)
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	809	21	320	6	72
v/c Ratio	0.01	0.35	0.06	0.14	0.01	0.15
Control Delay	15.3	6.7	14.7	5.6	14.4	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	6.7	14.7	5.6	14.4	1.6
Queue Length 50th (ft)	0	43	2	14	1	0
Queue Length 95th (ft)	6	134	21	48	8	4
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	933	3297	757	3441	1448	925
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.25	0.03	0.09	0.00	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Background (2025)
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕			↕	↗		↕	
Traffic Volume (veh/h)	3	726	10	19	291	0	5	0	60	0	0	0
Future Volume (veh/h)	3	726	10	19	291	0	5	0	60	0	0	0
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		1.00	1.00		1.00	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	1870	1870	1870	788	1870	1870	1870	1870	1203	1870	1870	1870
Adj Flow Rate, veh/h	3	798	11	21	320	0	6	0	72	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.83	0.83	0.83	0.25	0.25	0.25
Percent Heavy Veh, %	2	2	2	75	2	2	2	2	47	2	2	2
Cap, veh/h	10	1358	19	32	1478	0	228	0	131	0	6	0
Arrive On Green	0.01	0.38	0.38	0.04	0.42	0.00	0.13	0.00	0.13	0.00	0.00	0.00
Sat Flow, veh/h	1781	3587	49	751	3647	0	1781	0	1020	0	1870	0
Grp Volume(v), veh/h	3	395	414	21	320	0	6	0	72	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1860	751	1777	0	1781	0	1020	0	1870	0
Q Serve(g_s), s	0.0	5.2	5.2	0.8	1.7	0.0	0.1	0.0	2.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.2	5.2	0.8	1.7	0.0	0.1	0.0	2.0	0.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	673	704	32	1478	0	228	0	131	0	6	0
V/C Ratio(X)	0.29	0.59	0.59	0.65	0.22	0.00	0.03	0.00	0.55	0.00	0.00	0.00
Avail Cap(c_a), veh/h	724	2106	2205	509	4212	0	1508	0	863	0	760	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	14.6	7.3	7.3	13.9	5.5	0.0	11.3	0.0	12.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.6	0.6	8.0	0.1	0.0	0.0	0.0	1.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	0.9	0.2	0.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	7.9	7.9	21.9	5.6	0.0	11.3	0.0	13.4	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	A	A	A
Approach Vol, veh/h		812			341			78				0
Approach Delay, s/veh		8.0			6.6			13.3				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	16.5		0.0	4.2	17.6		7.8				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	2.8	7.2		0.0	2.0	3.7		4.0				
Green Ext Time (p_c), s	0.0	3.8		0.0	0.0	1.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background (2025)
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	102	496	211	137	203	337	73	1345	153	312	1560	68
v/c Ratio	0.23	0.77	0.47	0.27	0.58	0.51	0.17	0.82	0.25	0.65	0.83	0.11
Control Delay	48.7	51.6	8.9	47.5	47.9	23.6	49.4	38.5	6.3	54.1	37.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	51.6	8.9	47.5	47.9	23.6	49.4	38.5	6.3	54.1	37.1	0.4
Queue Length 50th (ft)	30	171	0	41	127	134	22	285	3	100	348	0
Queue Length 95th (ft)	80	268	62	99	230	263	61	475	54	#246	575	0
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	436	1826	885	644	1038	657	625	3276	1089	483	3013	899
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.27	0.24	0.21	0.20	0.51	0.12	0.41	0.14	0.65	0.52	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Background (2025)
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↔	↔↔	↑	↔	↔↔	↑↑↑	↔	↔↔	↑↑↑	↔
Traffic Volume (veh/h)	94	456	194	122	181	300	70	1291	147	281	1404	61
Future Volume (veh/h)	94	456	194	122	181	300	70	1291	147	281	1404	61
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		1.00	1.00		1.00	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	1707	1870	1826	1870	1856	1870	1826	1841	1870	1870	1826	1663
Adj Flow Rate, veh/h	102	496	211	137	203	337	73	1345	153	312	1560	68
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.96	0.96	0.96	0.90	0.90	0.90
Percent Heavy Veh, %	13	2	5	2	3	2	5	4	2	2	5	16
Cap, veh/h	432	667	290	523	375	519	400	1674	528	433	1694	479
Arrive On Green	0.14	0.19	0.19	0.15	0.20	0.20	0.12	0.33	0.33	0.13	0.34	0.34
Sat Flow, veh/h	3155	3554	1545	3456	1856	1585	3374	5025	1585	3456	4985	1409
Grp Volume(v), veh/h	102	496	211	137	203	337	73	1345	153	312	1560	68
Grp Sat Flow(s),veh/h/ln	1577	1777	1545	1728	1856	1585	1687	1675	1585	1728	1662	1409
Q Serve(g_s), s	3.0	13.7	13.3	3.6	10.2	18.8	2.0	25.3	7.4	9.0	31.2	3.5
Cycle Q Clear(g_c), s	3.0	13.7	13.3	3.6	10.2	18.8	2.0	25.3	7.4	9.0	31.2	3.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	432	667	290	523	375	519	400	1674	528	433	1694	479
V/C Ratio(X)	0.24	0.74	0.73	0.26	0.54	0.65	0.18	0.80	0.29	0.72	0.92	0.14
Avail Cap(c_a), veh/h	456	667	290	667	1074	1116	651	3393	1070	500	2644	748
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	39.9	39.8	39.6	38.9	37.1	29.8	41.2	31.5	25.5	43.6	32.9	23.7
Incr Delay (d2), s/veh	0.1	4.0	7.8	0.1	0.5	0.5	0.1	0.4	0.1	3.2	2.8	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.1	5.5	1.5	4.5	6.8	0.8	9.5	2.7	3.9	12.1	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.0	43.7	47.4	39.0	37.5	30.3	41.3	31.8	25.6	46.8	35.7	23.8
LnGrp LOS	D	D	D	D	D	C	D	C	C	D	D	C
Approach Vol, veh/h		809			677			1571			1940	
Approach Delay, s/veh		44.2			34.2			31.7			37.1	
Approach LOS		D			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	40.3	20.4	25.3	17.0	41.0	18.9	26.8				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	11.0	27.3	5.6	15.7	4.0	33.2	5.0	20.8				
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.0	2.1	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	36.1
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background (2025)
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	33	51	15	1599	1923	33
v/c Ratio	0.08	0.14	0.05	0.40	0.51	0.04
Control Delay	21.5	8.9	21.5	3.5	6.4	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	8.9	21.5	3.5	6.4	3.8
Queue Length 50th (ft)	5	0	2	71	95	1
Queue Length 95th (ft)	12	8	10	91	238	13
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1455	1197	1087	5036	3860	873
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.01	0.32	0.50	0.04

Intersection Summary

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background (2025)
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	22	34	14	1487	1673	29
Future Volume (veh/h)	22	34	14	1487	1673	29
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1678	1663	1100	1856	1841	1248
Adj Flow Rate, veh/h	33	51	15	1599	1923	33
Peak Hour Factor	0.67	0.67	0.93	0.93	0.87	0.87
Percent Heavy Veh, %	15	16	54	3	4	44
Cap, veh/h	329	264	55	3144	2266	477
Arrive On Green	0.11	0.11	0.03	0.62	0.45	0.45
Sat Flow, veh/h	3100	2480	2032	5233	5191	1058
Grp Volume(v), veh/h	33	51	15	1599	1923	33
Grp Sat Flow(s),veh/h/ln	1550	1240	1016	1689	1675	1058
Q Serve(g_s), s	0.4	0.7	0.3	7.0	13.6	0.7
Cycle Q Clear(g_c), s	0.4	0.7	0.3	7.0	13.6	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	329	264	55	3144	2266	477
V/C Ratio(X)	0.10	0.19	0.27	0.51	0.85	0.07
Avail Cap(c_a), veh/h	1942	1554	1273	3808	3777	795
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.1	16.3	19.0	4.2	9.7	6.2
Incr Delay (d2), s/veh	0.0	0.1	1.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	0.3	2.5	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.2	16.4	20.0	4.2	10.2	6.2
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	84			1614	1956	
Approach Delay, s/veh	16.3			4.4	10.1	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		31.0		8.9	6.8	24.2
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		9.0		2.7	2.3	15.6
Green Ext Time (p_c), s		1.9		0.0	0.0	2.4

Intersection Summary

HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Background (2025)
Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	91	573	1084	92	411	1517
v/c Ratio	0.11	0.84	0.59	0.05	0.49	0.72
Control Delay	22.4	20.5	19.5	0.9	30.3	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	20.5	19.5	0.9	30.3	12.5
Queue Length 50th (ft)	15	58	130	0	57	208
Queue Length 95th (ft)	38	#226	215	6	105	361
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1335	866	2691	2319	1553	2916
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.66	0.40	0.04	0.26	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background (2025)
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↗	↖	↑↑↑	↖↗	↖↗↖	↑↑
Traffic Volume (veh/h)	83	521	986	84	366	1350
Future Volume (veh/h)	83	521	986	84	366	1350
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1826	1841	1870	1826
Adj Flow Rate, veh/h	91	573	1084	92	411	1517
Peak Hour Factor	0.91	0.91	0.91	0.91	0.89	0.89
Percent Heavy Veh, %	2	2	5	4	2	5
Cap, veh/h	1175	539	1701	1870	610	1818
Arrive On Green	0.34	0.34	0.34	0.34	0.12	0.52
Sat Flow, veh/h	3456	1585	5149	2745	5023	3561
Grp Volume(v), veh/h	91	573	1084	92	411	1517
Grp Sat Flow(s),veh/h/ln	1728	1585	1662	1373	1674	1735
Q Serve(g_s), s	1.3	25.0	13.5	0.8	5.8	27.2
Cycle Q Clear(g_c), s	1.3	25.0	13.5	0.8	5.8	27.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1175	539	1701	1870	610	1818
V/C Ratio(X)	0.08	1.06	0.64	0.05	0.67	0.83
Avail Cap(c_a), veh/h	1175	539	2373	2241	1366	1818
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.4	24.3	20.4	3.9	30.9	14.8
Incr Delay (d2), s/veh	0.0	56.6	0.6	0.0	1.3	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	16.9	4.5	0.2	2.2	8.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.5	80.9	21.0	3.9	32.2	18.5
LnGrp LOS	B	F	C	A	C	B
Approach Vol, veh/h	664		1176			1928
Approach Delay, s/veh	72.1		19.6			21.4
Approach LOS	E		B			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.4	30.6			44.0	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	7.8	15.5			29.2	27.0
Green Ext Time (p_c), s	1.2	9.6			4.8	0.0
Intersection Summary						
HCM 6th Ctrl Delay			29.8			
HCM 6th LOS			C			

Queues
12: Isabel Ave & Airway Blvd

Background (2025)
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	12	117	280	34	63	268	165	1665	31	266	1671
v/c Ratio	0.04	0.34	0.41	0.11	0.12	0.33	0.71	0.89	0.05	0.62	0.91
Control Delay	44.8	38.8	7.8	44.7	27.7	3.5	61.9	36.4	0.1	50.7	39.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	38.8	7.8	44.7	27.7	3.5	61.9	36.4	0.1	50.7	39.1
Queue Length 50th (ft)	7	72	28	20	28	0	106	353	0	88	370
Queue Length 95th (ft)	30	123	83	61	74	49	#273	#685	0	#172	#675
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	295	492	714	298	609	830	278	2257	744	487	2143
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.24	0.39	0.11	0.10	0.32	0.59	0.74	0.04	0.55	0.78

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Background (2025)
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	11	105	252	31	57	244	150	1515	28	231	1445	9
Future Volume (veh/h)	11	105	252	31	57	244	150	1515	28	231	1445	9
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		1.00	1.00		1.00	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	1752	1737	1870	1870	1870	1870	1870	1841	1781	1826	1811	1811
Adj Flow Rate, veh/h	12	117	280	34	63	268	165	1665	31	266	1661	10
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87
Percent Heavy Veh, %	10	11	2	2	2	2	2	4	8	5	6	6
Cap, veh/h	77	308	457	171	424	555	199	1814	545	416	1891	11
Arrive On Green	0.05	0.18	0.18	0.10	0.23	0.23	0.11	0.36	0.36	0.12	0.37	0.37
Sat Flow, veh/h	1668	1737	1582	1781	1870	1585	1781	5025	1510	3374	5071	31
Grp Volume(v), veh/h	12	117	280	34	63	268	165	1665	31	266	1080	591
Grp Sat Flow(s),veh/h/ln	1668	1737	1582	1781	1870	1585	1781	1675	1510	1687	1648	1806
Q Serve(g_s), s	0.6	5.3	13.6	1.6	2.4	11.8	8.1	28.2	1.2	6.7	27.2	27.2
Cycle Q Clear(g_c), s	0.6	5.3	13.6	1.6	2.4	11.8	8.1	28.2	1.2	6.7	27.2	27.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	77	308	457	171	424	555	199	1814	545	416	1229	673
V/C Ratio(X)	0.16	0.38	0.61	0.20	0.15	0.48	0.83	0.92	0.06	0.64	0.88	0.88
Avail Cap(c_a), veh/h	300	449	585	300	441	569	280	2201	661	493	1444	791
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	40.8	32.3	27.4	37.1	27.5	22.6	38.7	27.2	18.6	37.1	26.0	26.0
Incr Delay (d2), s/veh	0.3	0.3	0.5	0.2	0.1	0.2	9.7	5.4	0.0	1.2	5.2	8.9
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	0.2	2.1	4.9	0.7	1.0	4.1	3.9	11.0	0.4	2.7	10.5	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.1	32.6	27.9	37.3	27.6	22.9	48.4	32.5	18.6	38.3	31.2	34.9
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	C	C
Approach Vol, veh/h		409			365			1861			1937	
Approach Delay, s/veh		29.6			25.0			33.7			33.3	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	37.9	13.5	21.6	14.9	39.0	9.1	26.0				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	8.7	30.2	3.6	15.6	10.1	29.2	2.6	13.8				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.1	0.0	1.6	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	32.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	9	17	14	6	26
Future Vol, veh/h	18	9	17	14	6	26
Conflicting Peds, #/hr	0	1	1	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	73	73	68	68
Heavy Vehicles, %	2	13	56	38	33	50
Mvmt Flow	23	12	23	19	9	38

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	36	0	98
Stage 1	-	-	-	-	30
Stage 2	-	-	-	-	68
Critical Hdwy	-	-	4.66	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.704	-	3.797
Pot Cap-1 Maneuver	-	-	1288	-	831
Stage 1	-	-	-	-	918
Stage 2	-	-	-	-	882
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1287	-	813
Mov Cap-2 Maneuver	-	-	-	-	813
Stage 1	-	-	-	-	917
Stage 2	-	-	-	-	863

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	899	-	-	1287	-
HCM Lane V/C Ratio	0.052	-	-	0.018	-
HCM Control Delay (s)	9.2	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Background (2025)
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	42	1	8	24	18	3	5	25	12	2	3
Future Vol, veh/h	3	42	1	8	24	18	3	5	25	12	2	3
Conflicting Peds, #/hr	1	0	0	0	0	1	14	0	6	6	0	14
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	77	77	77	71	71	71	67	67	67
Heavy Vehicles, %	2	31	2	2	55	65	67	2	13	2	2	2
Mvmt Flow	3	43	1	10	31	23	4	7	35	18	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	55	0	0	44	0	0	130	125	50	141	114	58
Stage 1	-	-	-	-	-	-	50	50	-	64	64	-
Stage 2	-	-	-	-	-	-	80	75	-	77	50	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.77	6.52	6.33	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	4.103	4.018	3.417	3.518	4.018	3.318
Pot Cap-1 Maneuver	1550	-	-	1564	-	-	713	765	988	829	776	1008
Stage 1	-	-	-	-	-	-	822	853	-	947	842	-
Stage 2	-	-	-	-	-	-	790	833	-	932	853	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1549	-	-	1564	-	-	694	757	982	783	768	994
Mov Cap-2 Maneuver	-	-	-	-	-	-	694	757	-	783	768	-
Stage 1	-	-	-	-	-	-	820	851	-	944	835	-
Stage 2	-	-	-	-	-	-	768	826	-	884	851	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			1.2			9.2			9.6		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	907	1549	-	-	1564	-	-	812
HCM Lane V/C Ratio	0.051	0.002	-	-	0.007	-	-	0.031
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	9.6
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background (2025)

Timing Plan: PM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	136	135	670	900	1101	633
v/c Ratio	0.38	0.37	0.65	0.91	0.47	0.50
Control Delay	25.1	25.0	18.3	31.7	7.1	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	25.0	18.3	31.7	7.1	2.1
Queue Length 50th (ft)	49	49	105	300	97	0
Queue Length 95th (ft)	96	95	156	#638	176	35
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	509	511	1437	988	2882	1406
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.26	0.47	0.91	0.38	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background (2025)

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↙	↖	↗		↑			↕	↘	
Traffic Volume (vph)	0	0	0	238	4	596	0	801	0	0	1002	576	
Future Volume (vph)	0	0	0	238	4	596	0	801	0	0	1002	576	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1681	1688	2787		1863			3539	1583	
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1681	1688	2787		1863			3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.91	0.91	0.91	
Adj. Flow (vph)	0	0	0	267	4	670	0	900	0	0	1101	633	
RTOR Reduction (vph)	0	0	0	0	0	75	0	0	0	0	0	218	
Lane Group Flow (vph)	0	0	0	136	135	595	0	900	0	0	1101	415	
Confl. Bikes (#/hr)									1				
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				14.3	14.3	22.6		35.2			43.5	43.5	
Effective Green, g (s)				14.3	14.3	22.6		35.2			43.5	43.5	
Actuated g/C Ratio				0.22	0.22	0.34		0.53			0.66	0.66	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				362	364	950		989			2321	1038	
v/s Ratio Prot								c0.48			0.31		
v/s Ratio Perm				0.08	0.08	c0.21						0.26	
v/c Ratio				0.38	0.37	0.63		0.91			0.47	0.40	
Uniform Delay, d1				22.2	22.2	18.3		14.1			5.7	5.3	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	0.9		11.9			0.1	0.1	
Delay (s)				22.4	22.4	19.2		26.0			5.7	5.4	
Level of Service				C	C	B		C			A	A	
Approach Delay (s)		0.0			20.2			26.0			5.6		
Approach LOS		A			C			C			A		
Intersection Summary													
HCM 2000 Control Delay			14.6		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.85										
Actuated Cycle Length (s)			66.3		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			70.3%		ICU Level of Service					C			
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background (2025)

Timing Plan: PM Peak



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	493	445	947	391	814
v/c Ratio	0.57	0.49	0.59	0.44	0.48
Control Delay	13.9	6.9	7.7	2.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	6.9	7.7	2.6	6.8
Queue Length 50th (ft)	35	13	48	0	38
Queue Length 95th (ft)	76	40	113	30	83
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2842	2353	3285	1397	3456
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.19	0.29	0.28	0.24

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background (2025)

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔		↔↔					↕↔	↔		↕↕	
Traffic Volume (vph)	394	0	356	0	0	0	0	868	417	0	700	0
Future Volume (vph)	394	0	356	0	0	0	0	868	417	0	700	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frbp, ped/bikes	1.00		1.00					1.00	0.99		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					0.99	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2787					3365	1420		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2787					3365	1420		3539	
Peak-hour factor, PHF	0.80	0.80	0.80	0.92	0.92	0.92	0.96	0.96	0.96	0.86	0.86	0.86
Adj. Flow (vph)	492	0	445	0	0	0	0	904	434	0	814	0
RTOR Reduction (vph)	0	0	196	0	0	0	0	5	201	0	0	0
Lane Group Flow (vph)	493	0	249	0	0	0	0	942	190	0	814	0
Confl. Peds. (#/hr)									3			
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	8.1		8.1					15.2	15.2		15.2	
Effective Green, g (s)	8.1		8.1					15.2	15.2		15.2	
Actuated g/C Ratio	0.26		0.26					0.49	0.49		0.49	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	888		721					1634	689		1718	
v/s Ratio Prot								c0.28			0.23	
v/s Ratio Perm	c0.14		0.09						0.13			
v/c Ratio	0.56		0.35					0.58	0.28		0.47	
Uniform Delay, d1	10.0		9.4					5.8	4.8		5.4	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.4		0.1					0.3	0.1		0.1	
Delay (s)	10.5		9.5					6.1	4.9		5.5	
Level of Service	B		A					A	A		A	
Approach Delay (s)		10.0			0.0			5.7			5.5	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			31.3					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			51.1%					ICU Level of Service			A	
Analysis Period (min)			15									

c Critical Lane Group

Appendix E – Background plus Project(s) Conditions Intersection Level of Service and Queuing Work Sheets

Queues

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	180	81	4	237	391	5	95	434	109	352
v/c Ratio	0.29	0.06	0.03	0.32	0.28	0.04	0.21	0.46	0.28	0.22
Control Delay	32.0	17.3	39.2	24.6	2.1	39.0	25.2	27.2	16.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	17.3	39.2	24.6	2.1	39.0	25.2	27.2	16.9	0.3
Queue Length 50th (ft)	19	8	1	35	0	2	9	44	22	0
Queue Length 95th (ft)	59	35	15	104	27	12	23	136	91	0
Internal Link Dist (ft)		745		868			221		816	
Turn Bay Length (ft)	400		350			110		600		420
Base Capacity (vph)	1859	2327	403	2024	2578	328	1650	3891	967	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.03	0.01	0.12	0.15	0.02	0.06	0.11	0.11	0.22

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background plus SMP 39
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔	↑↑	↔↔	↔	↑↑↔		↔↔↔	↑	↔
Traffic Volume (veh/h)	142	64	0	4	216	356	3	61	2	386	97	313
Future Volume (veh/h)	142	64	0	4	216	356	3	61	2	386	97	313
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		1.00	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	1870	1870	1870	1530	1870	1826	1411	537	537	1752	685	1870
Adj Flow Rate, veh/h	180	81	0	4	237	391	5	92	3	434	109	0
Peak Hour Factor	0.79	0.79	0.79	0.91	0.91	0.91	0.66	0.66	0.66	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	25	2	5	33	92	92	10	82	2
Cap, veh/h	493	1095	488	8	766	1004	7	160	5	734	178	
Arrive On Green	0.10	0.31	0.00	0.01	0.22	0.22	0.01	0.11	0.11	0.16	0.26	0.00
Sat Flow, veh/h	5023	3554	1585	1457	3554	2688	1344	1457	47	4705	685	1585
Grp Volume(v), veh/h	180	81	0	4	237	391	5	61	34	434	109	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1585	1457	1777	1344	1344	488	528	1568	685	1585
Q Serve(g_s), s	1.5	0.7	0.0	0.1	2.6	4.9	0.2	2.7	2.8	3.9	6.4	0.0
Cycle Q Clear(g_c), s	1.5	0.7	0.0	0.1	2.6	4.9	0.2	2.7	2.8	3.9	6.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	493	1095	488	8	766	1004	7	107	58	734	178	
V/C Ratio(X)	0.37	0.07	0.00	0.51	0.31	0.39	0.69	0.57	0.58	0.59	0.61	
Avail Cap(c_a), veh/h	2192	2768	1234	477	2380	2225	381	703	380	5132	1056	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.3	11.2	0.0	22.7	15.1	10.6	22.8	19.4	19.4	18.0	14.9	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	17.5	0.2	0.2	35.6	3.6	6.7	0.6	2.5	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.0	0.1	0.8	1.1	0.1	0.3	0.4	1.2	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	11.3	0.0	40.2	15.3	10.8	58.4	23.0	26.1	18.6	17.4	0.0
LnGrp LOS	B	B	A	D	B	B	E	C	C	B	B	
Approach Vol, veh/h		261			632			100			543	A
Approach Delay, s/veh		16.9			12.7			25.8			18.3	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	15.2	11.1	11.0	4.2	19.4	4.2	17.9				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	3.5	6.9	5.9	4.8	2.1	2.7	2.2	8.4				
Green Ext Time (p_c), s	0.3	3.0	1.2	0.4	0.0	0.4	0.0	0.5				

Intersection Summary

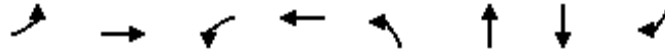
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 User approved changes to right turn type.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	55	390	14	720	9	8	14	16
v/c Ratio	0.03	0.11	0.02	0.16	0.01	0.01	0.02	0.01
Control Delay	23.0	9.5	29.1	12.2	17.7	15.0	27.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	9.5	29.1	12.2	17.7	15.0	27.6	0.0
Queue Length 50th (ft)	0	0	1	0	0	0	0	0
Queue Length 95th (ft)	38	101	28	132	12	9	20	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2613	4157	1199	5281	1135	1149	1076	2034
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.09	0.01	0.14	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39

Timing Plan: AM Peak

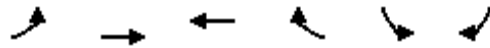


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	377	1	12	586	12	8	1	3	6	3	10
Future Volume (vph)	53	377	1	12	586	12	8	1	3	6	3	10
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	4661		1671	6327		1517	1534			1500	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	4661		1671	6327		1517	1534			1500	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.83	0.83	0.83	0.69	0.69	0.69	0.64	0.64	0.64
Adj. Flow (vph)	55	389	1	14	706	14	12	1	4	9	5	16
RTOR Reduction (vph)	0	0	0	0	2	0	0	4	0	0	0	15
Lane Group Flow (vph)	55	390	0	14	718	0	9	4	0	0	14	1
Confl. Peds. (#/hr)			2			2			2			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	4%	11%	100%	8%	3%	2%	13%	2%	2%	17%	33%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	2.9	22.9		0.7	20.7		2.8	2.8			2.6	2.6
Effective Green, g (s)	2.9	22.9		0.7	20.7		2.8	2.8			2.6	2.6
Actuated g/C Ratio	0.06	0.49		0.02	0.45		0.06	0.06			0.06	0.06
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	210	2305		25	2828		91	92			84	156
v/s Ratio Prot	c0.02	0.08		0.01	c0.11		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.26	0.17		0.56	0.25		0.10	0.05			0.17	0.01
Uniform Delay, d1	20.7	6.5		22.6	8.0		20.6	20.5			20.8	20.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.0		15.9	0.0		0.3	0.2			0.3	0.0
Delay (s)	21.2	6.5		38.6	8.0		20.9	20.6			21.2	20.6
Level of Service	C	A		D	A		C	C			C	C
Approach Delay (s)		8.3			8.6			20.8			20.9	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	46.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c	Critical Lane Group		

Queues

3: W Jack London Blvd & Livermore Outlets Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	57	385	723	40	10	38
v/c Ratio	0.04	0.14	0.33	0.04	0.01	0.03
Control Delay	14.7	2.6	9.5	4.8	16.0	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	2.6	9.5	4.8	16.0	7.5
Queue Length 50th (ft)	3	0	44	0	1	0
Queue Length 95th (ft)	19	33	117	12	11	9
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2546	3223	3304	1490	1192	1889
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.12	0.22	0.03	0.01	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary
 3: W Jack London Blvd & Livermore Outlets Dr

Background plus SMP 39

Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↗	↖	↖↗
Traffic Volume (veh/h)	50	339	586	32	8	30
Future Volume (veh/h)	50	339	586	32	8	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1722	1841	1870	1870	1870
Adj Flow Rate, veh/h	57	385	723	40	10	38
Peak Hour Factor	0.88	0.88	0.81	0.81	0.80	0.80
Percent Heavy Veh, %	2	12	4	2	2	2
Cap, veh/h	432	1936	1182	524	194	304
Arrive On Green	0.13	0.59	0.34	0.34	0.11	0.11
Sat Flow, veh/h	3456	3358	3589	1550	1781	2790
Grp Volume(v), veh/h	57	385	723	40	10	38
Grp Sat Flow(s),veh/h/ln	1728	1636	1749	1550	1781	1395
Q Serve(g_s), s	0.5	1.7	5.4	0.5	0.2	0.4
Cycle Q Clear(g_c), s	0.5	1.7	5.4	0.5	0.2	0.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	432	1936	1182	524	194	304
V/C Ratio(X)	0.13	0.20	0.61	0.08	0.05	0.12
Avail Cap(c_a), veh/h	2778	4209	5061	2243	1146	1794
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.1	2.9	8.6	7.0	12.4	12.5
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.0	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.2	3.0	8.8	7.0	12.4	12.6
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		442	763		48	
Approach Delay, s/veh		4.1	8.7		12.5	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.9	15.8			23.7	7.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.5	7.4			3.7	2.4
Green Ext Time (p_c), s	0.1	3.2			1.5	0.1

Intersection Summary

HCM 6th Ctrl Delay	7.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues
4: W Jack London Blvd & Wolf House Dr

Background plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	3	382	705	18	44	52
v/c Ratio	0.01	0.38	0.60	0.02	0.09	0.11
Control Delay	21.7	5.9	11.0	5.2	20.9	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	5.9	11.0	5.2	20.9	9.1
Queue Length 50th (ft)	1	46	107	1	9	0
Queue Length 95th (ft)	9	75	301	10	25	7
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1240	1696	1685	1425	945	869
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.23	0.42	0.01	0.05	0.06
Intersection Summary						

HCM 6th Signalized Intersection Summary
4: W Jack London Blvd & Wolf House Dr

Background plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↘	↖	↘
Traffic Volume (veh/h)	3	344	592	15	22	26
Future Volume (veh/h)	3	344	592	15	22	26
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1722	1841	1870	1870	1870
Adj Flow Rate, veh/h	3	382	705	18	44	52
Peak Hour Factor	0.90	0.90	0.84	0.84	0.50	0.50
Percent Heavy Veh, %	2	12	4	2	2	2
Cap, veh/h	15	999	855	719	302	268
Arrive On Green	0.01	0.58	0.46	0.46	0.17	0.17
Sat Flow, veh/h	1781	1722	1841	1549	1781	1585
Grp Volume(v), veh/h	3	382	705	18	44	52
Grp Sat Flow(s),veh/h/ln	1781	1722	1841	1549	1781	1585
Q Serve(g_s), s	0.1	4.4	12.3	0.2	0.8	1.0
Cycle Q Clear(g_c), s	0.1	4.4	12.3	0.2	0.8	1.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	15	999	855	719	302	268
V/C Ratio(X)	0.21	0.38	0.82	0.03	0.15	0.19
Avail Cap(c_a), veh/h	1439	2087	2231	1878	960	854
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	18.3	4.2	8.6	5.4	13.1	13.2
Incr Delay (d2), s/veh	5.0	0.1	0.8	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.4	2.4	0.0	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.3	4.3	9.4	5.4	13.2	13.4
LnGrp LOS	C	A	A	A	B	B
Approach Vol, veh/h		385	723		96	
Approach Delay, s/veh		4.4	9.3		13.3	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	22.5			26.8	10.3
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	14.3			6.4	3.0
Green Ext Time (p_c), s	0.0	2.9			1.3	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	257	99	134	579	0	30	0	43	0	0	1
Future Vol, veh/h	2	257	99	134	579	0	30	0	43	0	0	1
Conflicting Peds, #/hr	0	0	0	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	180	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	92	92	86	86	92	92	92	25	92	25
Heavy Vehicles, %	50	9	17	16	3	2	17	2	19	2	2	100
Mvmt Flow	2	313	108	146	673	0	33	0	47	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	673	0	0	421	0	0	1338	1336	367	1360	1390	673
Stage 1	-	-	-	-	-	-	371	371	-	965	965	-
Stage 2	-	-	-	-	-	-	967	965	-	395	425	-
Critical Hdwy	4.6	-	-	4.26	-	-	7.27	6.52	6.39	7.12	6.52	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.65	-	-	2.344	-	-	3.653	4.018	3.471	3.518	4.018	4.2
Pot Cap-1 Maneuver	729	-	-	1067	-	-	121	153	642	126	142	322
Stage 1	-	-	-	-	-	-	620	620	-	306	333	-
Stage 2	-	-	-	-	-	-	287	333	-	630	586	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	729	-	-	1067	-	-	99	119	642	97	111	322
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	119	-	97	111	-
Stage 1	-	-	-	-	-	-	618	618	-	305	260	-
Stage 2	-	-	-	-	-	-	221	260	-	583	584	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.6			35.1			16.3		
HCM LOS							E			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	197	729	-	-	1067	-	-	322
HCM Lane V/C Ratio	0.403	0.003	-	-	0.137	-	-	0.012
HCM Control Delay (s)	35.1	10	-	-	8.9	0	-	16.3
HCM Lane LOS	E	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	1.8	0	-	-	0.5	-	-	0

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕			↕			↕	
Traffic Vol, veh/h	2	199	100	136	687	1	33	0	43	3	0	0
Future Vol, veh/h	2	199	100	136	687	1	33	0	43	3	0	0
Conflicting Peds, #/hr	0	0	0	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	300	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	92	92	86	86	92	92	92	75	92	75
Heavy Vehicles, %	2	7	18	16	5	100	18	2	14	33	2	2
Mvmt Flow	3	252	109	148	799	1	36	0	47	4	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	800	0	0	361	0	0	1409	1409	307	1432	1463	800
Stage 1	-	-	-	-	-	-	313	313	-	1096	1096	-
Stage 2	-	-	-	-	-	-	1096	1096	-	336	367	-
Critical Hdwy	4.12	-	-	4.26	-	-	7.28	6.52	6.34	7.43	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.28	5.52	-	6.43	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.28	5.52	-	6.43	5.52	-
Follow-up Hdwy	2.218	-	-	2.344	-	-	3.662	4.018	3.426	3.797	4.018	3.318
Pot Cap-1 Maneuver	823	-	-	1124	-	-	107	139	706	96	129	385
Stage 1	-	-	-	-	-	-	665	657	-	226	289	-
Stage 2	-	-	-	-	-	-	241	289	-	618	622	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	823	-	-	1124	-	-	87	106	706	73	98	385
Mov Cap-2 Maneuver	-	-	-	-	-	-	87	106	-	73	98	-
Stage 1	-	-	-	-	-	-	662	654	-	225	221	-
Stage 2	-	-	-	-	-	-	184	221	-	575	620	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.4			43.5			57.2		
HCM LOS							E			F		

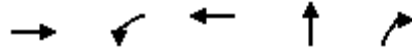
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	173	823	-	-	1124	-	-	73
HCM Lane V/C Ratio	0.478	0.003	-	-	0.132	-	-	0.055
HCM Control Delay (s)	43.5	9.4	-	-	8.7	0	-	57.2
HCM Lane LOS	E	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	2.3	0	-	-	0.5	-	-	0.2

Queues

7: Discovery Dr & W Jack London Blvd

Background plus SMP 39

Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	287	17	926	22	13
v/c Ratio	0.11	0.03	0.33	0.03	0.02
Control Delay	4.7	14.7	3.3	13.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	14.7	3.3	13.9	0.1
Queue Length 50th (ft)	0	1	0	1	0
Queue Length 95th (ft)	44	18	79	19	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	2905	1333	3406	1210	873
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.01	0.27	0.02	0.01

Intersection Summary

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Background plus SMP 39
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	226	18	15	806	0	17	0	10	0	0	0
Future Volume (veh/h)	0	226	18	15	806	0	17	0	10	0	0	0
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		1.00	1.00		1.00	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	0	1767	1767	1604	1811	0	1870	1870	1159	1870	1870	1870
Adj Flow Rate, veh/h	0	266	21	17	926	0	22	0	13	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.87	0.87	0.87	0.78	0.78	0.78	0.25	0.25	0.25
Percent Heavy Veh, %	0	9	9	20	6	0	2	2	50	2	2	2
Cap, veh/h	0	1054	83	55	1844	0	139	0	77	0	8	0
Arrive On Green	0.00	0.33	0.33	0.04	0.54	0.00	0.08	0.00	0.08	0.00	0.00	0.00
Sat Flow, veh/h	0	3241	247	1527	3532	0	1781	0	982	0	1870	0
Grp Volume(v), veh/h	0	141	146	17	926	0	22	0	13	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1678	1722	1527	1721	0	1781	0	982	0	1870	0
Q Serve(g_s), s	0.0	1.5	1.5	0.3	4.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.5	1.5	0.3	4.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Prop In Lane	0.00		0.14	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	561	575	55	1844	0	139	0	77	0	8	0
V/C Ratio(X)	0.00	0.25	0.25	0.31	0.50	0.00	0.16	0.00	0.17	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2090	2144	1902	4285	0	1479	0	815	0	932	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.8	5.8	11.3	3.5	0.0	10.4	0.0	10.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.2	1.2	0.2	0.0	0.2	0.0	0.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.0	6.0	12.5	3.7	0.0	10.6	0.0	10.8	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		287			943			35				0
Approach Delay, s/veh		6.0			3.9			10.6				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	4.9	13.4		0.0		18.2		5.9				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	3.5		0.0		6.1		2.3				
Green Ext Time (p_c), s	0.0	1.2		0.0		5.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.5
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	313	60	971	13	57
v/c Ratio	0.01	0.16	0.14	0.40	0.04	0.14
Control Delay	18.5	9.2	16.9	6.0	17.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	9.2	16.9	6.0	17.7	0.7
Queue Length 50th (ft)	1	29	10	56	2	0
Queue Length 95th (ft)	6	43	43	141	13	0
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	830	2892	889	3239	868	788
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.11	0.07	0.30	0.01	0.07
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Background plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	233	8	50	806	0	9	0	41	0	0	0
Future Volume (veh/h)	2	233	8	50	806	0	9	0	41	0	0	0
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		1.00	1.00		1.00	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	1870	1752	1752	1337	1811	1811	1870	1870	996	1870	1870	1870
Adj Flow Rate, veh/h	3	303	10	60	971	0	12	0	57	0	0	0
Peak Hour Factor	0.77	0.77	0.77	0.83	0.83	0.83	0.72	0.72	0.72	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	38	6	6	2	2	61	2	2	2
Cap, veh/h	10	1176	39	132	1569	0	205	0	97	0	6	0
Arrive On Green	0.01	0.36	0.36	0.10	0.46	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3286	108	1273	3532	0	1781	0	844	0	1870	0
Grp Volume(v), veh/h	3	153	160	60	971	0	12	0	57	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1664	1729	1273	1721	0	1781	0	844	0	1870	0
Q Serve(g_s), s	0.1	2.0	2.1	1.4	6.7	0.0	0.2	0.0	2.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	2.0	2.1	1.4	6.7	0.0	0.2	0.0	2.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	596	619	132	1569	0	205	0	97	0	6	0
V/C Ratio(X)	0.29	0.26	0.26	0.45	0.62	0.00	0.06	0.00	0.59	0.00	0.00	0.00
Avail Cap(c_a), veh/h	680	1853	1925	810	3831	0	1417	0	671	0	714	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	15.6	7.1	7.1	13.2	6.5	0.0	12.4	0.0	13.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.2	0.2	0.9	0.3	0.0	0.0	0.0	2.1	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.4	0.4	0.3	0.9	0.0	0.1	0.0	0.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	7.3	7.3	14.2	6.8	0.0	12.4	0.0	15.3	0.0	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		316			1031			69				0
Approach Delay, s/veh		7.4			7.2			14.8				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	16.6		0.0	4.2	19.6		7.6				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.4	4.1		0.0	2.1	8.7		4.0				
Green Ext Time (p_c), s	0.0	1.3		0.0	0.0	5.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	105	135	94	173	423	390	318	1544	174	228	1499	253
v/c Ratio	0.38	0.15	0.21	0.43	0.87	0.62	0.77	0.88	0.26	0.66	0.92	0.44
Control Delay	67.6	41.6	3.1	65.3	68.5	31.2	74.1	48.3	8.5	73.4	54.0	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	41.6	3.1	65.3	68.5	31.2	74.1	48.3	8.5	73.4	54.0	16.4
Queue Length 50th (ft)	46	50	0	76	369	224	144	461	17	105	469	61
Queue Length 95th (ft)	88	81	8	138	548	360	218	554	58	173	596	145
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	279	1426	626	507	827	644	479	2442	878	381	2289	734
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.09	0.15	0.34	0.51	0.61	0.66	0.63	0.20	0.60	0.65	0.34

Intersection Summary

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖	↖↗	↕	↖	↖↗	↕↖↗	↖	↖↗	↕↖↗	↖
Traffic Volume (veh/h)	88	113	79	152	372	343	261	1266	143	196	1289	218
Future Volume (veh/h)	88	113	79	152	372	343	261	1266	143	196	1289	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		0.99	1.00		1.00	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	1322	1856	1633	1870	1870	1870	1781	1752	1870	1870	1767	1618
Adj Flow Rate, veh/h	105	135	94	173	423	390	318	1544	174	228	1499	253
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	39	3	18	2	2	2	8	10	2	2	9	19
Cap, veh/h	302	807	312	470	451	553	393	1650	546	383	1622	461
Arrive On Green	0.12	0.23	0.23	0.14	0.24	0.24	0.12	0.34	0.34	0.11	0.34	0.34
Sat Flow, veh/h	2443	3526	1364	3456	1870	1565	3291	4782	1584	3456	4823	1372
Grp Volume(v), veh/h	105	135	94	173	423	390	318	1544	174	228	1499	253
Grp Sat Flow(s),veh/h/ln	1221	1763	1364	1728	1870	1565	1646	1594	1584	1728	1608	1372
Q Serve(g_s), s	4.6	3.6	6.7	5.3	26.0	25.2	11.0	36.6	9.5	7.4	35.1	17.6
Cycle Q Clear(g_c), s	4.6	3.6	6.7	5.3	26.0	25.2	11.0	36.6	9.5	7.4	35.1	17.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	807	312	470	451	553	393	1650	546	383	1622	461
V/C Ratio(X)	0.35	0.17	0.30	0.37	0.94	0.71	0.81	0.94	0.32	0.60	0.92	0.55
Avail Cap(c_a), veh/h	313	807	312	590	958	977	562	2857	946	442	2264	644
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	47.0	36.2	37.4	46.0	43.6	32.8	50.3	37.1	28.2	49.6	37.4	31.6
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	4.2	0.6	3.7	2.3	0.1	0.7	4.5	0.4
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	1.4	1.5	2.2	2.2	12.1	9.2	4.6	13.7	3.5	3.1	13.8	5.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.2	36.3	37.6	46.2	47.8	33.4	54.0	39.4	28.4	50.3	41.9	32.0
LnGrp LOS	D	D	D	D	D	C	D	D	C	D	D	C
Approach Vol, veh/h		334			986			2036			1980	
Approach Delay, s/veh		40.1			41.8			40.7			41.6	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	46.2	20.6	32.6	18.7	45.2	19.2	34.0				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	9.4	38.6	7.3	8.7	13.0	37.1	6.6	28.0				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.1	0.0	1.9	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	41.2
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	40	38	23	1946	1757	54
v/c Ratio	0.12	0.13	0.06	0.51	0.48	0.06
Control Delay	22.4	10.2	21.8	4.1	6.2	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	10.2	21.8	4.1	6.2	3.3
Queue Length 50th (ft)	6	0	3	99	83	1
Queue Length 95th (ft)	14	8	12	113	201	15
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1232	926	1488	4803	3664	964
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.02	0.41	0.48	0.06
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background plus SMP 39
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	29	27	19	1635	1476	45
Future Volume (veh/h)	29	27	19	1635	1476	45
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1396	1189	1737	1781	1781	1470
Adj Flow Rate, veh/h	40	38	23	1946	1757	54
Peak Hour Factor	0.72	0.72	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	34	48	11	8	8	29
Cap, veh/h	265	182	127	2998	2091	536
Arrive On Green	0.10	0.10	0.04	0.62	0.43	0.43
Sat Flow, veh/h	2579	1773	3209	5024	5024	1246
Grp Volume(v), veh/h	40	38	23	1946	1757	54
Grp Sat Flow(s),veh/h/ln	1290	886	1605	1621	1621	1246
Q Serve(g_s), s	0.5	0.8	0.3	9.9	12.5	1.0
Cycle Q Clear(g_c), s	0.5	0.8	0.3	9.9	12.5	1.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	265	182	127	2998	2091	536
V/C Ratio(X)	0.15	0.21	0.18	0.65	0.84	0.10
Avail Cap(c_a), veh/h	1662	1142	2068	3761	3761	963
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	15.9	16.0	18.0	4.8	9.9	6.6
Incr Delay (d2), s/veh	0.1	0.2	0.3	0.1	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	0.1	0.4	2.2	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.0	16.2	18.3	4.9	10.2	6.6
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	78			1969	1811	
Approach Delay, s/veh	16.1			5.0	10.1	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		30.1		8.7	7.2	22.9
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		11.9		2.8	2.3	14.5
Green Ext Time (p_c), s		2.6		0.0	0.0	2.2

Intersection Summary

HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues

11: Isabel Ave & Stanley Blvd

Background plus SMP 39

Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	93	477	1445	169	540	1210
v/c Ratio	0.16	0.80	0.70	0.09	0.60	0.54
Control Delay	27.3	17.3	20.4	2.8	31.7	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	17.3	20.4	2.8	31.7	7.6
Queue Length 50th (ft)	19	32	175	7	82	107
Queue Length 95th (ft)	37	100	315	18	130	242
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1172	799	2342	2326	1350	2693
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.60	0.62	0.07	0.40	0.45
Intersection Summary						

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background plus SMP 39
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	77	396	1243	145	464	1041
Future Volume (veh/h)	77	396	1243	145	464	1041
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1826	1826	1767	1811	1811	1752
Adj Flow Rate, veh/h	93	477	1445	169	540	1210
Peak Hour Factor	0.83	0.83	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	5	5	9	6	6	10
Cap, veh/h	1001	459	1853	1839	715	1946
Arrive On Green	0.30	0.30	0.38	0.38	0.15	0.58
Sat Flow, veh/h	3374	1547	4982	2701	4864	3416
Grp Volume(v), veh/h	93	477	1445	169	540	1210
Grp Sat Flow(s),veh/h/ln	1687	1547	1608	1351	1621	1664
Q Serve(g_s), s	1.7	25.0	22.2	1.8	9.0	20.0
Cycle Q Clear(g_c), s	1.7	25.0	22.2	1.8	9.0	20.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1001	459	1853	1839	715	1946
V/C Ratio(X)	0.09	1.04	0.78	0.09	0.76	0.62
Avail Cap(c_a), veh/h	1001	459	2003	1924	1155	1946
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.4	29.6	22.8	4.6	34.5	11.4
Incr Delay (d2), s/veh	0.0	52.5	2.1	0.0	1.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	15.4	7.6	0.4	3.4	5.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.5	82.1	24.9	4.6	36.1	12.1
LnGrp LOS	C	F	C	A	D	B
Approach Vol, veh/h	570		1614			1750
Approach Delay, s/veh	72.2		22.8			19.5
Approach LOS	E		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	16.9	37.9			54.8	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	11.0	24.2			22.0	27.0
Green Ext Time (p_c), s	1.4	8.2			8.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Background plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	79	157	69	93	147	190	1555	26	242	1802
v/c Ratio	0.02	0.27	0.26	0.26	0.17	0.22	0.81	0.78	0.03	0.60	0.92
Control Delay	45.0	40.4	4.6	48.0	28.4	3.9	72.2	32.4	0.1	53.6	41.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	40.4	4.6	48.0	28.4	3.9	72.2	32.4	0.1	53.6	41.2
Queue Length 50th (ft)	3	48	0	41	43	0	124	329	0	80	~447
Queue Length 95th (ft)	16	86	35	101	98	34	#328	#646	0	#157	#804
Internal Link Dist (ft)		834			379			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	302	424	636	270	616	695	261	2036	759	458	1959
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.19	0.25	0.26	0.15	0.21	0.73	0.76	0.03	0.53	0.92

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Background plus SMP 39
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	4	69	137	60	81	128	173	1415	24	215	1586	18
Future Volume (veh/h)	4	69	137	60	81	128	173	1415	24	215	1586	18
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		1.00	1.00		1.00	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	1870	1559	1870	1796	1841	1663	1856	1737	1870	1811	1752	1752
Adj Flow Rate, veh/h	5	79	157	69	93	147	190	1555	26	242	1782	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.91	0.91	0.91	0.89	0.89	0.89
Percent Heavy Veh, %	2	23	2	7	4	16	3	11	2	6	10	10
Cap, veh/h	37	222	424	221	462	511	221	1882	629	374	1870	21
Arrive On Green	0.02	0.14	0.14	0.13	0.25	0.25	0.13	0.40	0.40	0.11	0.38	0.38
Sat Flow, veh/h	1781	1559	1585	1711	1841	1409	1767	4742	1585	3346	4875	55
Grp Volume(v), veh/h	5	79	157	69	93	147	190	1555	26	242	1165	637
Grp Sat Flow(s),veh/h/ln	1781	1559	1585	1711	1841	1409	1767	1581	1585	1673	1594	1742
Q Serve(g_s), s	0.3	4.5	7.9	3.6	3.9	7.3	10.4	28.9	1.0	6.8	34.9	34.9
Cycle Q Clear(g_c), s	0.3	4.5	7.9	3.6	3.9	7.3	10.4	28.9	1.0	6.8	34.9	34.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	37	222	424	221	462	511	221	1882	629	374	1223	668
V/C Ratio(X)	0.14	0.36	0.37	0.31	0.20	0.29	0.86	0.83	0.04	0.65	0.95	0.95
Avail Cap(c_a), veh/h	290	365	569	261	462	511	252	1882	629	443	1265	691
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	47.3	38.1	29.3	38.8	29.1	22.3	42.1	26.6	18.2	41.8	29.4	29.4
Incr Delay (d2), s/veh	0.6	0.4	0.2	0.3	0.1	0.1	20.6	3.0	0.0	1.5	14.9	22.6
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	0.1	1.7	2.9	1.5	1.7	2.3	5.6	10.5	0.3	2.8	14.7	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.9	38.5	29.5	39.1	29.1	22.4	62.7	29.6	18.2	43.3	44.4	52.1
LnGrp LOS	D	D	C	D	C	C	E	C	B	D	D	D
Approach Vol, veh/h		241			309			1771			2044	
Approach Delay, s/veh		32.8			28.2			33.0			46.6	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	44.8	17.7	19.8	17.3	43.5	7.0	30.5				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	8.8	30.9	5.6	9.9	12.4	36.9	2.3	9.3				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	0.8	0.0	0.1				

Intersection Summary												
HCM 6th Ctrl Delay			39.0									
HCM 6th LOS			D									

Notes
 User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	22	5	18	13	5	24
Future Vol, veh/h	22	5	18	13	5	24
Conflicting Peds, #/hr	0	3	3	0	4	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	60	60	68	68
Heavy Vehicles, %	5	40	47	23	20	75
Mvmt Flow	32	7	30	22	7	35

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	42	0	125 41
Stage 1	-	-	-	-	39 -
Stage 2	-	-	-	-	86 -
Critical Hdwy	-	-	4.57	-	6.6 6.95
Critical Hdwy Stg 1	-	-	-	-	5.6 -
Critical Hdwy Stg 2	-	-	-	-	5.6 -
Follow-up Hdwy	-	-	2.623	-	3.68 3.975
Pot Cap-1 Maneuver	-	-	1321	-	829 856
Stage 1	-	-	-	-	939 -
Stage 2	-	-	-	-	894 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1317	-	804 852
Mov Cap-2 Maneuver	-	-	-	-	804 -
Stage 1	-	-	-	-	936 -
Stage 2	-	-	-	-	870 -

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	843	-	-	1317	-
HCM Lane V/C Ratio	0.051	-	-	0.023	-
HCM Control Delay (s)	9.5	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

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	4	35	9	25	22	13	7	0	18	4	0	3
Future Vol, veh/h	4	35	9	25	22	13	7	0	18	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	11	11	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	72	72	72	75	75	75	44	44	44
Heavy Vehicles, %	25	51	11	20	45	31	33	2	33	2	2	2
Mvmt Flow	6	51	13	35	31	18	9	0	24	9	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	49	0	0	64	0	0	184	189	69	203	186	40
Stage 1	-	-	-	-	-	-	70	70	-	110	110	-
Stage 2	-	-	-	-	-	-	114	119	-	93	76	-
Critical Hdwy	4.35	-	-	4.3	-	-	7.43	6.52	6.53	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.425	-	-	2.38	-	-	3.797	4.018	3.597	3.518	4.018	3.318
Pot Cap-1 Maneuver	1422	-	-	1431	-	-	714	706	914	755	708	1031
Stage 1	-	-	-	-	-	-	868	837	-	895	804	-
Stage 2	-	-	-	-	-	-	821	797	-	914	832	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1422	-	-	1431	-	-	693	686	904	711	687	1031
Mov Cap-2 Maneuver	-	-	-	-	-	-	693	686	-	711	687	-
Stage 1	-	-	-	-	-	-	865	834	-	891	784	-
Stage 2	-	-	-	-	-	-	795	777	-	877	829	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			3.2			9.5			9.5		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	833	1422	-	-	1431	-	-	820
HCM Lane V/C Ratio	0.04	0.004	-	-	0.024	-	-	0.019
HCM Control Delay (s)	9.5	7.5	0	-	7.6	0	-	9.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	98	100	547	815	733	703
v/c Ratio	0.35	0.35	0.59	0.78	0.30	0.54
Control Delay	25.2	25.2	15.6	19.2	4.8	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	25.2	15.6	19.2	4.8	2.3
Queue Length 50th (ft)	33	34	67	207	43	0
Queue Length 95th (ft)	72	73	116	#375	82	17
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	521	531	1371	1061	3095	1456
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.19	0.40	0.77	0.24	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background plus SMP 39

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↖	↖	↖↖		↑			↑↑	↖	
Traffic Volume (vph)	0	0	0	163	21	509	0	668	0	0	586	562	
Future Volume (vph)	0	0	0	163	21	509	0	668	0	0	586	562	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1631	2707		1863			3539	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1631	2707		1863			3539	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.82	0.82	0.82	0.80	0.80	0.80	
Adj. Flow (vph)	0	0	0	175	23	547	0	815	0	0	732	702	
RTOR Reduction (vph)	0	0	0	0	0	105	0	0	0	0	0	221	
Lane Group Flow (vph)	0	0	0	98	100	442	0	815	0	0	733	482	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	5%	5%	2%	2%	2%	2%	2%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				10.9	10.9	18.6		34.5			42.2	42.2	
Effective Green, g (s)				10.9	10.9	18.6		34.5			42.2	42.2	
Actuated g/C Ratio				0.18	0.18	0.30		0.56			0.69	0.69	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				283	288	817		1043			2424	1071	
v/s Ratio Prot								c0.44			0.21		
v/s Ratio Perm				0.06	0.06	c0.16						0.31	
v/c Ratio				0.35	0.35	0.54		0.78			0.30	0.45	
Uniform Delay, d1				22.2	22.2	17.9		10.6			3.9	4.4	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.3	0.3	0.4		3.6			0.0	0.1	
Delay (s)				22.5	22.5	18.3		14.2			3.9	4.5	
Level of Service				C	C	B		B			A	A	
Approach Delay (s)		0.0			19.4			14.2			4.2		
Approach LOS		A			B			B			A		
Intersection Summary													
HCM 2000 Control Delay			10.7		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.75										
Actuated Cycle Length (s)			61.6		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			60.3%		ICU Level of Service					B			
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	520	458	491	95	428
v/c Ratio	0.57	0.50	0.40	0.15	0.30
Control Delay	10.5	3.0	6.6	2.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	3.0	6.6	2.4	5.9
Queue Length 50th (ft)	26	0	18	0	14
Queue Length 95th (ft)	44	13	42	12	34
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3393	2200	3003	1386	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.21	0.16	0.07	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background plus SMP 39

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	458	0	403	0	0	0	0	461	102	0	394	0
Future Volume (vph)	458	0	403	0	0	0	0	461	102	0	394	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3002	1386		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3002	1386		3505	
Peak-hour factor, PHF	0.88	0.88	0.88	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	520	0	458	0	0	0	0	480	106	0	428	0
RTOR Reduction (vph)	0	0	337	0	0	0	0	2	56	0	0	0
Lane Group Flow (vph)	520	0	121	0	0	0	0	489	39	0	428	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	6%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	6.5		6.5					10.1	10.1		10.1	
Effective Green, g (s)	6.5		6.5					10.1	10.1		10.1	
Actuated g/C Ratio	0.26		0.26					0.41	0.41		0.41	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	907		586					1232	569		1439	
v/s Ratio Prot								c0.16			0.12	
v/s Ratio Perm	c0.15		0.05						0.03			
v/c Ratio	0.57		0.21					0.40	0.07		0.30	
Uniform Delay, d1	7.8		7.0					5.1	4.4		4.9	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.5		0.1					0.1	0.0		0.0	
Delay (s)	8.4		7.1					5.2	4.4		4.9	
Level of Service	A		A					A	A		A	
Approach Delay (s)		7.8			0.0			5.1			4.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.4					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			24.6					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			33.6%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	561	390	10	17	233	929	14	59	828	23	376
v/c Ratio	0.63	0.27	0.01	0.12	0.34	0.50	0.11	0.10	0.59	0.04	0.24
Control Delay	37.4	21.1	0.0	48.1	33.9	2.9	48.5	27.6	28.7	15.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	21.1	0.0	48.1	33.9	2.9	48.5	27.6	28.7	15.7	0.4
Queue Length 50th (ft)	85	57	0	7	48	10	6	6	115	6	0
Queue Length 95th (ft)	204	192	0	40	134	62	26	16	263	26	0
Internal Link Dist (ft)		745			868			217		816	
Turn Bay Length (ft)	400		305	350			110		600		420
Base Capacity (vph)	1410	1502	722	375	1014	2482	325	1694	3370	1284	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.26	0.01	0.05	0.23	0.37	0.04	0.03	0.25	0.02	0.24

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background plus SMP 39
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔	↑↑	↔↔	↔	↑↑↔		↔↔↔	↑	↔
Traffic Volume (veh/h)	527	367	9	16	224	892	10	30	11	762	21	346
Future Volume (veh/h)	527	367	9	16	224	892	10	30	11	762	21	346
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		0.99	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	1870	1870	1870	1870	1870	1841	1870	1796	1796	1856	1618	1870
Adj Flow Rate, veh/h	561	390	10	17	233	929	14	43	16	828	23	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.69	0.69	0.69	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	4	2	7	7	3	19	2
Cap, veh/h	749	1475	654	36	1017	1379	24	251	83	1095	445	
Arrive On Green	0.15	0.42	0.42	0.02	0.29	0.29	0.01	0.07	0.07	0.22	0.28	0.00
Sat Flow, veh/h	5023	3554	1576	1781	3554	2710	1781	3627	1203	4983	1618	1585
Grp Volume(v), veh/h	561	390	10	17	233	929	14	38	21	828	23	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1576	1781	1777	1355	1781	1635	1562	1661	1618	1585
Q Serve(g_s), s	7.5	5.0	0.3	0.7	3.5	18.0	0.5	0.8	0.9	10.9	0.7	0.0
Cycle Q Clear(g_c), s	7.5	5.0	0.3	0.7	3.5	18.0	0.5	0.8	0.9	10.9	0.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	749	1475	654	36	1017	1379	24	226	108	1095	445	
V/C Ratio(X)	0.75	0.26	0.02	0.47	0.23	0.67	0.58	0.17	0.19	0.76	0.05	
Avail Cap(c_a), veh/h	1437	1475	654	382	1017	1379	331	1169	558	3564	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)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.5	13.4	12.0	33.9	19.1	13.0	34.3	30.6	30.7	25.5	18.6	0.0
Incr Delay (d2), s/veh	0.6	0.1	0.0	3.6	0.1	1.3	7.8	0.3	0.6	0.8	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	2.8	1.8	0.1	0.3	1.3	4.7	0.3	0.3	0.3	4.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	13.5	12.0	37.5	19.2	14.3	42.1	30.9	31.3	26.3	18.7	0.0
LnGrp LOS	C	B	B	D	B	B	D	C	C	C	B	
Approach Vol, veh/h		961			1179			73			851	A
Approach Delay, s/veh		22.6			15.6			33.2			26.1	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.4	25.3	19.4	10.8	5.4	34.3	5.0	25.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	9.5	20.0	12.9	2.9	2.7	7.0	2.5	2.7				
Green Ext Time (p_c), s	0.9	0.0	2.5	0.2	0.0	2.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Notes

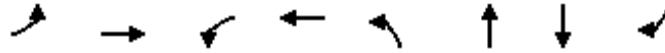
User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	374	817	34	646	101	97	80	514
v/c Ratio	0.56	0.42	0.15	0.54	0.30	0.29	0.27	0.58
Control Delay	33.6	19.6	39.2	28.8	30.0	24.8	36.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	19.6	39.2	28.8	30.0	24.8	36.3	6.8
Queue Length 50th (ft)	67	72	12	64	35	26	27	0
Queue Length 95th (ft)	196	222	58	146	114	95	111	55
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1468	3575	504	3425	525	518	516	1162
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.23	0.07	0.19	0.19	0.19	0.16	0.44
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39

Timing Plan: PM Peak



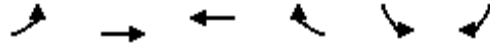
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑↔		↔	↑↑↑		↔	↔			↔	↔↔
Traffic Volume (vph)	359	763	21	29	504	52	141	16	36	44	34	504
Future Volume (vph)	359	763	21	29	504	52	141	16	36	44	34	504
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5013		1770	5990		1681	1614			1812	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5013		1770	5990		1681	1614			1812	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	374	795	22	34	586	60	145	16	37	45	35	514
RTOR Reduction (vph)	0	2	0	0	15	0	0	17	0	0	0	431
Lane Group Flow (vph)	374	815	0	34	631	0	101	80	0	0	80	83
Confl. Peds. (#/hr)							1		9			
Confl. Bikes (#/hr)							2		1			1
Heavy Vehicles (%)	2%	3%	5%	2%	8%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	14.7	29.3		3.2	17.8		15.0	15.0			12.4	12.4
Effective Green, g (s)	14.7	29.3		3.2	17.8		15.0	15.0			12.4	12.4
Actuated g/C Ratio	0.19	0.38		0.04	0.23		0.19	0.19			0.16	0.16
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	653	1902		73	1381		326	313			291	447
v/s Ratio Prot	c0.11	c0.16		0.02	0.11		c0.06	0.05			c0.04	0.03
v/s Ratio Perm												
v/c Ratio	0.57	0.43		0.47	0.46		0.31	0.26			0.27	0.18
Uniform Delay, d1	28.4	17.7		36.2	25.5		26.7	26.4			28.5	28.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.0	0.1		1.7	0.1		0.4	0.3			0.2	0.1
Delay (s)	29.4	17.8		37.9	25.6		27.1	26.7			28.6	28.1
Level of Service	C	B		D	C		C	C			C	C
Approach Delay (s)		21.4			26.2			26.9			28.2	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	17.3
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	106	799	493	40	43	131
v/c Ratio	0.10	0.34	0.33	0.06	0.08	0.14
Control Delay	18.3	4.9	12.8	4.3	19.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	4.9	12.8	4.3	19.1	5.7
Queue Length 50th (ft)	10	50	57	0	9	0
Queue Length 95th (ft)	39	71	86	13	41	22
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2118	3505	3135	1451	944	1548
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.23	0.16	0.03	0.05	0.08

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Background plus SMP 39

Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	102	767	478	39	40	123
Future Volume (veh/h)	102	767	478	39	40	123
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1856	1781	1856	1870	1870
Adj Flow Rate, veh/h	106	799	493	40	43	131
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	3	8	3	2	2
Cap, veh/h	607	1911	891	403	389	609
Arrive On Green	0.18	0.54	0.26	0.26	0.22	0.22
Sat Flow, veh/h	3456	3618	3474	1531	1781	2790
Grp Volume(v), veh/h	106	799	493	40	43	131
Grp Sat Flow(s),veh/h/ln	1728	1763	1692	1531	1781	1395
Q Serve(g_s), s	1.0	5.2	4.9	0.8	0.7	1.5
Cycle Q Clear(g_c), s	1.0	5.2	4.9	0.8	0.7	1.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	607	1911	891	403	389	609
V/C Ratio(X)	0.17	0.42	0.55	0.10	0.11	0.22
Avail Cap(c_a), veh/h	2228	3636	3927	1776	919	1439
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.6	5.3	12.3	10.8	12.1	12.4
Incr Delay (d2), s/veh	0.1	0.1	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.7	1.3	0.2	0.3	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	5.3	12.5	10.8	12.2	12.5
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		905	533		174	
Approach Delay, s/veh		6.3	12.4		12.4	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.8	15.5			26.3	12.5
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.0	6.9			7.2	3.5
Green Ext Time (p_c), s	0.2	2.1			3.5	0.3

Intersection Summary

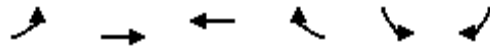
HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues

4: W Jack London Blvd & Wolf House Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	14	819	527	14	24	40
v/c Ratio	0.02	0.60	0.42	0.01	0.04	0.07
Control Delay	24.8	9.9	10.4	7.6	18.2	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	9.9	10.4	7.6	18.2	7.9
Queue Length 50th (ft)	3	136	70	1	4	0
Queue Length 95th (ft)	25	451	342	13	22	14
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1311	1805	1579	1385	1022	948
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.45	0.33	0.01	0.02	0.04

Intersection Summary

HCM 6th Signalized Intersection Summary
 4: W Jack London Blvd & Wolf House Dr

Background plus SMP 39

Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	794	490	13	17	28
Future Volume (veh/h)	14	794	490	13	17	28
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1856	1781	1870	1811	1841
Adj Flow Rate, veh/h	14	819	527	14	24	40
Peak Hour Factor	0.97	0.97	0.93	0.93	0.70	0.70
Percent Heavy Veh, %	2	3	8	2	6	4
Cap, veh/h	65	1032	690	599	237	214
Arrive On Green	0.04	0.56	0.39	0.39	0.14	0.14
Sat Flow, veh/h	1781	1856	1781	1546	1725	1560
Grp Volume(v), veh/h	14	819	527	14	24	40
Grp Sat Flow(s),veh/h/ln	1781	1856	1781	1546	1725	1560
Q Serve(g_s), s	0.2	10.6	7.8	0.2	0.4	0.7
Cycle Q Clear(g_c), s	0.2	10.6	7.8	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	65	1032	690	599	237	214
V/C Ratio(X)	0.21	0.79	0.76	0.02	0.10	0.19
Avail Cap(c_a), veh/h	1762	2753	2643	2294	1137	1029
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.2	5.4	8.1	5.7	11.4	11.6
Incr Delay (d2), s/veh	1.2	0.5	0.7	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	1.3	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.4	5.9	8.8	5.7	11.5	11.7
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		833	541		64	
Approach Delay, s/veh		6.0	8.7		11.7	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.1	17.1			22.2	8.2
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.2	9.8			12.6	2.7
Green Ext Time (p_c), s	0.0	2.0			3.6	0.1

Intersection Summary

HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	58.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕			↕			↕	
Traffic Vol, veh/h	0	772	45	57	412	0	97	0	134	0	0	0
Future Vol, veh/h	0	772	45	57	412	0	97	0	134	0	0	0
Conflicting Peds, #/hr	1	0	0	0	0	1	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	180	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	92	92	94	94	92	92	92	25	92	25
Heavy Vehicles, %	2	2	18	16	5	2	18	2	16	2	2	2
Mvmt Flow	0	898	49	62	438	0	105	0	146	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	439	0	0	947	0	0	1485	1486	923	1559	1510	439
Stage 1	-	-	-	-	-	-	923	923	-	563	563	-
Stage 2	-	-	-	-	-	-	562	563	-	996	947	-
Critical Hdwy	4.12	-	-	4.26	-	-	7.28	6.52	6.36	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.344	-	-	3.662	4.018	3.444	3.518	4.018	3.318
Pot Cap-1 Maneuver	1121	-	-	671	-	-	~ 95	124	308	91	120	618
Stage 1	-	-	-	-	-	-	303	349	-	511	509	-
Stage 2	-	-	-	-	-	-	484	509	-	294	340	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1120	-	-	671	-	-	~ 86	109	308	43	105	617
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 86	109	-	43	105	-
Stage 1	-	-	-	-	-	-	303	349	-	510	446	-
Stage 2	-	-	-	-	-	-	425	446	-	155	340	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.4			\$ 393.7			0		
HCM LOS							F			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	148	1120	-	-	671	-	-	-
HCM Lane V/C Ratio	1.697	-	-	-	0.092	-	-	-
HCM Control Delay (s)	\$ 393.7	0	-	-	10.9	0	-	0
HCM Lane LOS	F	A	-	-	B	A	-	A
HCM 95th %tile Q(veh)	18.1	0	-	-	0.3	-	-	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	75.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕			↕			↕	
Traffic Vol, veh/h	2	853	44	63	374	0	101	0	133	0	0	1
Future Vol, veh/h	2	853	44	63	374	0	101	0	133	0	0	1
Conflicting Peds, #/hr	0	0	0	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	300	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	92	92	90	90	92	92	92	25	92	25
Heavy Vehicles, %	2	3	18	16	3	2	18	2	15	2	2	2
Mvmt Flow	2	969	48	68	416	0	110	0	145	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	416	0	0	1017	0	0	1551	1549	993	1622	1573	416
Stage 1	-	-	-	-	-	-	997	997	-	552	552	-
Stage 2	-	-	-	-	-	-	554	552	-	1070	1021	-
Critical Hdwy	4.12	-	-	4.26	-	-	7.28	6.52	6.35	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.344	-	-	3.662	4.018	3.435	3.518	4.018	3.318
Pot Cap-1 Maneuver	1143	-	-	630	-	-	~ 85	114	281	82	110	637
Stage 1	-	-	-	-	-	-	275	322	-	518	515	-
Stage 2	-	-	-	-	-	-	489	515	-	268	314	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1143	-	-	630	-	-	~ 75	98	281	36	94	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 75	98	-	36	94	-
Stage 1	-	-	-	-	-	-	274	321	-	517	443	-
Stage 2	-	-	-	-	-	-	418	443	-	130	313	-

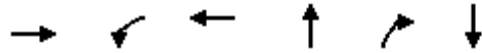
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	\$ 520.9	10.7
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	129	1143	-	-	630	-	-	637
HCM Lane V/C Ratio	1.972	0.002	-	-	0.109	-	-	0.006
HCM Control Delay (s)	\$ 520.9	8.2	-	-	11.4	0	-	10.7
HCM Lane LOS	F	A	-	-	B	A	-	B
HCM 95th %tile Q(veh)	20.4	0	-	-	0.4	-	-	0

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues
7: Discovery Dr & W Jack London Blvd

Background plus SMP 39
Timing Plan: PM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1136	9	441	27	20	18
v/c Ratio	0.41	0.03	0.15	0.07	0.06	0.05
Control Delay	6.9	22.5	3.2	21.2	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	22.5	3.2	21.2	0.3	0.3
Queue Length 50th (ft)	0	1	0	4	0	0
Queue Length 95th (ft)	273	16	61	22	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	2775	1039	3345	848	614	574
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.01	0.13	0.03	0.03	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary
7: Discovery Dr & W Jack London Blvd

Background plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	971	17	8	406	0	17	0	13	8	0	2
Future Volume (veh/h)	0	971	17	8	406	0	17	0	13	8	0	2
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		1.00	1.00		1.00	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	0	1826	1826	1530	1811	0	1870	1870	1337	1870	1870	1870
Adj Flow Rate, veh/h	0	1116	20	9	441	0	27	0	20	14	0	4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.64	0.64	0.64	0.56	0.56	0.56
Percent Heavy Veh, %	0	5	5	25	6	0	2	2	38	2	2	2
Cap, veh/h	0	1536	28	28	1918	0	162	0	103	37	0	10
Arrive On Green	0.00	0.44	0.44	0.02	0.56	0.00	0.09	0.00	0.09	0.03	0.00	0.03
Sat Flow, veh/h	0	3576	62	1457	3532	0	1781	0	1133	1348	0	385
Grp Volume(v), veh/h	0	555	581	9	441	0	27	0	20	18	0	0
Grp Sat Flow(s),veh/h/ln	0	1735	1813	1457	1721	0	1781	0	1133	1734	0	0
Q Serve(g_s), s	0.0	10.8	10.8	0.2	2.7	0.0	0.6	0.0	0.7	0.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	10.8	10.8	0.2	2.7	0.0	0.6	0.0	0.7	0.4	0.0	0.0
Prop In Lane	0.00		0.03	1.00		0.00	1.00		1.00	0.78		0.22
Lane Grp Cap(c), veh/h	0	765	799	28	1918	0	162	0	103	47	0	0
V/C Ratio(X)	0.00	0.73	0.73	0.33	0.23	0.00	0.17	0.00	0.19	0.38	0.00	0.00
Avail Cap(c_a), veh/h	0	1270	1327	1066	2519	0	869	0	553	508	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.4	9.4	19.8	4.6	0.0	17.2	0.0	17.2	19.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.0	1.0	2.5	0.0	0.0	0.2	0.0	0.3	1.9	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.5	2.6	0.1	0.4	0.0	0.2	0.0	0.2	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.4	10.4	22.3	4.7	0.0	17.4	0.0	17.6	21.5	0.0	0.0
LnGrp LOS	A	B	B	C	A	A	B	A	B	C	A	A
Approach Vol, veh/h		1136			450			47			18	
Approach Delay, s/veh		10.4			5.0			17.5			21.5	
Approach LOS		B			A			B			C	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	4.8	23.4		5.1		28.1		7.7				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.2	12.8		2.4		4.7		2.7				
Green Ext Time (p_c), s	0.0	5.3		0.0		2.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	1101	21	452	6	72
v/c Ratio	0.01	0.44	0.09	0.18	0.02	0.20
Control Delay	20.0	6.2	19.9	4.6	19.0	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	6.2	19.9	4.6	19.0	2.1
Queue Length 50th (ft)	1	67	4	21	1	0
Queue Length 95th (ft)	7	195	24	65	10	2
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	590	2922	570	3199	1230	807
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.38	0.04	0.14	0.00	0.09
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Background plus SMP 39

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	3	992	10	19	411	0	5	0	60	0	0	0
Future Volume (veh/h)	3	992	10	19	411	0	5	0	60	0	0	0
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		1.00	1.00		1.00	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	1870	1826	1826	774	1811	1811	1870	1870	1203	1870	1870	1870
Adj Flow Rate, veh/h	3	1090	11	21	452	0	6	0	72	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.83	0.83	0.83	0.25	0.25	0.25
Percent Heavy Veh, %	2	5	5	76	6	6	2	2	47	2	2	2
Cap, veh/h	10	1620	16	31	1710	0	216	0	123	0	5	0
Arrive On Green	0.01	0.46	0.46	0.04	0.50	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3518	35	737	3532	0	1781	0	1020	0	1870	0
Grp Volume(v), veh/h	3	537	564	21	452	0	6	0	72	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1735	1819	737	1721	0	1781	0	1020	0	1870	0
Q Serve(g_s), s	0.1	8.6	8.6	1.0	2.7	0.0	0.1	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	8.6	8.6	1.0	2.7	0.0	0.1	0.0	2.4	0.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	799	838	31	1710	0	216	0	123	0	5	0
V/C Ratio(X)	0.29	0.67	0.67	0.68	0.26	0.00	0.03	0.00	0.58	0.00	0.00	0.00
Avail Cap(c_a), veh/h	605	1717	1800	417	3406	0	1259	0	721	0	635	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	17.5	7.5	7.5	16.7	5.1	0.0	13.7	0.0	14.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.7	0.7	9.1	0.1	0.0	0.0	0.0	1.6	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	1.6	0.2	0.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	8.2	8.2	25.8	5.2	0.0	13.7	0.0	16.3	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	A	A	A
Approach Vol, veh/h		1104			473			78				0
Approach Delay, s/veh		8.2			6.1			16.1				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	21.6		0.0	4.2	22.9		8.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.0	10.6		0.0	2.1	4.7		4.4				
Green Ext Time (p_c), s	0.0	5.6		0.0	0.0	2.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	215	579	303	137	243	337	113	1345	153	312	1560	120
v/c Ratio	0.54	0.86	0.68	0.27	0.66	0.51	0.28	0.79	0.24	0.67	0.91	0.22
Control Delay	54.5	58.3	21.7	48.8	51.1	23.8	51.1	38.0	6.3	56.3	44.5	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.5	58.3	21.7	48.8	51.1	23.8	51.1	38.0	6.3	56.3	44.5	5.0
Queue Length 50th (ft)	71	209	56	43	159	138	36	297	4	105	364	0
Queue Length 95th (ft)	#160	316	168	99	274	263	87	473	54	#246	575	37
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	398	1771	837	624	1017	659	584	3208	1061	468	2922	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.33	0.36	0.22	0.24	0.51	0.19	0.42	0.14	0.67	0.53	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	198	533	279	122	216	300	108	1291	147	281	1404	108
Future Volume (veh/h)	198	533	279	122	216	300	108	1291	147	281	1404	108
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		1.00	1.00		1.00	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	1604	1870	1767	1870	1870	1870	1767	1856	1870	1870	1826	1604
Adj Flow Rate, veh/h	215	579	303	137	243	337	112	1345	153	312	1560	120
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.96	0.96	0.96	0.90	0.90	0.90
Percent Heavy Veh, %	20	2	9	2	2	2	9	3	2	2	5	20
Cap, veh/h	411	695	292	504	379	512	409	1740	544	416	1688	460
Arrive On Green	0.14	0.20	0.20	0.15	0.20	0.20	0.13	0.34	0.34	0.12	0.34	0.34
Sat Flow, veh/h	2963	3554	1495	3456	1870	1585	3264	5066	1585	3456	4985	1359
Grp Volume(v), veh/h	215	579	303	137	243	337	112	1345	153	312	1560	120
Grp Sat Flow(s),veh/h/ln	1481	1777	1495	1728	1870	1585	1632	1689	1585	1728	1662	1359
Q Serve(g_s), s	7.3	16.9	21.1	3.8	12.8	19.7	3.4	25.6	7.6	9.4	32.5	6.9
Cycle Q Clear(g_c), s	7.3	16.9	21.1	3.8	12.8	19.7	3.4	25.6	7.6	9.4	32.5	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	411	695	292	504	379	512	409	1740	544	416	1688	460
V/C Ratio(X)	0.52	0.83	1.04	0.27	0.64	0.66	0.27	0.77	0.28	0.75	0.92	0.26
Avail Cap(c_a), veh/h	412	695	292	641	1040	1073	605	3287	1028	480	2541	693
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	43.1	41.7	43.4	41.0	39.4	31.4	42.7	31.7	25.7	45.9	34.3	25.9
Incr Delay (d2), s/veh	0.6	8.1	62.4	0.1	0.7	0.5	0.1	0.3	0.1	4.4	3.4	0.1
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	2.6	7.9	12.5	1.6	5.8	7.2	1.3	9.8	2.7	4.2	12.8	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.7	49.8	105.8	41.1	40.1	31.9	42.9	31.9	25.8	50.3	37.8	26.0
LnGrp LOS	D	D	F	D	D	C	D	C	C	D	D	C
Approach Vol, veh/h		1097			717			1610			1992	
Approach Delay, s/veh		64.1			36.4			32.1			39.0	
Approach LOS		E			D			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	42.8	20.4	26.9	18.2	42.3	19.7	27.7				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	11.4	27.6	5.8	23.1	5.4	34.5	9.3	21.7				
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.0	2.0	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	41.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	33	51	15	1640	2021	33
v/c Ratio	0.08	0.14	0.05	0.41	0.54	0.04
Control Delay	22.1	9.1	22.1	3.4	6.7	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.1	9.1	22.1	3.4	6.7	3.9
Queue Length 50th (ft)	5	0	2	73	103	1
Queue Length 95th (ft)	12	8	10	95	259	13
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1444	1189	1048	4988	3784	858
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.01	0.33	0.53	0.04
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background plus SMP 39
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	34	14	1525	1758	29
Future Volume (veh/h)	22	34	14	1525	1758	29
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1693	1678	1055	1841	1826	1233
Adj Flow Rate, veh/h	33	51	15	1640	2021	33
Peak Hour Factor	0.67	0.67	0.93	0.93	0.87	0.87
Percent Heavy Veh, %	14	15	57	4	5	45
Cap, veh/h	327	261	52	3186	2345	492
Arrive On Green	0.10	0.10	0.03	0.63	0.47	0.47
Sat Flow, veh/h	3127	2502	1950	5191	5149	1045
Grp Volume(v), veh/h	33	51	15	1640	2021	33
Grp Sat Flow(s),veh/h/ln	1564	1251	975	1675	1662	1045
Q Serve(g_s), s	0.4	0.8	0.3	7.4	15.0	0.7
Cycle Q Clear(g_c), s	0.4	0.8	0.3	7.4	15.0	0.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	327	261	52	3186	2345	492
V/C Ratio(X)	0.10	0.20	0.29	0.51	0.86	0.07
Avail Cap(c_a), veh/h	1876	1501	1170	3618	3589	752
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.9	17.1	19.9	4.1	9.8	6.0
Incr Delay (d2), s/veh	0.0	0.1	1.1	0.0	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.6	0.1	0.4	2.8	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.9	17.2	21.0	4.2	10.8	6.1
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	84			1655	2054	
Approach Delay, s/veh	17.1			4.3	10.7	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		32.6		9.1	6.8	25.8
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		9.4		2.8	2.3	17.0
Green Ext Time (p_c), s		2.0		0.0	0.0	2.5

Intersection Summary

HCM 6th Ctrl Delay	8.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	91	597	1101	92	469	1555
v/c Ratio	0.11	0.87	0.61	0.05	0.54	0.74
Control Delay	23.0	23.6	20.8	1.0	31.5	13.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	23.6	20.8	1.0	31.5	13.5
Queue Length 50th (ft)	16	75	147	0	71	249
Queue Length 95th (ft)	38	#296	226	6	118	380
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1272	843	2538	2258	1479	2811
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.71	0.43	0.04	0.32	0.55

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background plus SMP 39
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	83	543	1002	84	417	1384
Future Volume (veh/h)	83	543	1002	84	417	1384
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1811	1841	1870	1811
Adj Flow Rate, veh/h	91	597	1101	92	469	1555
Peak Hour Factor	0.91	0.91	0.91	0.91	0.89	0.89
Percent Heavy Veh, %	2	2	6	4	2	6
Cap, veh/h	1147	526	1691	1851	670	1842
Arrive On Green	0.33	0.33	0.34	0.34	0.13	0.54
Sat Flow, veh/h	3456	1585	5107	2745	5023	3532
Grp Volume(v), veh/h	91	597	1101	92	469	1555
Grp Sat Flow(s),veh/h/ln	1728	1585	1648	1373	1674	1721
Q Serve(g_s), s	1.4	25.0	14.2	0.9	6.7	28.9
Cycle Q Clear(g_c), s	1.4	25.0	14.2	0.9	6.7	28.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1147	526	1691	1851	670	1842
V/C Ratio(X)	0.08	1.13	0.65	0.05	0.70	0.84
Avail Cap(c_a), veh/h	1147	526	2298	2188	1334	1842
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	17.3	25.2	21.0	4.1	31.2	14.8
Incr Delay (d2), s/veh	0.0	81.9	0.6	0.0	1.3	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	20.5	4.8	0.2	2.6	9.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.3	107.0	21.6	4.2	32.5	18.8
LnGrp LOS	B	F	C	A	C	B
Approach Vol, veh/h	688		1193			2024
Approach Delay, s/veh	95.1		20.2			22.0
Approach LOS	F		C			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	14.5	31.3			45.8	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	8.7	16.2			30.9	27.0
Green Ext Time (p_c), s	1.3	9.6			3.5	0.0
Intersection Summary						
HCM 6th Ctrl Delay			34.3			
HCM 6th LOS			C			

Queues

12: Isabel Ave & Airway Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	12	117	280	34	63	268	165	1779	31	266	1725
v/c Ratio	0.04	0.36	0.43	0.12	0.13	0.34	0.74	0.90	0.05	0.65	0.88
Control Delay	44.8	39.5	8.0	44.9	28.1	3.5	65.7	36.7	0.1	52.8	36.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	39.5	8.0	44.9	28.1	3.5	65.7	36.7	0.1	52.8	36.6
Queue Length 50th (ft)	7	72	28	20	28	0	106	393	0	88	389
Queue Length 95th (ft)	30	123	83	61	74	49	#273	#764	0	#172	#708
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	281	467	690	281	583	814	263	2113	710	460	2026
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.25	0.41	0.12	0.11	0.33	0.63	0.84	0.04	0.58	0.85

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
12: Isabel Ave & Airway Blvd

Background plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↑↑↑	↗	↖↗	↗↘	↘
Traffic Volume (veh/h)	11	105	252	31	57	244	150	1619	28	231	1492	9
Future Volume (veh/h)	11	105	252	31	57	244	150	1619	28	231	1492	9
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		1.00	1.00		1.00	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	1767	1737	1870	1870	1870	1870	1870	1826	1781	1826	1811	1811
Adj Flow Rate, veh/h	12	117	280	34	63	268	165	1779	31	266	1715	10
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87
Percent Heavy Veh, %	9	11	2	2	2	2	2	5	8	5	6	6
Cap, veh/h	77	306	455	167	420	542	197	1903	576	396	1969	11
Arrive On Green	0.05	0.18	0.18	0.09	0.22	0.22	0.11	0.38	0.38	0.12	0.39	0.39
Sat Flow, veh/h	1682	1737	1582	1781	1870	1585	1781	4985	1510	3374	5072	30
Grp Volume(v), veh/h	12	117	280	34	63	268	165	1779	31	266	1114	611
Grp Sat Flow(s),veh/h/ln	1682	1737	1582	1781	1870	1585	1781	1662	1510	1687	1648	1806
Q Serve(g_s), s	0.6	5.6	14.4	1.7	2.5	12.5	8.5	32.1	1.2	7.1	29.3	29.3
Cycle Q Clear(g_c), s	0.6	5.6	14.4	1.7	2.5	12.5	8.5	32.1	1.2	7.1	29.3	29.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	77	306	455	167	420	542	197	1903	576	396	1280	701
V/C Ratio(X)	0.16	0.38	0.62	0.20	0.15	0.49	0.84	0.94	0.05	0.67	0.87	0.87
Avail Cap(c_a), veh/h	287	427	564	285	420	542	266	2076	629	468	1373	752
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	42.9	34.1	28.9	39.2	29.1	24.4	40.8	27.8	18.3	39.6	26.5	26.5
Incr Delay (d2), s/veh	0.3	0.3	0.5	0.2	0.1	0.3	12.0	7.9	0.0	1.9	5.7	9.7
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	0.3	2.3	5.2	0.7	1.1	4.5	4.2	12.9	0.4	2.9	11.4	13.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	34.4	29.4	39.4	29.2	24.7	52.8	35.7	18.3	41.5	32.1	36.2
LnGrp LOS	D	C	C	D	C	C	D	D	B	D	C	D
Approach Vol, veh/h		409			365			1975			1991	
Approach Delay, s/veh		31.2			26.8			36.9			34.6	
Approach LOS		C			C			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	41.5	13.8	22.3	15.4	42.2	9.3	26.8				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	9.1	34.1	3.7	16.4	10.5	31.3	2.6	14.5				
Green Ext Time (p_c), s	0.0	1.6	0.0	0.1	0.0	1.5	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	34.7
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	9	17	14	6	26
Future Vol, veh/h	18	9	17	14	6	26
Conflicting Peds, #/hr	0	1	1	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	73	73	68	68
Heavy Vehicles, %	2	11	59	36	33	50
Mvmt Flow	23	12	23	19	9	38

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	36	0	98
Stage 1	-	-	-	-	30
Stage 2	-	-	-	-	68
Critical Hdwy	-	-	4.69	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.731	-	3.797
Pot Cap-1 Maneuver	-	-	1275	-	831
Stage 1	-	-	-	-	918
Stage 2	-	-	-	-	882
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1274	-	813
Mov Cap-2 Maneuver	-	-	-	-	813
Stage 1	-	-	-	-	917
Stage 2	-	-	-	-	863

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	899	-	-	1274	-
HCM Lane V/C Ratio	0.052	-	-	0.018	-
HCM Control Delay (s)	9.2	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

Intersection												
Int Delay, s/veh	4.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	42	1	8	24	18	3	5	25	12	2	3
Future Vol, veh/h	3	42	1	8	24	18	3	5	25	12	2	3
Conflicting Peds, #/hr	1	0	0	0	0	1	14	0	6	6	0	14
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	77	77	77	71	71	71	67	67	67
Heavy Vehicles, %	2	31	2	2	54	67	67	2	12	2	2	2
Mvmt Flow	3	43	1	10	31	23	4	7	35	18	3	4

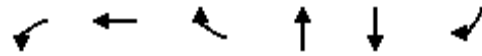
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	55	0	0	44	0	0	130	125	50	141	114	58
Stage 1	-	-	-	-	-	-	50	50	-	64	64	-
Stage 2	-	-	-	-	-	-	80	75	-	77	50	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.77	6.52	6.32	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	4.103	4.018	3.408	3.518	4.018	3.318
Pot Cap-1 Maneuver	1550	-	-	1564	-	-	713	765	991	829	776	1008
Stage 1	-	-	-	-	-	-	822	853	-	947	842	-
Stage 2	-	-	-	-	-	-	790	833	-	932	853	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1549	-	-	1564	-	-	694	757	985	783	768	994
Mov Cap-2 Maneuver	-	-	-	-	-	-	694	757	-	783	768	-
Stage 1	-	-	-	-	-	-	820	851	-	944	835	-
Stage 2	-	-	-	-	-	-	768	826	-	884	851	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			1.2			9.2			9.6		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	909	1549	-	-	1564	-	-	812
HCM Lane V/C Ratio	0.051	0.002	-	-	0.007	-	-	0.031
HCM Control Delay (s)	9.2	7.3	0	-	7.3	0	-	9.6
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	136	135	670	944	1120	633
v/c Ratio	0.36	0.36	0.66	0.96	0.49	0.51
Control Delay	24.3	24.2	18.9	38.6	7.5	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	24.2	18.9	38.6	7.5	2.2
Queue Length 50th (ft)	49	49	107	337	101	0
Queue Length 95th (ft)	93	93	160	#659	181	36
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	509	511	1437	987	2878	1405
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.26	0.47	0.96	0.39	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background plus SMP 39

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↖	↖	↖↖		↑			↑↑	↖	
Traffic Volume (vph)	0	0	0	238	4	596	0	840	0	0	1019	576	
Future Volume (vph)	0	0	0	238	4	596	0	840	0	0	1019	576	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1681	1688	2787		1863			3539	1583	
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1681	1688	2787		1863			3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.91	0.91	0.91	
Adj. Flow (vph)	0	0	0	267	4	670	0	944	0	0	1120	633	
RTOR Reduction (vph)	0	0	0	0	0	65	0	0	0	0	0	222	
Lane Group Flow (vph)	0	0	0	136	135	605	0	944	0	0	1120	411	
Confl. Bikes (#/hr)									1				
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				14.7	14.7	22.6		35.1			43.0	43.0	
Effective Green, g (s)				14.7	14.7	22.6		35.1			43.0	43.0	
Actuated g/C Ratio				0.22	0.22	0.34		0.53			0.65	0.65	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				373	374	951		987			2298	1028	
v/s Ratio Prot								c0.51			0.32		
v/s Ratio Perm				0.08	0.08	c0.22						0.26	
v/c Ratio				0.36	0.36	0.64		0.96			0.49	0.40	
Uniform Delay, d1				21.8	21.8	18.3		14.8			5.9	5.5	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	1.0		18.7			0.1	0.1	
Delay (s)				22.0	22.0	19.4		33.5			6.0	5.6	
Level of Service				C	C	B		C			A	A	
Approach Delay (s)		0.0			20.1			33.5			5.9		
Approach LOS		A			C			C			A		
Intersection Summary													
HCM 2000 Control Delay			16.7		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.89										
Actuated Cycle Length (s)			66.2		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			72.4%		ICU Level of Service					C			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	493	520	1125	391	834
v/c Ratio	0.58	0.61	0.66	0.42	0.46
Control Delay	16.1	10.5	8.7	2.3	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	10.5	8.7	2.3	6.6
Queue Length 50th (ft)	42	24	69	0	43
Queue Length 95th (ft)	92	63	161	30	93
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2556	2061	3106	1358	3324
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.25	0.36	0.29	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background plus SMP 39

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔		↔↔					↕↔	↔		↕↕	
Traffic Volume (vph)	394	0	416	0	0	0	0	1039	417	0	717	0
Future Volume (vph)	394	0	416	0	0	0	0	1039	417	0	717	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frpb, ped/bikes	1.00		1.00					1.00	0.99		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					0.99	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2682					3307	1421		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2682					3307	1421		3539	
Peak-hour factor, PHF	0.80	0.80	0.80	0.92	0.92	0.92	0.96	0.96	0.96	0.86	0.86	0.86
Adj. Flow (vph)	492	0	520	0	0	0	0	1082	434	0	834	0
RTOR Reduction (vph)	0	0	187	0	0	0	0	4	186	0	0	0
Lane Group Flow (vph)	493	0	333	0	0	0	0	1121	205	0	834	0
Confl. Peds. (#/hr)									3			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	4%	2%	2%	2%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	9.2		9.2					18.9	18.9		18.9	
Effective Green, g (s)	9.2		9.2					18.9	18.9		18.9	
Actuated g/C Ratio	0.25		0.25					0.52	0.52		0.52	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	874		683					1731	743		1852	
v/s Ratio Prot								c0.34			0.24	
v/s Ratio Perm	c0.14		0.12						0.14			
v/c Ratio	0.56		0.49					0.65	0.28		0.45	
Uniform Delay, d1	11.7		11.4					6.2	4.8		5.4	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.5		0.2					0.6	0.1		0.1	
Delay (s)	12.2		11.6					6.8	4.9		5.4	
Level of Service	B		B					A	A		A	
Approach Delay (s)		11.9			0.0			6.3			5.4	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.8					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			36.1					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			52.0%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Background plus SMP 40

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	180	48	4	227	332	5	95	240	109	352
v/c Ratio	0.28	0.03	0.03	0.30	0.25	0.04	0.20	0.30	0.30	0.22
Control Delay	29.5	15.4	35.8	22.0	2.3	35.7	22.5	27.6	18.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	15.4	35.8	22.0	2.3	35.7	22.5	27.6	18.0	0.3
Queue Length 50th (ft)	17	4	1	30	0	1	9	22	21	0
Queue Length 95th (ft)	56	21	14	92	26	12	21	79	94	0
Internal Link Dist (ft)		745		868			221		816	
Turn Bay Length (ft)	400		350			110		600		420
Base Capacity (vph)	1979	2437	429	2155	2652	349	1756	4392	976	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.02	0.01	0.11	0.13	0.01	0.05	0.05	0.11	0.22

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background plus SMP 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↗	↖	↑↑	↗↗	↖	↑↑↑		↖↖↖	↑	↗
Traffic Volume (veh/h)	142	38	0	4	207	302	3	61	2	214	97	313
Future Volume (veh/h)	142	38	0	4	207	302	3	61	2	214	97	313
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		1.00	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	1870	1856	1870	1530	1870	1856	1411	537	537	1870	685	1870
Adj Flow Rate, veh/h	180	48	0	4	227	332	5	92	3	240	109	0
Peak Hour Factor	0.79	0.79	0.79	0.91	0.91	0.91	0.66	0.66	0.66	0.89	0.89	0.89
Percent Heavy Veh, %	2	3	2	25	2	3	33	92	92	2	82	2
Cap, veh/h	509	1031	463	8	698	955	7	161	5	759	176	
Arrive On Green	0.10	0.29	0.00	0.01	0.20	0.20	0.01	0.11	0.11	0.15	0.26	0.00
Sat Flow, veh/h	5023	3526	1585	1457	3554	2731	1344	1457	47	5023	685	1585
Grp Volume(v), veh/h	180	48	0	4	227	332	5	61	34	240	109	0
Grp Sat Flow(s),veh/h/ln	1674	1763	1585	1457	1777	1366	1344	488	528	1674	685	1585
Q Serve(g_s), s	1.5	0.4	0.0	0.1	2.4	4.0	0.2	2.6	2.7	1.9	6.2	0.0
Cycle Q Clear(g_c), s	1.5	0.4	0.0	0.1	2.4	4.0	0.2	2.6	2.7	1.9	6.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	509	1031	463	8	698	955	7	108	58	759	176	
V/C Ratio(X)	0.35	0.05	0.00	0.51	0.33	0.35	0.69	0.57	0.58	0.32	0.62	
Avail Cap(c_a), veh/h	2292	2872	1291	499	2489	2331	399	735	398	5731	1105	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	18.4	11.1	0.0	21.7	15.1	10.6	21.8	18.5	18.5	16.6	14.4	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	17.4	0.3	0.2	35.4	3.4	6.5	0.2	2.6	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.1	0.0	0.1	0.8	0.9	0.1	0.3	0.4	0.6	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.5	11.1	0.0	39.1	15.4	10.8	57.2	21.9	25.0	16.8	17.1	0.0
LnGrp LOS	B	B	A	D	B	B	E	C	C	B	B	
Approach Vol, veh/h		228			563			100			349	A
Approach Delay, s/veh		17.0			12.9			24.7			16.9	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.4	13.9	10.6	10.9	4.2	18.1	4.2	17.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	3.5	6.0	3.9	4.7	2.1	2.4	2.2	8.2				
Green Ext Time (p_c), s	0.3	2.7	0.7	0.4	0.0	0.2	0.0	0.5				

Intersection Summary

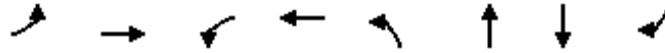
HCM 6th Ctrl Delay	15.7
HCM 6th LOS	B

Notes

- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- User approved changes to right turn type.
- Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	55	186	14	644	9	8	14	16
v/c Ratio	0.03	0.05	0.02	0.14	0.01	0.01	0.02	0.01
Control Delay	22.8	10.2	28.8	12.3	17.5	14.8	27.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	10.2	28.8	12.3	17.5	14.8	27.3	0.0
Queue Length 50th (ft)	0	0	1	0	0	0	0	0
Queue Length 95th (ft)	38	52	28	118	12	9	20	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2621	4462	1201	5353	1138	1151	1078	2038
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.01	0.12	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	179	1	12	523	12	8	1	3	6	3	10
Future Volume (vph)	53	179	1	12	523	12	8	1	3	6	3	10
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	5006		1671	6385		1517	1534			1500	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	5006		1671	6385		1517	1534			1500	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.83	0.83	0.83	0.69	0.69	0.69	0.64	0.64	0.64
Adj. Flow (vph)	55	185	1	14	630	14	12	1	4	9	5	16
RTOR Reduction (vph)	0	1	0	0	2	0	0	4	0	0	0	15
Lane Group Flow (vph)	55	185	0	14	642	0	9	4	0	0	14	1
Confl. Peds. (#/hr)			2				2		2			
Confl. Bikes (#/hr)							2					
Heavy Vehicles (%)	4%	3%	100%	8%	2%	2%	13%	2%	2%	17%	33%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	2.9	22.6		0.7	20.4		2.8	2.8			2.7	2.7
Effective Green, g (s)	2.9	22.6		0.7	20.4		2.8	2.8			2.7	2.7
Actuated g/C Ratio	0.06	0.49		0.02	0.44		0.06	0.06			0.06	0.06
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	211	2454		25	2825		92	93			87	163
v/s Ratio Prot	c0.02	0.04		0.01	c0.10		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.26	0.08		0.56	0.23		0.10	0.05			0.16	0.01
Uniform Delay, d1	20.6	6.2		22.5	8.0		20.5	20.4			20.6	20.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.0		15.9	0.0		0.3	0.1			0.3	0.0
Delay (s)	21.1	6.2		38.5	8.0		20.8	20.5			20.9	20.4
Level of Service	C	A		D	A		C	C			C	C
Approach Delay (s)		9.6			8.6			20.7			20.7	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	17.3
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	57	160	646	40	10	38
v/c Ratio	0.04	0.05	0.25	0.03	0.01	0.03
Control Delay	12.5	2.8	8.1	5.1	14.1	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	2.8	8.1	5.1	14.1	7.1
Queue Length 50th (ft)	0	0	0	0	1	0
Queue Length 95th (ft)	18	15	104	13	10	8
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2761	3471	3425	1514	1351	2137
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.05	0.19	0.03	0.01	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Background plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	50	141	523	32	8	30
Future Volume (veh/h)	50	141	523	32	8	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1841	1870	1870	1870	1870
Adj Flow Rate, veh/h	57	160	646	40	10	38
Peak Hour Factor	0.88	0.88	0.81	0.81	0.80	0.80
Percent Heavy Veh, %	2	4	2	2	2	2
Cap, veh/h	434	2045	1164	508	195	306
Arrive On Green	0.13	0.58	0.33	0.33	0.11	0.11
Sat Flow, veh/h	3456	3589	3647	1550	1781	2790
Grp Volume(v), veh/h	57	160	646	40	10	38
Grp Sat Flow(s),veh/h/ln	1728	1749	1777	1550	1781	1395
Q Serve(g_s), s	0.4	0.6	4.5	0.5	0.2	0.4
Cycle Q Clear(g_c), s	0.4	0.6	4.5	0.5	0.2	0.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	434	2045	1164	508	195	306
V/C Ratio(X)	0.13	0.08	0.55	0.08	0.05	0.12
Avail Cap(c_a), veh/h	2839	4598	5256	2292	1171	1834
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	11.8	2.7	8.4	7.1	12.1	12.2
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.9	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	11.9	2.8	8.6	7.1	12.2	12.3
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		217	686		48	
Approach Delay, s/veh		5.2	8.5		12.3	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.8	15.3			23.1	7.3
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.4	6.5			2.6	2.4
Green Ext Time (p_c), s	0.1	2.8			0.6	0.1

Intersection Summary

HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues
4: W Jack London Blvd & Wolf House Dr

Background plus SMP 40
Timing Plan: AM Peak

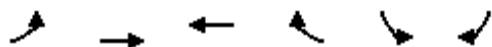


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	3	162	630	18	44	52
v/c Ratio	0.00	0.12	0.49	0.02	0.07	0.08
Control Delay	18.3	4.2	9.3	5.9	17.1	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	4.2	9.3	5.9	17.1	7.9
Queue Length 50th (ft)	1	16	88	1	6	0
Queue Length 95th (ft)	8	31	257	10	23	6
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1436	1827	1742	1445	1193	1084
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.09	0.36	0.01	0.04	0.05
Intersection Summary						

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Background plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	146	529	15	22	26
Future Volume (veh/h)	3	146	529	15	22	26
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1841	1870	1870	1870	1870
Adj Flow Rate, veh/h	3	162	630	18	44	52
Peak Hour Factor	0.90	0.90	0.84	0.84	0.50	0.50
Percent Heavy Veh, %	2	4	2	2	2	2
Cap, veh/h	15	1013	793	657	313	278
Arrive On Green	0.01	0.55	0.42	0.42	0.18	0.18
Sat Flow, veh/h	1781	1841	1870	1549	1781	1585
Grp Volume(v), veh/h	3	162	630	18	44	52
Grp Sat Flow(s),veh/h/ln	1781	1841	1870	1549	1781	1585
Q Serve(g_s), s	0.1	1.5	9.9	0.2	0.7	0.9
Cycle Q Clear(g_c), s	0.1	1.5	9.9	0.2	0.7	0.9
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	15	1013	793	657	313	278
V/C Ratio(X)	0.20	0.16	0.79	0.03	0.14	0.19
Avail Cap(c_a), veh/h	1576	2442	2482	2055	1050	935
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.7	3.8	8.5	5.7	11.8	11.9
Incr Delay (d2), s/veh	5.0	0.0	0.7	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	1.9	0.0	0.2	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.7	3.8	9.2	5.7	11.9	12.0
LnGrp LOS	C	A	A	A	B	B
Approach Vol, veh/h		165	648		96	
Approach Delay, s/veh		4.1	9.1		12.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	19.7			24.0	10.0
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	11.9			3.5	2.9
Green Ext Time (p_c), s	0.0	2.4			0.5	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	158	546	0	0	1
Future Vol, veh/h	2	158	546	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	82	82	86	86	25	25
Heavy Vehicles, %	50	4	2	2	2	100
Mvmt Flow	2	193	635	0	0	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	635	0	-	0	832
Stage 1	-	-	-	-	635
Stage 2	-	-	-	-	197
Critical Hdwy	4.6	-	-	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	2.65	-	-	-	3.518
Pot Cap-1 Maneuver	755	-	-	-	339
Stage 1	-	-	-	-	528
Stage 2	-	-	-	-	836
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	755	-	-	-	338
Mov Cap-2 Maneuver	-	-	-	-	338
Stage 1	-	-	-	-	526
Stage 2	-	-	-	-	836

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	755	-	-	-	341
HCM Lane V/C Ratio	0.003	-	-	-	0.012
HCM Control Delay (s)	9.8	-	-	-	15.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	157	553	1	3	0
Future Vol, veh/h	2	157	553	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	79	79	86	86	75	75
Heavy Vehicles, %	2	4	2	100	33	2
Mvmt Flow	3	199	643	1	4	0

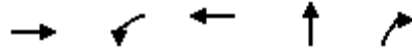
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	644	0	-	0	849
Stage 1	-	-	-	-	644
Stage 2	-	-	-	-	205
Critical Hdwy	4.12	-	-	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	2.218	-	-	-	3.797
Pot Cap-1 Maneuver	941	-	-	-	293
Stage 1	-	-	-	-	469
Stage 2	-	-	-	-	761
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	941	-	-	-	292
Mov Cap-2 Maneuver	-	-	-	-	292
Stage 1	-	-	-	-	468
Stage 2	-	-	-	-	761

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	17.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	941	-	-	-	292
HCM Lane V/C Ratio	0.003	-	-	-	0.014
HCM Control Delay (s)	8.8	-	-	-	17.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues
7: Discovery Dr & W Jack London Blvd

Background plus SMP 40
Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	187	20	616	22	13
v/c Ratio	0.06	0.03	0.19	0.03	0.02
Control Delay	3.3	11.7	1.3	11.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	11.7	1.3	11.0	0.1
Queue Length 50th (ft)	0	1	0	1	0
Queue Length 95th (ft)	29	21	48	19	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	3093	1369	3539	1337	954
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.01	0.17	0.02	0.01
Intersection Summary					

HCM 6th Signalized Intersection Summary
7: Discovery Dr & W Jack London Blvd

Background plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	140	19	17	536	0	17	0	10	0	0	0
Future Volume (veh/h)	0	140	19	17	536	0	17	0	10	0	0	0
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		1.00	1.00		1.00	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	0	1841	1841	1604	1870	0	1870	1870	1159	1870	1870	1870
Adj Flow Rate, veh/h	0	165	22	20	616	0	22	0	13	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.87	0.87	0.87	0.78	0.78	0.78	0.25	0.25	0.25
Percent Heavy Veh, %	0	4	4	20	2	0	2	2	50	2	2	2
Cap, veh/h	0	1029	135	64	1912	0	139	0	77	0	8	0
Arrive On Green	0.00	0.33	0.33	0.04	0.54	0.00	0.08	0.00	0.08	0.00	0.00	0.00
Sat Flow, veh/h	0	3199	408	1527	3647	0	1781	0	982	0	1870	0
Grp Volume(v), veh/h	0	92	95	20	616	0	22	0	13	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1749	1767	1527	1777	0	1781	0	982	0	1870	0
Q Serve(g_s), s	0.0	0.9	0.9	0.3	2.3	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	0.9	0.9	0.3	2.3	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Prop In Lane	0.00		0.23	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	579	585	64	1912	0	139	0	77	0	8	0
V/C Ratio(X)	0.00	0.16	0.16	0.31	0.32	0.00	0.16	0.00	0.17	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2167	2189	1892	4403	0	1471	0	811	0	927	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.7	5.7	11.3	3.1	0.0	10.4	0.0	10.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	1.0	0.1	0.0	0.2	0.0	0.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	5.8	5.8	12.3	3.2	0.0	10.6	0.0	10.8	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		187			636			35				0
Approach Delay, s/veh		5.8			3.5			10.7				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.0	13.3		0.0		18.3		5.9				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	2.9		0.0		4.3		2.3				
Green Ext Time (p_c), s	0.0	0.7		0.0		3.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	201	60	646	13	57
v/c Ratio	0.00	0.08	0.11	0.23	0.03	0.12
Control Delay	17.0	6.7	14.4	4.1	15.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	6.7	14.4	4.1	15.9	0.5
Queue Length 50th (ft)	0	0	1	0	1	0
Queue Length 95th (ft)	6	28	43	85	13	0
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	1082	3025	1017	3369	951	850
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.07	0.06	0.19	0.01	0.07
Intersection Summary						

HCM 6th Signalized Intersection Summary

8: Voyager St & W Jack London Blvd

Background plus SMP 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	2	147	8	50	536	0	9	0	41	0	0	0
Future Volume (veh/h)	2	147	8	50	536	0	9	0	41	0	0	0
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		1.00	1.00		1.00	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	1870	1796	1796	1337	1870	1870	1870	1870	996	1870	1870	1870
Adj Flow Rate, veh/h	3	191	10	60	646	0	12	0	57	0	0	0
Peak Hour Factor	0.77	0.77	0.77	0.83	0.83	0.83	0.72	0.72	0.72	0.92	0.92	0.92
Percent Heavy Veh, %	2	7	7	38	2	2	2	2	61	2	2	2
Cap, veh/h	10	962	50	136	1397	0	212	0	101	0	7	0
Arrive On Green	0.01	0.29	0.29	0.11	0.39	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3296	171	1273	3647	0	1781	0	844	0	1870	0
Grp Volume(v), veh/h	3	98	103	60	646	0	12	0	57	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1706	1761	1273	1777	0	1781	0	844	0	1870	0
Q Serve(g_s), s	0.0	1.2	1.2	1.2	3.7	0.0	0.2	0.0	1.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.2	1.2	1.2	3.7	0.0	0.2	0.0	1.8	0.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	498	514	136	1397	0	212	0	101	0	7	0
V/C Ratio(X)	0.29	0.20	0.20	0.44	0.46	0.00	0.06	0.00	0.57	0.00	0.00	0.00
Avail Cap(c_a), veh/h	775	2164	2233	923	4508	0	1614	0	765	0	813	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	13.7	7.3	7.3	11.5	6.2	0.0	10.8	0.0	11.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.1	0.1	0.8	0.2	0.0	0.0	0.0	1.9	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.2	0.5	0.0	0.1	0.0	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.4	7.5	7.5	12.4	6.4	0.0	10.8	0.0	13.3	0.0	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		204			706			69				0
Approach Delay, s/veh		7.7			6.9			12.9				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	13.4		0.0	4.2	16.1		7.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.2	3.2		0.0	2.0	5.7		3.8				
Green Ext Time (p_c), s	0.1	0.8		0.0	0.0	3.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.5
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	64	105	62	181	334	390	212	1556	177	228	1537	131
v/c Ratio	0.21	0.14	0.16	0.40	0.69	0.60	0.52	0.90	0.27	0.59	0.90	0.22
Control Delay	58.0	40.8	0.9	56.6	52.4	28.3	60.0	45.2	8.1	62.7	45.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	40.8	0.9	56.6	52.4	28.3	60.0	45.2	8.1	62.7	45.6	5.7
Queue Length 50th (ft)	23	35	0	67	248	193	81	416	16	89	412	1
Queue Length 95th (ft)	55	64	0	132	408	344	140	513	56	159	550	40
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	299	1604	693	571	930	667	565	2747	970	428	2574	839
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.09	0.32	0.36	0.58	0.38	0.57	0.18	0.53	0.60	0.16

Intersection Summary

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Background plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↖	↗	↖↗	↖	↗	↖↗	↖↖↖	↗	↖↗	↖↖↖	↗
Traffic Volume (veh/h)	54	88	52	159	294	343	174	1276	145	196	1322	113
Future Volume (veh/h)	54	88	52	159	294	343	174	1276	145	196	1322	113
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		0.99	1.00		1.00	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	1218	1856	1648	1870	1870	1870	1856	1752	1870	1870	1767	1722
Adj Flow Rate, veh/h	64	105	62	181	334	390	212	1556	177	228	1537	131
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	46	3	17	2	2	2	3	10	2	2	9	12
Cap, veh/h	257	739	289	484	440	549	421	1683	557	394	1655	501
Arrive On Green	0.11	0.21	0.21	0.14	0.24	0.24	0.12	0.35	0.35	0.11	0.34	0.34
Sat Flow, veh/h	2251	3526	1376	3456	1870	1565	3428	4782	1584	3456	4823	1459
Grp Volume(v), veh/h	64	105	62	181	334	390	212	1556	177	228	1537	131
Grp Sat Flow(s),veh/h/ln	1125	1763	1376	1728	1870	1565	1714	1594	1584	1728	1608	1459
Q Serve(g_s), s	3.0	2.8	4.2	5.4	18.9	24.6	6.6	35.6	9.3	7.1	35.0	7.4
Cycle Q Clear(g_c), s	3.0	2.8	4.2	5.4	18.9	24.6	6.6	35.6	9.3	7.1	35.0	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	739	289	484	440	549	421	1683	557	394	1655	501
V/C Ratio(X)	0.25	0.14	0.21	0.37	0.76	0.71	0.50	0.92	0.32	0.58	0.93	0.26
Avail Cap(c_a), veh/h	296	739	289	607	985	1005	602	2939	973	455	2329	705
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	46.0	36.7	37.3	44.4	40.5	32.1	46.7	35.5	26.9	47.9	36.1	27.0
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.2	1.0	0.6	0.3	1.7	0.1	0.5	4.6	0.1
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	0.8	1.2	1.4	2.3	8.5	8.9	2.7	13.1	3.4	3.0	13.7	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.2	36.7	37.4	44.6	41.6	32.7	47.1	37.1	27.1	48.4	40.7	27.1
LnGrp LOS	D	D	D	D	D	C	D	D	C	D	D	C
Approach Vol, veh/h		231			905			1945			1896	
Approach Delay, s/veh		39.5			38.4			37.3			40.7	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	45.9	20.6	29.7	18.7	44.9	17.7	32.6				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	9.1	37.6	7.4	6.2	8.6	37.0	5.0	26.6				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.1	0.0	2.0	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	38.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	57	44	39	1843	1725	101
v/c Ratio	0.17	0.16	0.10	0.51	0.54	0.11
Control Delay	24.4	10.2	23.5	4.5	8.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	10.2	23.5	4.5	8.7	3.6
Queue Length 50th (ft)	8	0	5	90	81	2
Queue Length 95th (ft)	19	9	17	105	196	22
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1200	897	1383	4769	3248	906
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.03	0.39	0.53	0.11
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background plus SMP 40
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔↔	↔↔	↑↑↑	↓↓↓	↔
Traffic Volume (veh/h)	41	32	33	1548	1449	85
Future Volume (veh/h)	41	32	33	1548	1449	85
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1470	1248	1722	1781	1781	1544
Adj Flow Rate, veh/h	57	44	39	1843	1725	101
Peak Hour Factor	0.72	0.72	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	29	44	12	8	8	24
Cap, veh/h	316	217	195	3008	2037	548
Arrive On Green	0.12	0.12	0.06	0.62	0.42	0.42
Sat Flow, veh/h	2716	1861	3182	5024	5024	1309
Grp Volume(v), veh/h	57	44	39	1843	1725	101
Grp Sat Flow(s),veh/h/ln	1358	931	1591	1621	1621	1309
Q Serve(g_s), s	0.8	0.9	0.5	9.6	13.1	2.0
Cycle Q Clear(g_c), s	0.8	0.9	0.5	9.6	13.1	2.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	316	217	195	3008	2037	548
V/C Ratio(X)	0.18	0.20	0.20	0.61	0.85	0.18
Avail Cap(c_a), veh/h	1651	1131	1933	3546	3546	954
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.4	16.4	18.4	4.8	10.8	7.5
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.1	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	0.6	2.6	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.5	16.6	18.5	4.9	11.2	7.6
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h	101			1882	1826	
Approach Delay, s/veh	16.6			5.2	11.0	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		31.7		9.5	8.2	23.4
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		11.6		2.9	2.5	15.1
Green Ext Time (p_c), s		2.4		0.0	0.0	2.1

Intersection Summary

HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Background plus SMP 40
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	93	428	1408	169	524	1200
v/c Ratio	0.18	0.75	0.66	0.09	0.58	0.52
Control Delay	28.0	13.4	18.1	2.6	30.0	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	13.4	18.1	2.6	30.0	6.5
Queue Length 50th (ft)	19	11	145	6	71	78
Queue Length 95th (ft)	37	64	282	17	122	213
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1220	816	2461	2402	1393	2822
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.52	0.57	0.07	0.38	0.43
Intersection Summary						

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background plus SMP 40
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶↶	↶	↶↶↶	↶↶	↶↶↶	↶↶
Traffic Volume (veh/h)	77	355	1211	145	451	1032
Future Volume (veh/h)	77	355	1211	145	451	1032
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1826	1826	1781	1811	1796	1767
Adj Flow Rate, veh/h	93	428	1408	169	524	1200
Peak Hour Factor	0.83	0.83	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	5	5	8	6	7	9
Cap, veh/h	998	458	1865	1835	701	1957
Arrive On Green	0.30	0.30	0.38	0.38	0.15	0.58
Sat Flow, veh/h	3374	1547	5024	2701	4824	3445
Grp Volume(v), veh/h	93	428	1408	169	524	1200
Grp Sat Flow(s),veh/h/ln	1687	1547	1621	1351	1608	1678
Q Serve(g_s), s	1.6	22.2	20.7	1.8	8.6	19.2
Cycle Q Clear(g_c), s	1.6	22.2	20.7	1.8	8.6	19.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	998	458	1865	1835	701	1957
V/C Ratio(X)	0.09	0.94	0.76	0.09	0.75	0.61
Avail Cap(c_a), veh/h	1021	468	2061	1944	1168	1957
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.1	28.3	22.1	4.5	33.8	11.2
Incr Delay (d2), s/veh	0.0	26.0	1.6	0.0	1.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	11.0	7.1	0.4	3.2	5.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.1	54.3	23.7	4.6	35.5	11.8
LnGrp LOS	C	D	C	A	D	B
Approach Vol, veh/h	521		1577			1724
Approach Delay, s/veh	48.4		21.7			19.0
Approach LOS	D		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	16.5	37.2			53.7	28.9
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	10.6	22.7			21.2	24.2
Green Ext Time (p_c), s	1.4	8.9			8.3	0.2

Intersection Summary

HCM 6th Ctrl Delay	24.1
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Background plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	79	157	69	93	147	190	1529	26	242	1721
v/c Ratio	0.02	0.26	0.25	0.25	0.16	0.22	0.79	0.77	0.04	0.58	0.89
Control Delay	45.0	40.2	4.6	47.8	28.4	3.9	69.5	32.2	0.1	52.9	38.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	40.2	4.6	47.8	28.4	3.9	69.5	32.2	0.1	52.9	38.5
Queue Length 50th (ft)	3	48	0	41	43	0	124	320	0	80	401
Queue Length 95th (ft)	16	86	35	101	98	34	#328	#624	0	#157	#747
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	312	437	644	279	631	701	270	2125	781	474	2046
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.18	0.24	0.25	0.15	0.21	0.70	0.72	0.03	0.51	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Background plus SMP 40
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	4	69	137	60	81	128	173	1391	24	215	1514	18
Future Volume (veh/h)	4	69	137	60	81	128	173	1391	24	215	1514	18
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		1.00	1.00		1.00	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	1870	1559	1870	1796	1841	1663	1856	1752	1870	1811	1767	1767
Adj Flow Rate, veh/h	5	79	157	69	93	147	190	1529	26	242	1701	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.91	0.91	0.91	0.89	0.89	0.89
Percent Heavy Veh, %	2	23	2	7	4	16	3	10	2	6	9	9
Cap, veh/h	37	229	432	226	475	526	222	1814	601	386	1813	21
Arrive On Green	0.02	0.15	0.15	0.13	0.26	0.26	0.13	0.38	0.38	0.12	0.37	0.37
Sat Flow, veh/h	1781	1559	1585	1711	1841	1409	1767	4782	1585	3346	4914	58
Grp Volume(v), veh/h	5	79	157	69	93	147	190	1529	26	242	1113	608
Grp Sat Flow(s),veh/h/ln	1781	1559	1585	1711	1841	1409	1767	1594	1585	1673	1608	1756
Q Serve(g_s), s	0.3	4.3	7.6	3.5	3.8	7.0	10.0	27.8	1.0	6.6	31.8	31.8
Cycle Q Clear(g_c), s	0.3	4.3	7.6	3.5	3.8	7.0	10.0	27.8	1.0	6.6	31.8	31.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	37	229	432	226	475	526	222	1814	601	386	1186	648
V/C Ratio(X)	0.13	0.35	0.36	0.31	0.20	0.28	0.86	0.84	0.04	0.63	0.94	0.94
Avail Cap(c_a), veh/h	299	376	582	269	475	526	260	1957	649	457	1316	719
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	45.8	36.5	28.0	37.4	27.6	20.9	40.8	27.0	18.7	40.2	29.0	29.0
Incr Delay (d2), s/veh	0.6	0.3	0.2	0.3	0.1	0.1	18.9	3.0	0.0	1.1	11.6	18.3
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	0.1	1.6	2.8	1.4	1.6	2.2	5.3	10.2	0.3	2.6	13.1	15.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	36.9	28.2	37.7	27.7	21.0	59.7	30.0	18.7	41.3	40.6	47.3
LnGrp LOS	D	D	C	D	C	C	E	C	B	D	D	D
Approach Vol, veh/h		241			309			1745			1963	
Approach Delay, s/veh		31.4			26.7			33.1			42.8	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	41.9	17.6	19.8	17.0	41.0	7.0	30.4				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	8.6	29.8	5.5	9.6	12.0	33.8	2.3	9.0				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	1.3	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	37.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	22	6	50	13	5	36
Future Vol, veh/h	22	6	50	13	5	36
Conflicting Peds, #/hr	0	3	3	0	4	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	60	60	68	68
Heavy Vehicles, %	5	33	27	23	20	58
Mvmt Flow	32	9	83	22	7	53

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	44	0	232 42
Stage 1	-	-	-	-	40 -
Stage 2	-	-	-	-	192 -
Critical Hdwy	-	-	4.37	-	6.6 6.78
Critical Hdwy Stg 1	-	-	-	-	5.6 -
Critical Hdwy Stg 2	-	-	-	-	5.6 -
Follow-up Hdwy	-	-	2.443	-	3.68 3.822
Pot Cap-1 Maneuver	-	-	1418	-	718 890
Stage 1	-	-	-	-	938 -
Stage 2	-	-	-	-	799 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1414	-	671 886
Mov Cap-2 Maneuver	-	-	-	-	671 -
Stage 1	-	-	-	-	935 -
Stage 2	-	-	-	-	749 -

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	853	-	-	1414	-
HCM Lane V/C Ratio	0.071	-	-	0.059	-
HCM Control Delay (s)	9.5	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	47	9	47	54	13	7	0	23	4	0	3
Future Vol, veh/h	4	47	9	47	54	13	7	0	23	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	11	11	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	72	72	72	75	75	75	44	44	44
Heavy Vehicles, %	25	45	11	19	28	31	33	2	26	2	2	2
Mvmt Flow	6	68	13	65	75	18	9	0	31	9	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	93	0	0	81	0	0	305	310	86	327	307	84
Stage 1	-	-	-	-	-	-	87	87	-	214	214	-
Stage 2	-	-	-	-	-	-	218	223	-	113	93	-
Critical Hdwy	4.35	-	-	4.29	-	-	7.43	6.52	6.46	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.425	-	-	2.371	-	-	3.797	4.018	3.534	3.518	4.018	3.318
Pot Cap-1 Maneuver	1369	-	-	1416	-	-	591	605	910	626	607	975
Stage 1	-	-	-	-	-	-	849	823	-	788	725	-
Stage 2	-	-	-	-	-	-	719	719	-	892	818	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1369	-	-	1416	-	-	563	572	900	574	574	975
Mov Cap-2 Maneuver	-	-	-	-	-	-	563	572	-	574	574	-
Stage 1	-	-	-	-	-	-	845	819	-	784	689	-
Stage 2	-	-	-	-	-	-	679	684	-	848	814	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			3.2			9.8			10.3		
HCM LOS							A			B		

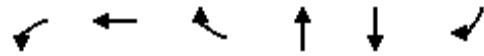
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	1369	-	-	1416	-	-	697
HCM Lane V/C Ratio	0.051	0.004	-	-	0.046	-	-	0.023
HCM Control Delay (s)	9.8	7.6	0	-	7.7	0	-	10.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Queues

Background plus SMP 40

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Timing Plan: AM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	98	100	547	800	684	703
v/c Ratio	0.35	0.35	0.58	0.78	0.29	0.55
Control Delay	25.0	24.9	14.8	19.1	4.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	24.9	14.8	19.1	4.7	2.3
Queue Length 50th (ft)	32	32	62	197	38	0
Queue Length 95th (ft)	72	73	114	362	76	17
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	543	553	1405	1106	3168	1481
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.18	0.39	0.72	0.22	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background plus SMP 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↙	↖	↗		↑			↕	↘	
Traffic Volume (vph)	0	0	0	163	21	509	0	656	0	0	547	562	
Future Volume (vph)	0	0	0	163	21	509	0	656	0	0	547	562	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1631	2707		1863			3505	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1631	2707		1863			3505	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.82	0.82	0.82	0.80	0.80	0.80	
Adj. Flow (vph)	0	0	0	175	23	547	0	800	0	0	684	702	
RTOR Reduction (vph)	0	0	0	0	0	109	0	0	0	0	0	225	
Lane Group Flow (vph)	0	0	0	98	100	438	0	800	0	0	684	478	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	5%	5%	2%	2%	2%	2%	3%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				10.5	10.5	18.2		32.7			40.4	40.4	
Effective Green, g (s)				10.5	10.5	18.2		32.7			40.4	40.4	
Actuated g/C Ratio				0.18	0.18	0.31		0.55			0.68	0.68	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				283	288	829		1025			2383	1063	
v/s Ratio Prot								c0.43			0.20		
v/s Ratio Perm				0.06	0.06	c0.16						0.31	
v/c Ratio				0.35	0.35	0.53		0.78			0.29	0.45	
Uniform Delay, d1				21.4	21.4	17.0		10.5			3.8	4.4	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.3	0.3	0.3		3.6			0.0	0.1	
Delay (s)				21.7	21.7	17.3		14.1			3.8	4.5	
Level of Service				C	C	B		B			A	A	
Approach Delay (s)		0.0			18.5			14.1			4.1		
Approach LOS		A			B			B			A		
Intersection Summary													
HCM 2000 Control Delay			10.5		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.74										
Actuated Cycle Length (s)			59.4		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			59.7%		ICU Level of Service					B			
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	520	307	435	95	386
v/c Ratio	0.58	0.38	0.35	0.15	0.27
Control Delay	10.6	2.7	6.2	2.3	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	2.7	6.2	2.3	5.7
Queue Length 50th (ft)	26	0	15	0	13
Queue Length 95th (ft)	42	10	35	10	30
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3415	2211	3001	1386	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.14	0.14	0.07	0.11

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background plus SMP 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	458	0	270	0	0	0	0	407	102	0	355	0
Future Volume (vph)	458	0	270	0	0	0	0	407	102	0	355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3001	1386		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3001	1386		3505	
Peak-hour factor, PHF	0.88	0.88	0.88	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	520	0	307	0	0	0	0	424	106	0	386	0
RTOR Reduction (vph)	0	0	226	0	0	0	0	3	56	0	0	0
Lane Group Flow (vph)	520	0	81	0	0	0	0	432	39	0	386	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	6%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	6.4		6.4					10.0	10.0		10.0	
Effective Green, g (s)	6.4		6.4					10.0	10.0		10.0	
Actuated g/C Ratio	0.26		0.26					0.41	0.41		0.41	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	900		582					1229	568		1436	
v/s Ratio Prot								c0.14			0.11	
v/s Ratio Perm	c0.15		0.04						0.03			
v/c Ratio	0.58		0.14					0.35	0.07		0.27	
Uniform Delay, d1	7.8		6.9					5.0	4.4		4.8	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.6		0.0					0.1	0.0		0.0	
Delay (s)	8.4		6.9					5.0	4.4		4.8	
Level of Service	A		A					A	A		A	
Approach Delay (s)		7.8			0.0			4.9			4.8	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.3					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			24.4					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			32.1%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Background plus SMP 40

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	561	379	10	17	207	751	14	59	745	23	376
v/c Ratio	0.61	0.26	0.01	0.12	0.32	0.44	0.10	0.10	0.57	0.04	0.24
Control Delay	34.8	19.9	0.0	45.3	32.5	2.1	45.8	25.6	28.3	15.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	19.9	0.0	45.3	32.5	2.1	45.8	25.6	28.3	15.7	0.4
Queue Length 50th (ft)	77	51	0	7	40	0	6	6	96	6	0
Queue Length 95th (ft)	197	178	0	39	117	35	26	16	235	26	0
Internal Link Dist (ft)		745			868			221		816	
Turn Bay Length (ft)	400		305	350			110		600		420
Base Capacity (vph)	1523	1543	739	404	1094	2577	351	1825	3577	1353	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.25	0.01	0.04	0.19	0.29	0.04	0.03	0.21	0.02	0.24

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background plus SMP 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔	↑↑	↔↔	↔	↑↑↔		↔↔↔	↑	↔
Traffic Volume (veh/h)	527	356	9	16	199	721	10	30	11	685	21	346
Future Volume (veh/h)	527	356	9	16	199	721	10	30	11	685	21	346
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		0.99	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	1870	1870	1870	1870	1870	1870	1870	1796	1796	1870	1618	1870
Adj Flow Rate, veh/h	561	379	10	17	207	751	14	43	16	745	23	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.69	0.69	0.69	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	7	7	2	19	2
Cap, veh/h	769	1413	626	36	941	1301	25	265	88	1028	427	
Arrive On Green	0.15	0.40	0.40	0.02	0.26	0.26	0.01	0.07	0.07	0.20	0.26	0.00
Sat Flow, veh/h	5023	3554	1575	1781	3554	2754	1781	3628	1204	5023	1618	1585
Grp Volume(v), veh/h	561	379	10	17	207	751	14	38	21	745	23	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1575	1781	1777	1377	1781	1635	1563	1674	1618	1585
Q Serve(g_s), s	6.8	4.6	0.2	0.6	2.9	12.6	0.5	0.7	0.8	8.8	0.7	0.0
Cycle Q Clear(g_c), s	6.8	4.6	0.2	0.6	2.9	12.6	0.5	0.7	0.8	8.8	0.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	769	1413	626	36	941	1301	25	239	114	1028	427	
V/C Ratio(X)	0.73	0.27	0.02	0.47	0.22	0.58	0.57	0.16	0.18	0.72	0.05	
Avail Cap(c_a), veh/h	1583	1413	626	421	1120	1439	365	1288	616	3959	510	
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	0.00
Uniform Delay (d), s/veh	25.6	12.9	11.6	30.7	18.2	12.3	31.1	27.6	27.6	23.6	17.4	0.0
Incr Delay (d2), s/veh	0.5	0.1	0.0	3.4	0.1	0.5	7.5	0.2	0.6	0.7	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	2.5	1.6	0.1	0.3	1.0	3.2	0.2	0.3	0.3	3.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.1	13.0	11.6	34.2	18.3	12.7	38.6	27.8	28.2	24.3	17.5	0.0
LnGrp LOS	C	B	B	C	B	B	D	C	C	C	B	
Approach Vol, veh/h		950			975			73			768	A
Approach Delay, s/veh		20.7			14.3			30.0			24.1	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.7	22.1	17.0	10.6	5.3	30.5	4.9	22.7				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	8.8	14.6	10.8	2.8	2.6	6.6	2.5	2.7				
Green Ext Time (p_c), s	1.0	2.2	2.2	0.2	0.0	2.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	19.6
HCM 6th LOS	B

Notes

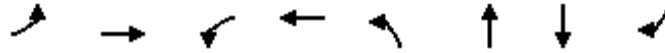
User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	374	725	34	418	101	97	80	514
v/c Ratio	0.56	0.38	0.15	0.35	0.30	0.28	0.26	0.57
Control Delay	33.1	19.4	38.4	25.5	29.2	24.1	35.5	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	19.4	38.4	25.5	29.2	24.1	35.5	6.7
Queue Length 50th (ft)	64	62	11	37	34	26	26	0
Queue Length 95th (ft)	196	195	58	91	114	95	111	55
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1494	3667	513	3643	533	526	525	1173
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.20	0.07	0.11	0.19	0.18	0.15	0.44
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑↔		↔	↑↑↑		↔	↔			↔	↔↔
Traffic Volume (vph)	359	675	21	29	308	52	141	16	36	44	34	504
Future Volume (vph)	359	675	21	29	308	52	141	16	36	44	34	504
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5058		1770	6257		1681	1614			1812	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5058		1770	6257		1681	1614			1812	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	374	703	22	34	358	60	145	16	37	45	35	514
RTOR Reduction (vph)	0	3	0	0	27	0	0	17	0	0	0	430
Lane Group Flow (vph)	374	722	0	34	391	0	101	80	0	0	80	84
Confl. Peds. (#/hr)							1		9			
Confl. Bikes (#/hr)							2		1			1
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	14.6	28.1		3.2	16.7		15.0	15.0			12.5	12.5
Effective Green, g (s)	14.6	28.1		3.2	16.7		15.0	15.0			12.5	12.5
Actuated g/C Ratio	0.19	0.37		0.04	0.22		0.20	0.20			0.16	0.16
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	658	1867		74	1373		331	318			297	457
v/s Ratio Prot	c0.11	c0.14		0.02	0.06		c0.06	0.05			c0.04	0.03
v/s Ratio Perm												
v/c Ratio	0.57	0.39		0.46	0.28		0.31	0.25			0.27	0.18
Uniform Delay, d1	27.9	17.7		35.6	24.7		26.1	25.8			27.8	27.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.9	0.0		1.6	0.0		0.4	0.3			0.2	0.1
Delay (s)	28.8	17.7		37.2	24.8		26.5	26.1			28.0	27.5
Level of Service	C	B		D	C		C	C			C	C
Approach Delay (s)		21.5			25.7			26.3			27.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	76.1	Sum of lost time (s)	17.3
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
3: W Jack London Blvd & Livermore Outlets Dr

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	106	707	291	40	43	131
v/c Ratio	0.10	0.30	0.19	0.06	0.08	0.14
Control Delay	18.0	4.7	12.1	4.3	18.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	4.7	12.1	4.3	18.8	5.7
Queue Length 50th (ft)	10	43	31	0	8	0
Queue Length 95th (ft)	39	61	51	13	41	22
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2139	3539	3319	1451	953	1560
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.20	0.09	0.03	0.05	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Background plus SMP 40
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	102	679	282	39	40	123
Future Volume (veh/h)	102	679	282	39	40	123
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	106	707	291	40	43	131
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	3	2	2
Cap, veh/h	609	1915	919	396	391	612
Arrive On Green	0.18	0.54	0.26	0.26	0.22	0.22
Sat Flow, veh/h	3456	3647	3647	1531	1781	2790
Grp Volume(v), veh/h	106	707	291	40	43	131
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1531	1781	1395
Q Serve(g_s), s	1.0	4.4	2.5	0.8	0.7	1.5
Cycle Q Clear(g_c), s	1.0	4.4	2.5	0.8	0.7	1.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	609	1915	919	396	391	612
V/C Ratio(X)	0.17	0.37	0.32	0.10	0.11	0.21
Avail Cap(c_a), veh/h	2246	3695	4157	1790	926	1450
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.5	5.1	11.5	10.9	12.0	12.3
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.6	0.7	0.2	0.3	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.6	5.2	11.6	10.9	12.1	12.4
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		813	331		174	
Approach Delay, s/veh		6.2	11.5		12.3	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.8	15.3			26.0	12.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.0	4.5			6.4	3.5
Green Ext Time (p_c), s	0.2	1.2			3.0	0.3

Intersection Summary

HCM 6th Ctrl Delay	8.4
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
4: W Jack London Blvd & Wolf House Dr

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	14	728	316	14	24	40
v/c Ratio	0.02	0.55	0.25	0.01	0.04	0.06
Control Delay	21.3	9.7	9.6	7.6	14.9	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.3	9.7	9.6	7.6	14.9	6.6
Queue Length 50th (ft)	2	111	35	1	4	0
Queue Length 95th (ft)	22	375	185	12	18	13
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1374	1863	1705	1412	1114	1029
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.39	0.19	0.01	0.02	0.04
Intersection Summary						

HCM 6th Signalized Intersection Summary
 4: W Jack London Blvd & Wolf House Dr

Background plus SMP 40
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	706	294	13	17	28
Future Volume (veh/h)	14	706	294	13	17	28
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1811	1841
Adj Flow Rate, veh/h	14	728	316	14	24	40
Peak Hour Factor	0.97	0.97	0.93	0.93	0.70	0.70
Percent Heavy Veh, %	2	2	2	2	6	4
Cap, veh/h	66	975	633	524	243	219
Arrive On Green	0.04	0.52	0.34	0.34	0.14	0.14
Sat Flow, veh/h	1781	1870	1870	1546	1725	1560
Grp Volume(v), veh/h	14	728	316	14	24	40
Grp Sat Flow(s),veh/h/ln	1781	1870	1870	1546	1725	1560
Q Serve(g_s), s	0.2	8.4	3.7	0.2	0.3	0.6
Cycle Q Clear(g_c), s	0.2	8.4	3.7	0.2	0.3	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	66	975	633	524	243	219
V/C Ratio(X)	0.21	0.75	0.50	0.03	0.10	0.18
Avail Cap(c_a), veh/h	1944	3062	3062	2531	1255	1135
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.9	5.2	7.2	6.1	10.3	10.4
Incr Delay (d2), s/veh	1.2	0.4	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	0.6	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.0	5.6	7.5	6.1	10.4	10.6
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		742	330		64	
Approach Delay, s/veh		5.8	7.4		10.5	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.0	14.6			19.6	7.9
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.2	5.7			10.4	2.6
Green Ext Time (p_c), s	0.0	1.1			3.0	0.1

Intersection Summary

HCM 6th Ctrl Delay			6.5			
HCM 6th LOS			A			

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	729	313	0	0	0
Future Vol, veh/h	0	729	313	0	0	0
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	94	94	25	25
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	848	333	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	334	0	-	0	1182 334
Stage 1	-	-	-	-	334 -
Stage 2	-	-	-	-	848 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1225	-	-	-	210 708
Stage 1	-	-	-	-	725 -
Stage 2	-	-	-	-	420 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1224	-	-	-	210 707
Mov Cap-2 Maneuver	-	-	-	-	210 -
Stage 1	-	-	-	-	724 -
Stage 2	-	-	-	-	420 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1224	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↙	↑	↘		↙	
Traffic Vol, veh/h	2	720	319	0	0	1
Future Vol, veh/h	2	720	319	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	90	90	25	25
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	818	354	0	0	4

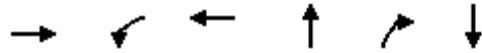
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	354	0	-	0	1176 354
Stage 1	-	-	-	-	354 -
Stage 2	-	-	-	-	822 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1205	-	-	-	211 690
Stage 1	-	-	-	-	710 -
Stage 2	-	-	-	-	432 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1205	-	-	-	211 690
Mov Cap-2 Maneuver	-	-	-	-	211 -
Stage 1	-	-	-	-	709 -
Stage 2	-	-	-	-	432 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1205	-	-	-	690
HCM Lane V/C Ratio	0.002	-	-	-	0.006
HCM Control Delay (s)	8	-	-	-	10.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues
7: Discovery Dr & W Jack London Blvd

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	831	9	311	30	20	18
v/c Ratio	0.30	0.02	0.11	0.04	0.04	0.03
Control Delay	6.7	18.1	3.7	16.3	0.2	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	18.1	3.7	16.3	0.2	0.1
Queue Length 50th (ft)	0	1	0	1	0	0
Queue Length 95th (ft)	182	15	44	22	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	3011	1234	3526	1362	924	1053
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.01	0.09	0.02	0.02	0.02
Intersection Summary						

HCM 6th Signalized Intersection Summary
7: Discovery Dr & W Jack London Blvd

Background plus SMP 40
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	705	18	8	286	0	19	0	13	8	0	2
Future Volume (veh/h)	0	705	18	8	286	0	19	0	13	8	0	2
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		1.00	1.00		1.00	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	0	1870	1870	1530	1870	0	1870	1870	1337	1870	1870	1870
Adj Flow Rate, veh/h	0	810	21	9	311	0	30	0	20	14	0	4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.64	0.64	0.64	0.56	0.56	0.56
Percent Heavy Veh, %	0	2	2	25	2	0	2	2	38	2	2	2
Cap, veh/h	0	1262	33	28	1745	0	177	0	112	37	0	11
Arrive On Green	0.00	0.36	0.36	0.02	0.49	0.00	0.10	0.00	0.10	0.03	0.00	0.03
Sat Flow, veh/h	0	3630	92	1457	3647	0	1781	0	1133	1348	0	385
Grp Volume(v), veh/h	0	407	424	9	311	0	30	0	20	18	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1851	1457	1777	0	1781	0	1133	1734	0	0
Q Serve(g_s), s	0.0	6.6	6.6	0.2	1.7	0.0	0.5	0.0	0.6	0.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.6	6.6	0.2	1.7	0.0	0.5	0.0	0.6	0.4	0.0	0.0
Prop In Lane	0.00		0.05	1.00		0.00	1.00		1.00	0.78		0.22
Lane Grp Cap(c), veh/h	0	634	661	28	1745	0	177	0	112	48	0	0
V/C Ratio(X)	0.00	0.64	0.64	0.32	0.18	0.00	0.17	0.00	0.18	0.38	0.00	0.00
Avail Cap(c_a), veh/h	0	1532	1597	1256	3065	0	1024	0	651	598	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.3	9.3	16.8	4.9	0.0	14.4	0.0	14.4	16.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.8	0.8	2.4	0.0	0.0	0.2	0.0	0.3	1.8	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	1.6	0.1	0.2	0.0	0.2	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.1	10.1	19.3	5.0	0.0	14.5	0.0	14.6	18.4	0.0	0.0
LnGrp LOS	A	B	B	B	A	A	B	A	B	B	A	A
Approach Vol, veh/h		831			320			50				18
Approach Delay, s/veh		10.1			5.4			14.6				18.4
Approach LOS		B			A			B				B
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	4.7	17.7		5.0		22.4		7.4				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.2	8.6		2.4		3.7		2.6				
Green Ext Time (p_c), s	0.0	3.8		0.0		1.5		0.1				

Intersection Summary

HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	809	21	320	6	72
v/c Ratio	0.01	0.35	0.06	0.14	0.01	0.15
Control Delay	15.3	6.7	14.7	5.6	14.4	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	6.7	14.7	5.6	14.4	1.6
Queue Length 50th (ft)	0	43	2	14	1	0
Queue Length 95th (ft)	6	134	21	48	8	4
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	933	3299	753	3441	1448	925
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.25	0.03	0.09	0.00	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Background plus SMP 40
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	3	726	10	19	291	0	5	0	60	0	0	0
Future Volume (veh/h)	3	726	10	19	291	0	5	0	60	0	0	0
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		1.00	1.00		1.00	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	1870	1870	1870	774	1870	1870	1870	1870	1203	1870	1870	1870
Adj Flow Rate, veh/h	3	798	11	21	320	0	6	0	72	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.83	0.83	0.83	0.25	0.25	0.25
Percent Heavy Veh, %	2	2	2	76	2	2	2	2	47	2	2	2
Cap, veh/h	10	1358	19	32	1478	0	228	0	131	0	6	0
Arrive On Green	0.01	0.38	0.38	0.04	0.42	0.00	0.13	0.00	0.13	0.00	0.00	0.00
Sat Flow, veh/h	1781	3587	49	737	3647	0	1781	0	1020	0	1870	0
Grp Volume(v), veh/h	3	395	414	21	320	0	6	0	72	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1860	737	1777	0	1781	0	1020	0	1870	0
Q Serve(g_s), s	0.0	5.2	5.2	0.8	1.7	0.0	0.1	0.0	2.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	5.2	5.2	0.8	1.7	0.0	0.1	0.0	2.0	0.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	673	704	32	1478	0	228	0	131	0	6	0
V/C Ratio(X)	0.29	0.59	0.59	0.66	0.22	0.00	0.03	0.00	0.55	0.00	0.00	0.00
Avail Cap(c_a), veh/h	724	2106	2205	499	4212	0	1508	0	863	0	760	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	14.6	7.3	7.3	13.9	5.5	0.0	11.3	0.0	12.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.6	0.6	8.6	0.1	0.0	0.0	0.0	1.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.9	0.9	0.2	0.2	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	7.9	7.9	22.5	5.6	0.0	11.3	0.0	13.4	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	A	A	A
Approach Vol, veh/h		812			341			78				0
Approach Delay, s/veh		8.0			6.6			13.3				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.3	16.5		0.0	4.2	17.6		7.8				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	2.8	7.2		0.0	2.0	3.7		4.0				
Green Ext Time (p_c), s	0.0	3.8		0.0	0.0	1.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	102	496	211	140	203	337	73	1385	161	312	1576	68
v/c Ratio	0.24	0.78	0.48	0.28	0.58	0.52	0.17	0.82	0.25	0.66	0.91	0.12
Control Delay	49.0	52.6	9.2	47.9	48.6	24.1	49.6	38.4	6.6	55.0	44.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	52.6	9.2	47.9	48.6	24.1	49.6	38.4	6.6	55.0	44.0	0.4
Queue Length 50th (ft)	30	172	1	42	128	136	22	297	6	100	353	0
Queue Length 95th (ft)	80	268	63	101	230	263	61	493	59	#246	583	0
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	428	1797	873	633	1021	649	621	3223	1075	475	2964	887
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.28	0.24	0.22	0.20	0.52	0.12	0.43	0.15	0.66	0.53	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Background plus SMP 40
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	94	456	194	125	181	300	70	1330	155	281	1418	61
Future Volume (veh/h)	94	456	194	125	181	300	70	1330	155	281	1418	61
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		1.00	1.00		1.00	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	1707	1870	1826	1870	1856	1870	1841	1841	1870	1870	1826	1663
Adj Flow Rate, veh/h	102	496	211	140	203	337	73	1385	161	312	1576	68
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.96	0.96	0.96	0.90	0.90	0.90
Percent Heavy Veh, %	13	2	5	2	3	2	4	4	2	2	5	16
Cap, veh/h	429	667	290	520	375	518	401	1690	533	430	1709	483
Arrive On Green	0.14	0.19	0.19	0.15	0.20	0.20	0.12	0.34	0.34	0.12	0.34	0.34
Sat Flow, veh/h	3155	3554	1545	3456	1856	1585	3401	5025	1585	3456	4985	1409
Grp Volume(v), veh/h	102	496	211	140	203	337	73	1385	161	312	1576	68
Grp Sat Flow(s),veh/h/ln	1577	1777	1545	1728	1856	1585	1700	1675	1585	1728	1662	1409
Q Serve(g_s), s	3.0	13.8	13.4	3.7	10.2	19.0	2.0	26.4	7.8	9.1	31.7	3.5
Cycle Q Clear(g_c), s	3.0	13.8	13.4	3.7	10.2	19.0	2.0	26.4	7.8	9.1	31.7	3.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	429	667	290	520	375	518	401	1690	533	430	1709	483
V/C Ratio(X)	0.24	0.74	0.73	0.27	0.54	0.65	0.18	0.82	0.30	0.73	0.92	0.14
Avail Cap(c_a), veh/h	453	667	290	661	1065	1107	651	3366	1062	496	2624	742
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	40.3	40.1	39.9	39.3	37.3	30.1	41.6	31.8	25.6	44.0	33.0	23.7
Incr Delay (d2), s/veh	0.1	4.0	7.8	0.1	0.5	0.5	0.1	0.4	0.1	3.4	3.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	1.1	6.1	5.5	1.5	4.5	6.9	0.8	9.9	2.8	4.0	12.4	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.4	44.0	47.7	39.4	37.8	30.6	41.6	32.1	25.7	47.5	36.0	23.8
LnGrp LOS	D	D	D	D	D	C	D	C	C	D	D	C
Approach Vol, veh/h		809			680			1619			1956	
Approach Delay, s/veh		44.5			34.6			31.9			37.4	
Approach LOS		D			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	41.0	20.4	25.4	17.0	41.6	18.9	26.9				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	11.1	28.4	5.7	15.8	4.0	33.7	5.0	21.0				
Green Ext Time (p_c), s	0.0	1.6	0.0	0.0	0.0	2.1	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	36.4
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	103	78	22	1599	1923	53
v/c Ratio	0.25	0.19	0.07	0.44	0.57	0.06
Control Delay	22.7	8.2	21.4	4.4	7.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	8.2	21.4	4.4	7.5	3.5
Queue Length 50th (ft)	12	0	2	71	95	1
Queue Length 95th (ft)	27	9	12	91	238	16
Internal Link Dist (ft)	707		3132		2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1465	1240	1172	5036	3406	828
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.06	0.02	0.32	0.56	0.06
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background plus SMP 40
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	69	52	20	1487	1673	46
Future Volume (veh/h)	69	52	20	1487	1673	46
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1663	1678	1233	1856	1841	1381
Adj Flow Rate, veh/h	103	78	22	1599	1923	53
Peak Hour Factor	0.67	0.67	0.93	0.93	0.87	0.87
Percent Heavy Veh, %	16	15	45	3	4	35
Cap, veh/h	435	354	85	3094	2230	520
Arrive On Green	0.14	0.14	0.04	0.61	0.44	0.44
Sat Flow, veh/h	3072	2502	2278	5233	5191	1171
Grp Volume(v), veh/h	103	78	22	1599	1923	53
Grp Sat Flow(s),veh/h/ln	1536	1251	1139	1689	1675	1171
Q Serve(g_s), s	1.3	1.2	0.4	7.9	15.2	1.2
Cycle Q Clear(g_c), s	1.3	1.2	0.4	7.9	15.2	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	435	354	85	3094	2230	520
V/C Ratio(X)	0.24	0.22	0.26	0.52	0.86	0.10
Avail Cap(c_a), veh/h	1745	1421	1294	3452	3424	798
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.8	16.7	20.6	4.9	11.0	7.1
Incr Delay (d2), s/veh	0.1	0.1	0.6	0.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.1	0.8	3.3	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.9	16.9	21.2	4.9	12.0	7.2
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	181			1621	1976	
Approach Delay, s/veh	16.9			5.1	11.9	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		33.1		10.9	7.4	25.7
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		9.9		3.3	2.4	17.2
Green Ext Time (p_c), s		1.9		0.0	0.0	2.4

Intersection Summary

HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	91	577	1086	92	425	1524
v/c Ratio	0.11	0.84	0.59	0.05	0.50	0.72
Control Delay	22.5	21.0	19.8	0.9	30.6	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	21.0	19.8	0.9	30.6	12.7
Queue Length 50th (ft)	15	60	132	0	59	214
Queue Length 95th (ft)	38	#238	217	6	108	364
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1318	860	2656	2305	1533	2902
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.67	0.41	0.04	0.28	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background plus SMP 40
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	83	525	988	84	378	1356
Future Volume (veh/h)	83	525	988	84	378	1356
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1826	1841	1870	1826
Adj Flow Rate, veh/h	91	577	1086	92	425	1524
Peak Hour Factor	0.91	0.91	0.91	0.91	0.89	0.89
Percent Heavy Veh, %	2	2	5	4	2	5
Cap, veh/h	1169	536	1699	1865	625	1826
Arrive On Green	0.34	0.34	0.34	0.34	0.12	0.53
Sat Flow, veh/h	3456	1585	5149	2745	5023	3561
Grp Volume(v), veh/h	91	577	1086	92	425	1524
Grp Sat Flow(s),veh/h/ln	1728	1585	1662	1373	1674	1735
Q Serve(g_s), s	1.3	25.0	13.6	0.8	6.0	27.4
Cycle Q Clear(g_c), s	1.3	25.0	13.6	0.8	6.0	27.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1169	536	1699	1865	625	1826
V/C Ratio(X)	0.08	1.08	0.64	0.05	0.68	0.83
Avail Cap(c_a), veh/h	1169	536	2362	2230	1360	1826
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.6	24.4	20.5	3.9	30.9	14.8
Incr Delay (d2), s/veh	0.0	60.8	0.6	0.0	1.3	3.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	17.5	4.6	0.2	2.3	9.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.6	85.2	21.1	3.9	32.2	18.5
LnGrp LOS	B	F	C	A	C	B
Approach Vol, veh/h	668		1178			1949
Approach Delay, s/veh	75.9		19.8			21.5
Approach LOS	E		B			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	13.7	30.7			44.4	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	8.0	15.6			29.4	27.0
Green Ext Time (p_c), s	1.2	9.6			4.6	0.0
Intersection Summary						
HCM 6th Ctrl Delay			30.5			
HCM 6th LOS			C			

Queues
12: Isabel Ave & Airway Blvd

Background plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	12	117	280	34	63	268	165	1708	31	266	1687
v/c Ratio	0.04	0.35	0.42	0.12	0.12	0.33	0.72	0.90	0.05	0.63	0.91
Control Delay	44.8	38.9	7.9	44.8	27.8	3.5	62.7	36.8	0.1	51.2	38.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	38.9	7.9	44.8	27.8	3.5	62.7	36.8	0.1	51.2	38.5
Queue Length 50th (ft)	7	72	28	20	28	0	106	367	0	88	375
Queue Length 95th (ft)	30	123	83	61	74	49	#273	#714	0	#172	#684
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	293	486	709	294	603	826	274	2226	742	480	2115
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.24	0.39	0.12	0.10	0.32	0.60	0.77	0.04	0.55	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Background plus SMP 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖
Traffic Volume (veh/h)	11	105	252	31	57	244	150	1554	28	231	1459	9
Future Volume (veh/h)	11	105	252	31	57	244	150	1554	28	231	1459	9
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		1.00	1.00		1.00	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	1767	1737	1870	1870	1870	1870	1870	1841	1796	1826	1811	1811
Adj Flow Rate, veh/h	12	117	280	34	63	268	165	1708	31	266	1677	10
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87
Percent Heavy Veh, %	9	11	2	2	2	2	2	4	7	5	6	6
Cap, veh/h	77	307	456	170	423	551	198	1850	561	409	1919	11
Arrive On Green	0.05	0.18	0.18	0.10	0.23	0.23	0.11	0.37	0.37	0.12	0.38	0.38
Sat Flow, veh/h	1682	1737	1582	1781	1870	1585	1781	5025	1522	3374	5072	30
Grp Volume(v), veh/h	12	117	280	34	63	268	165	1708	31	266	1090	597
Grp Sat Flow(s),veh/h/ln	1682	1737	1582	1781	1870	1585	1781	1675	1522	1687	1648	1806
Q Serve(g_s), s	0.6	5.4	13.9	1.6	2.4	12.0	8.2	29.5	1.2	6.8	27.8	27.8
Cycle Q Clear(g_c), s	0.6	5.4	13.9	1.6	2.4	12.0	8.2	29.5	1.2	6.8	27.8	27.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	77	307	456	170	423	551	198	1850	561	409	1247	683
V/C Ratio(X)	0.15	0.38	0.61	0.20	0.15	0.49	0.83	0.92	0.06	0.65	0.87	0.87
Avail Cap(c_a), veh/h	297	441	578	295	433	560	275	2163	655	484	1419	777
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	41.5	32.9	27.9	37.8	28.1	23.2	39.4	27.4	18.5	38.0	26.2	26.2
Incr Delay (d2), s/veh	0.3	0.3	0.5	0.2	0.1	0.2	10.5	6.1	0.0	1.4	5.3	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/ln	0.3	2.2	5.0	0.7	1.1	4.3	4.0	11.7	0.4	2.8	10.8	12.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.9	33.2	28.4	38.0	28.1	23.5	49.9	33.5	18.5	39.4	31.4	35.2
LnGrp LOS	D	C	C	D	C	C	D	C	B	D	C	D
Approach Vol, veh/h		409			365			1904			1953	
Approach Delay, s/veh		30.2			25.6			34.7			33.7	
Approach LOS		C			C			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	39.2	13.6	21.8	15.1	40.1	9.2	26.3				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	8.8	31.5	3.6	15.9	10.2	29.8	2.6	14.0				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.1	0.0	1.6	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	33.1
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	6.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	10	32	15	7	66
Future Vol, veh/h	18	10	32	15	7	66
Conflicting Peds, #/hr	0	1	1	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	73	73	68	68
Heavy Vehicles, %	2	10	41	33	29	29
Mvmt Flow	23	13	44	21	10	97

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	37	0	143 31
Stage 1	-	-	-	-	31 -
Stage 2	-	-	-	-	112 -
Critical Hdwy	-	-	4.51	-	6.69 6.49
Critical Hdwy Stg 1	-	-	-	-	5.69 -
Critical Hdwy Stg 2	-	-	-	-	5.69 -
Follow-up Hdwy	-	-	2.569	-	3.761 3.561
Pot Cap-1 Maneuver	-	-	1356	-	790 971
Stage 1	-	-	-	-	926 -
Stage 2	-	-	-	-	850 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1355	-	761 970
Mov Cap-2 Maneuver	-	-	-	-	761 -
Stage 1	-	-	-	-	925 -
Stage 2	-	-	-	-	819 -

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	945	-	-	1355	-
HCM Lane V/C Ratio	0.114	-	-	0.032	-
HCM Control Delay (s)	9.3	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	82	1	16	39	18	4	5	50	12	2	3
Future Vol, veh/h	3	82	1	16	39	18	4	5	50	12	2	3
Conflicting Peds, #/hr	1	0	0	0	0	1	14	0	6	6	0	14
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	77	77	77	71	71	71	67	67	67
Heavy Vehicles, %	2	23	2	6	41	67	50	2	16	2	2	2
Mvmt Flow	3	84	1	21	51	23	6	7	70	18	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	75	0	0	85	0	0	213	208	91	241	197	78
Stage 1	-	-	-	-	-	-	91	91	-	106	106	-
Stage 2	-	-	-	-	-	-	122	117	-	135	91	-
Critical Hdwy	4.12	-	-	4.16	-	-	7.6	6.52	6.36	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.6	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.6	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.254	-	-	3.95	4.018	3.444	3.518	4.018	3.318
Pot Cap-1 Maneuver	1524	-	-	1487	-	-	652	689	929	713	699	983
Stage 1	-	-	-	-	-	-	810	820	-	900	807	-
Stage 2	-	-	-	-	-	-	779	799	-	868	820	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1523	-	-	1487	-	-	630	677	924	641	686	969
Mov Cap-2 Maneuver	-	-	-	-	-	-	630	677	-	641	686	-
Stage 1	-	-	-	-	-	-	808	818	-	897	794	-
Stage 2	-	-	-	-	-	-	751	786	-	789	818	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			1.6			9.6			10.4		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	870	1523	-	-	1487	-	-	687
HCM Lane V/C Ratio	0.096	0.002	-	-	0.014	-	-	0.037
HCM Control Delay (s)	9.6	7.4	0	-	7.5	0	-	10.4
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	136	135	670	900	1101	633
v/c Ratio	0.37	0.37	0.66	0.91	0.48	0.51
Control Delay	24.5	24.4	18.4	31.1	7.3	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	24.4	18.4	31.1	7.3	2.2
Queue Length 50th (ft)	49	49	105	300	97	0
Queue Length 95th (ft)	93	93	157	#615	177	36
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	511	513	1443	991	2891	1408
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.26	0.46	0.91	0.38	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background plus SMP 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↖	↖	↖↖		↑			↑↑	↖	
Traffic Volume (vph)	0	0	0	238	4	596	0	801	0	0	1002	576	
Future Volume (vph)	0	0	0	238	4	596	0	801	0	0	1002	576	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1681	1688	2787		1863			3539	1583	
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1681	1688	2787		1863			3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.91	0.91	0.91	
Adj. Flow (vph)	0	0	0	267	4	670	0	900	0	0	1101	633	
RTOR Reduction (vph)	0	0	0	0	0	75	0	0	0	0	0	221	
Lane Group Flow (vph)	0	0	0	136	135	595	0	900	0	0	1101	412	
Confl. Bikes (#/hr)									1				
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				14.5	14.5	22.4		35.1			43.0	43.0	
Effective Green, g (s)				14.5	14.5	22.4		35.1			43.0	43.0	
Actuated g/C Ratio				0.22	0.22	0.34		0.53			0.65	0.65	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				369	370	945		990			2305	1031	
v/s Ratio Prot								c0.48			0.31		
v/s Ratio Perm				0.08	0.08	c0.21						0.26	
v/c Ratio				0.37	0.36	0.63		0.91			0.48	0.40	
Uniform Delay, d1				21.9	21.8	18.3		14.0			5.8	5.4	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	1.0		11.6			0.1	0.1	
Delay (s)				22.1	22.1	19.3		25.6			5.9	5.5	
Level of Service				C	C	B		C			A	A	
Approach Delay (s)		0.0			20.1			25.6			5.7		
Approach LOS		A			C			C			A		
Intersection Summary													
HCM 2000 Control Delay			14.5		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.85										
Actuated Cycle Length (s)			66.0		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			70.3%		ICU Level of Service					C			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	493	445	947	391	814
v/c Ratio	0.57	0.49	0.59	0.44	0.48
Control Delay	13.9	6.9	7.7	2.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	6.9	7.7	2.6	6.8
Queue Length 50th (ft)	35	13	48	0	38
Queue Length 95th (ft)	76	40	113	30	83
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2842	2353	3285	1397	3456
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.19	0.29	0.28	0.24

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background plus SMP 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖↗					↕↔	↗		↕↕	
Traffic Volume (vph)	394	0	356	0	0	0	0	868	417	0	700	0
Future Volume (vph)	394	0	356	0	0	0	0	868	417	0	700	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frbp, ped/bikes	1.00		1.00					1.00	0.99		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					0.99	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2787					3365	1420		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2787					3365	1420		3539	
Peak-hour factor, PHF	0.80	0.80	0.80	0.92	0.92	0.92	0.96	0.96	0.96	0.86	0.86	0.86
Adj. Flow (vph)	492	0	445	0	0	0	0	904	434	0	814	0
RTOR Reduction (vph)	0	0	196	0	0	0	0	5	201	0	0	0
Lane Group Flow (vph)	493	0	249	0	0	0	0	942	190	0	814	0
Confl. Peds. (#/hr)									3			
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	8.1		8.1					15.2	15.2		15.2	
Effective Green, g (s)	8.1		8.1					15.2	15.2		15.2	
Actuated g/C Ratio	0.26		0.26					0.49	0.49		0.49	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	888		721					1634	689		1718	
v/s Ratio Prot								c0.28			0.23	
v/s Ratio Perm	c0.14		0.09						0.13			
v/c Ratio	0.56		0.35					0.58	0.28		0.47	
Uniform Delay, d1	10.0		9.4					5.8	4.8		5.4	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.4		0.1					0.3	0.1		0.1	
Delay (s)	10.5		9.5					6.1	4.9		5.5	
Level of Service	B		A					A	A		A	
Approach Delay (s)		10.0			0.0			5.7			5.5	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			31.3					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			51.1%					ICU Level of Service			A	
Analysis Period (min)			15									

c Critical Lane Group

Queues

Background plus SMP 39 & 40

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	180	82	4	237	391	5	95	434	109	352
v/c Ratio	0.29	0.06	0.03	0.32	0.28	0.04	0.21	0.46	0.28	0.22
Control Delay	32.0	17.3	39.2	24.6	2.1	39.0	25.2	27.2	16.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.0	17.3	39.2	24.6	2.1	39.0	25.2	27.2	16.9	0.3
Queue Length 50th (ft)	19	8	1	35	0	2	9	44	22	0
Queue Length 95th (ft)	59	35	15	104	27	12	23	136	91	0
Internal Link Dist (ft)		745		868			223		816	
Turn Bay Length (ft)	400		350			110		600		420
Base Capacity (vph)	1859	2327	403	2024	2578	328	1650	3891	967	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.04	0.01	0.12	0.15	0.02	0.06	0.11	0.11	0.22

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔	↑↑	↔↔	↔	↑↑↔		↔↔↔	↑	↔
Traffic Volume (veh/h)	142	65	0	4	216	356	3	61	2	386	97	313
Future Volume (veh/h)	142	65	0	4	216	356	3	61	2	386	97	313
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		1.00	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	1870	1870	1870	1530	1870	1826	1411	537	537	1752	685	1870
Adj Flow Rate, veh/h	180	82	0	4	237	391	5	92	3	434	109	0
Peak Hour Factor	0.79	0.79	0.79	0.91	0.91	0.91	0.66	0.66	0.66	0.89	0.89	0.89
Percent Heavy Veh, %	2	2	2	25	2	5	33	92	92	10	82	2
Cap, veh/h	493	1095	488	8	766	1004	7	160	5	734	178	
Arrive On Green	0.10	0.31	0.00	0.01	0.22	0.22	0.01	0.11	0.11	0.16	0.26	0.00
Sat Flow, veh/h	5023	3554	1585	1457	3554	2688	1344	1457	47	4705	685	1585
Grp Volume(v), veh/h	180	82	0	4	237	391	5	61	34	434	109	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1585	1457	1777	1344	1344	488	528	1568	685	1585
Q Serve(g_s), s	1.5	0.7	0.0	0.1	2.6	4.9	0.2	2.7	2.8	3.9	6.4	0.0
Cycle Q Clear(g_c), s	1.5	0.7	0.0	0.1	2.6	4.9	0.2	2.7	2.8	3.9	6.4	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	493	1095	488	8	766	1004	7	107	58	734	178	
V/C Ratio(X)	0.37	0.07	0.00	0.51	0.31	0.39	0.69	0.57	0.58	0.59	0.61	
Avail Cap(c_a), veh/h	2192	2768	1234	477	2380	2225	381	703	380	5132	1056	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	19.3	11.2	0.0	22.7	15.1	10.6	22.8	19.4	19.4	18.0	14.9	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	17.5	0.2	0.2	35.6	3.6	6.7	0.6	2.5	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.2	0.0	0.1	0.8	1.1	0.1	0.3	0.4	1.2	0.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	11.3	0.0	40.2	15.3	10.8	58.4	23.0	26.1	18.6	17.4	0.0
LnGrp LOS	B	B	A	D	B	B	E	C	C	B	B	
Approach Vol, veh/h		262			632			100			543	A
Approach Delay, s/veh		16.9			12.7			25.8			18.3	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.5	15.2	11.1	11.0	4.2	19.4	4.2	17.9				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	3.5	6.9	5.9	4.8	2.1	2.7	2.2	8.4				
Green Ext Time (p_c), s	0.3	3.0	1.2	0.4	0.0	0.4	0.0	0.5				

Intersection Summary

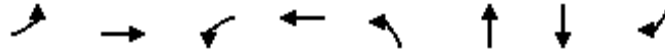
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Notes

- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- User approved changes to right turn type.
- Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	55	391	14	720	9	8	14	16
v/c Ratio	0.03	0.11	0.02	0.16	0.01	0.01	0.02	0.01
Control Delay	23.0	9.5	29.1	12.2	17.7	15.0	27.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	9.5	29.1	12.2	17.7	15.0	27.6	0.0
Queue Length 50th (ft)	0	0	1	0	0	0	0	0
Queue Length 95th (ft)	38	101	28	132	12	9	20	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2613	4157	1199	5281	1135	1149	1076	2034
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.09	0.01	0.14	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: AM Peak



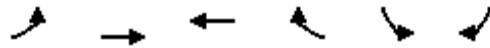
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	378	1	12	586	12	8	1	3	6	3	10
Future Volume (vph)	53	378	1	12	586	12	8	1	3	6	3	10
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	4661		1671	6327		1517	1534			1500	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	4661		1671	6327		1517	1534			1500	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.83	0.83	0.83	0.69	0.69	0.69	0.64	0.64	0.64
Adj. Flow (vph)	55	390	1	14	706	14	12	1	4	9	5	16
RTOR Reduction (vph)	0	0	0	0	2	0	0	4	0	0	0	15
Lane Group Flow (vph)	55	391	0	14	718	0	9	4	0	0	14	1
Confl. Peds. (#/hr)			2			2			2			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	4%	11%	100%	8%	3%	2%	13%	2%	2%	17%	33%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	2.9	22.9		0.7	20.7		2.8	2.8			2.6	2.6
Effective Green, g (s)	2.9	22.9		0.7	20.7		2.8	2.8			2.6	2.6
Actuated g/C Ratio	0.06	0.49		0.02	0.45		0.06	0.06			0.06	0.06
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	210	2305		25	2828		91	92			84	156
v/s Ratio Prot	c0.02	0.08		0.01	c0.11		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.26	0.17		0.56	0.25		0.10	0.05			0.17	0.01
Uniform Delay, d1	20.7	6.5		22.6	8.0		20.6	20.5			20.8	20.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.0		15.9	0.0		0.3	0.2			0.3	0.0
Delay (s)	21.2	6.5		38.6	8.0		20.9	20.6			21.2	20.6
Level of Service	C	A		D	A		C	C			C	C
Approach Delay (s)		8.3			8.6			20.8			20.9	
Approach LOS		A			A			C			C	

Intersection Summary

HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	46.3	Sum of lost time (s)	17.3
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	57	386	723	40	10	38
v/c Ratio	0.04	0.14	0.33	0.04	0.01	0.03
Control Delay	14.7	2.6	9.5	4.8	16.0	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	2.6	9.5	4.8	16.0	7.5
Queue Length 50th (ft)	3	0	44	0	1	0
Queue Length 95th (ft)	19	34	117	12	11	9
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2546	3223	3304	1490	1192	1889
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.12	0.22	0.03	0.01	0.02

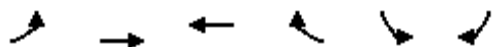
Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	340	586	32	8	30
Future Volume (veh/h)	50	340	586	32	8	30
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1722	1841	1870	1870	1870
Adj Flow Rate, veh/h	57	386	723	40	10	38
Peak Hour Factor	0.88	0.88	0.81	0.81	0.80	0.80
Percent Heavy Veh, %	2	12	4	2	2	2
Cap, veh/h	432	1936	1182	524	194	304
Arrive On Green	0.13	0.59	0.34	0.34	0.11	0.11
Sat Flow, veh/h	3456	3358	3589	1550	1781	2790
Grp Volume(v), veh/h	57	386	723	40	10	38
Grp Sat Flow(s),veh/h/ln	1728	1636	1749	1550	1781	1395
Q Serve(g_s), s	0.5	1.7	5.4	0.5	0.2	0.4
Cycle Q Clear(g_c), s	0.5	1.7	5.4	0.5	0.2	0.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	432	1936	1182	524	194	304
V/C Ratio(X)	0.13	0.20	0.61	0.08	0.05	0.12
Avail Cap(c_a), veh/h	2778	4209	5061	2243	1146	1794
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.1	2.9	8.6	7.0	12.4	12.5
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	1.0	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.2	3.0	8.8	7.0	12.4	12.6
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		443	763		48	
Approach Delay, s/veh		4.1	8.7		12.5	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	7.9	15.8			23.7	7.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.5	7.4			3.7	2.4
Green Ext Time (p_c), s	0.1	3.2			1.5	0.1

Intersection Summary

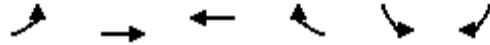
HCM 6th Ctrl Delay	7.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues

4: W Jack London Blvd & Wolf House Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	3	383	705	18	44	52
v/c Ratio	0.01	0.38	0.60	0.02	0.09	0.11
Control Delay	21.7	5.9	11.0	5.2	20.9	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	5.9	11.0	5.2	20.9	9.1
Queue Length 50th (ft)	1	46	107	1	9	0
Queue Length 95th (ft)	9	75	301	10	25	7
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1240	1696	1685	1425	945	869
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.23	0.42	0.01	0.05	0.06

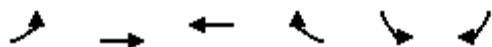
Intersection Summary

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	345	592	15	22	26
Future Volume (veh/h)	3	345	592	15	22	26
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1722	1841	1870	1870	1870
Adj Flow Rate, veh/h	3	383	705	18	44	52
Peak Hour Factor	0.90	0.90	0.84	0.84	0.50	0.50
Percent Heavy Veh, %	2	12	4	2	2	2
Cap, veh/h	15	999	855	719	302	268
Arrive On Green	0.01	0.58	0.46	0.46	0.17	0.17
Sat Flow, veh/h	1781	1722	1841	1549	1781	1585
Grp Volume(v), veh/h	3	383	705	18	44	52
Grp Sat Flow(s),veh/h/ln	1781	1722	1841	1549	1781	1585
Q Serve(g_s), s	0.1	4.5	12.3	0.2	0.8	1.0
Cycle Q Clear(g_c), s	0.1	4.5	12.3	0.2	0.8	1.0
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	15	999	855	719	302	268
V/C Ratio(X)	0.21	0.38	0.82	0.03	0.15	0.19
Avail Cap(c_a), veh/h	1439	2087	2231	1878	960	854
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	18.3	4.2	8.6	5.4	13.1	13.2
Incr Delay (d2), s/veh	5.0	0.1	0.8	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.4	2.4	0.0	0.3	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	23.3	4.3	9.4	5.4	13.2	13.4
LnGrp LOS	C	A	A	A	B	B
Approach Vol, veh/h		386	723		96	
Approach Delay, s/veh		4.4	9.3		13.3	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	22.5			26.8	10.3
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	14.3			6.5	3.0
Green Ext Time (p_c), s	0.0	2.9			1.3	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
 5: SMP 39 West Dwy/Ambassador Dwy & W Jack London Blvd

Background plus SMP 39 & 40
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	258	99	134	579	0	30	0	43	0	0	1
Future Vol, veh/h	2	258	99	134	579	0	30	0	43	0	0	1
Conflicting Peds, #/hr	0	0	0	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	180	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	92	92	86	86	92	92	92	25	92	25
Heavy Vehicles, %	50	9	17	16	3	2	17	2	19	2	2	100
Mvmt Flow	2	315	108	146	673	0	33	0	47	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	673	0	0	423	0	0	1340	1338	369	1362	1392	673
Stage 1	-	-	-	-	-	-	373	373	-	965	965	-
Stage 2	-	-	-	-	-	-	967	965	-	397	427	-
Critical Hdwy	4.6	-	-	4.26	-	-	7.27	6.52	6.39	7.12	6.52	7.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.27	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.27	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.65	-	-	2.344	-	-	3.653	4.018	3.471	3.518	4.018	4.2
Pot Cap-1 Maneuver	729	-	-	1065	-	-	120	153	640	125	142	322
Stage 1	-	-	-	-	-	-	618	618	-	306	333	-
Stage 2	-	-	-	-	-	-	287	333	-	629	585	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	729	-	-	1065	-	-	98	119	640	96	111	322
Mov Cap-2 Maneuver	-	-	-	-	-	-	98	119	-	96	111	-
Stage 1	-	-	-	-	-	-	616	616	-	305	260	-
Stage 2	-	-	-	-	-	-	221	260	-	581	583	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.6			35.3			16.3		
HCM LOS							E			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	196	729	-	-	1065	-	-	322
HCM Lane V/C Ratio	0.405	0.003	-	-	0.137	-	-	0.012
HCM Control Delay (s)	35.3	10	-	-	8.9	0	-	16.3
HCM Lane LOS	E	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	1.8	0	-	-	0.5	-	-	0

HCM 6th TWSC
6: SMP 39 East Dwy/Airport Dwy & W Jack London Blvd

Background plus SMP 39 & 40
Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕			↕			↕	
Traffic Vol, veh/h	2	200	100	136	687	1	33	0	43	3	0	0
Future Vol, veh/h	2	200	100	136	687	1	33	0	43	3	0	0
Conflicting Peds, #/hr	0	0	0	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	300	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	92	92	86	86	92	92	92	75	92	75
Heavy Vehicles, %	2	7	18	16	5	100	18	2	14	33	2	2
Mvmt Flow	3	253	109	148	799	1	36	0	47	4	0	0

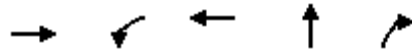
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	800	0	0	362	0	0	1410	1410	308	1433	1464	800
Stage 1	-	-	-	-	-	-	314	314	-	1096	1096	-
Stage 2	-	-	-	-	-	-	1096	1096	-	337	368	-
Critical Hdwy	4.12	-	-	4.26	-	-	7.28	6.52	6.34	7.43	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.28	5.52	-	6.43	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.28	5.52	-	6.43	5.52	-
Follow-up Hdwy	2.218	-	-	2.344	-	-	3.662	4.018	3.426	3.797	4.018	3.318
Pot Cap-1 Maneuver	823	-	-	1123	-	-	107	138	705	96	128	385
Stage 1	-	-	-	-	-	-	664	656	-	226	289	-
Stage 2	-	-	-	-	-	-	241	289	-	617	621	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	823	-	-	1123	-	-	87	105	705	73	97	385
Mov Cap-2 Maneuver	-	-	-	-	-	-	87	105	-	73	97	-
Stage 1	-	-	-	-	-	-	661	653	-	225	221	-
Stage 2	-	-	-	-	-	-	184	221	-	574	619	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.4			43.5			57.2		
HCM LOS							E			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	173	823	-	-	1123	-	-	73
HCM Lane V/C Ratio	0.478	0.003	-	-	0.132	-	-	0.055
HCM Control Delay (s)	43.5	9.4	-	-	8.7	0	-	57.2
HCM Lane LOS	E	A	-	-	A	A	-	F
HCM 95th %tile Q(veh)	2.3	0	-	-	0.5	-	-	0.2

Queues

7: Discovery Dr & W Jack London Blvd



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	288	20	926	22	13
v/c Ratio	0.11	0.03	0.33	0.03	0.02
Control Delay	4.7	14.8	3.3	13.9	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	14.8	3.3	13.9	0.1
Queue Length 50th (ft)	0	1	0	1	0
Queue Length 95th (ft)	43	21	79	19	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	2907	1333	3406	1210	873
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.02	0.27	0.02	0.01

Intersection Summary

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	226	19	17	806	0	17	0	10	0	0	0
Future Volume (veh/h)	0	226	19	17	806	0	17	0	10	0	0	0
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		1.00	1.00		1.00	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	0	1767	1767	1604	1811	0	1870	1870	1159	1870	1870	1870
Adj Flow Rate, veh/h	0	266	22	20	926	0	22	0	13	0	0	0
Peak Hour Factor	0.85	0.85	0.85	0.87	0.87	0.87	0.78	0.78	0.78	0.25	0.25	0.25
Percent Heavy Veh, %	0	9	9	20	6	0	2	2	50	2	2	2
Cap, veh/h	0	1043	86	64	1853	0	139	0	77	0	8	0
Arrive On Green	0.00	0.33	0.33	0.04	0.54	0.00	0.08	0.00	0.08	0.00	0.00	0.00
Sat Flow, veh/h	0	3228	258	1527	3532	0	1781	0	982	0	1870	0
Grp Volume(v), veh/h	0	141	147	20	926	0	22	0	13	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1678	1720	1527	1721	0	1781	0	982	0	1870	0
Q Serve(g_s), s	0.0	1.5	1.5	0.3	4.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.5	1.5	0.3	4.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Prop In Lane	0.00		0.15	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	557	571	64	1853	0	139	0	77	0	8	0
V/C Ratio(X)	0.00	0.25	0.26	0.31	0.50	0.00	0.16	0.00	0.17	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2076	2127	1889	4257	0	1469	0	810	0	925	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.9	5.9	11.3	3.5	0.0	10.4	0.0	10.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.2	1.0	0.2	0.0	0.2	0.0	0.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.1	6.1	12.3	3.7	0.0	10.6	0.0	10.8	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		288			946			35				0
Approach Delay, s/veh		6.1			3.9			10.7				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.0	13.4		0.0		18.4		5.9				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	3.5		0.0		6.1		2.3				
Green Ext Time (p_c), s	0.0	1.2		0.0		5.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	313	60	971	13	57
v/c Ratio	0.01	0.16	0.14	0.40	0.04	0.14
Control Delay	18.5	9.2	16.9	6.0	17.7	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	9.2	16.9	6.0	17.7	0.7
Queue Length 50th (ft)	1	29	10	56	2	0
Queue Length 95th (ft)	6	43	43	141	13	0
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	830	2892	889	3239	868	788
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.11	0.07	0.30	0.01	0.07
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	2	233	8	50	806	0	9	0	41	0	0	0
Future Volume (veh/h)	2	233	8	50	806	0	9	0	41	0	0	0
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		1.00	1.00		1.00	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	1870	1752	1752	1337	1811	1811	1870	1870	996	1870	1870	1870
Adj Flow Rate, veh/h	3	303	10	60	971	0	12	0	57	0	0	0
Peak Hour Factor	0.77	0.77	0.77	0.83	0.83	0.83	0.72	0.72	0.72	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	38	6	6	2	2	61	2	2	2
Cap, veh/h	10	1176	39	132	1569	0	205	0	97	0	6	0
Arrive On Green	0.01	0.36	0.36	0.10	0.46	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3286	108	1273	3532	0	1781	0	844	0	1870	0
Grp Volume(v), veh/h	3	153	160	60	971	0	12	0	57	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1664	1729	1273	1721	0	1781	0	844	0	1870	0
Q Serve(g_s), s	0.1	2.0	2.1	1.4	6.7	0.0	0.2	0.0	2.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	2.0	2.1	1.4	6.7	0.0	0.2	0.0	2.0	0.0	0.0	0.0
Prop In Lane	1.00		0.06	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	596	619	132	1569	0	205	0	97	0	6	0
V/C Ratio(X)	0.29	0.26	0.26	0.45	0.62	0.00	0.06	0.00	0.59	0.00	0.00	0.00
Avail Cap(c_a), veh/h	680	1853	1925	810	3831	0	1417	0	671	0	714	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	15.6	7.1	7.1	13.2	6.5	0.0	12.4	0.0	13.2	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.2	0.2	0.9	0.3	0.0	0.0	0.0	2.1	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.4	0.4	0.3	0.9	0.0	0.1	0.0	0.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	7.3	7.3	14.2	6.8	0.0	12.4	0.0	15.3	0.0	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		316			1031			69				0
Approach Delay, s/veh		7.4			7.2			14.8				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.3	16.6		0.0	4.2	19.6		7.6				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.4	4.1		0.0	2.1	8.7		4.0				
Green Ext Time (p_c), s	0.0	1.3		0.0	0.0	5.6		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	105	135	94	181	423	390	318	1556	177	228	1537	253
v/c Ratio	0.38	0.15	0.21	0.45	0.87	0.62	0.78	0.87	0.26	0.67	0.92	0.44
Control Delay	68.4	42.1	3.1	66.4	70.0	31.9	75.7	47.4	8.5	74.6	54.1	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.4	42.1	3.1	66.4	70.0	31.9	75.7	47.4	8.5	74.6	54.1	16.7
Queue Length 50th (ft)	46	51	0	81	377	230	147	467	18	106	487	64
Queue Length 95th (ft)	88	82	8	144	551	362	220	560	59	174	618	148
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	275	1404	618	500	814	638	472	2404	867	375	2253	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.10	0.15	0.36	0.52	0.61	0.67	0.65	0.20	0.61	0.68	0.35

Intersection Summary

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39 & 40
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖	↖↗	↕	↖	↖↗	↕↖↗	↖	↖↗	↕↖↗	↖
Traffic Volume (veh/h)	88	113	79	159	372	343	261	1276	145	196	1322	218
Future Volume (veh/h)	88	113	79	159	372	343	261	1276	145	196	1322	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		0.99	1.00		1.00	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	1322	1856	1633	1870	1870	1870	1781	1752	1870	1870	1767	1618
Adj Flow Rate, veh/h	105	135	94	181	423	390	318	1556	177	228	1537	253
Peak Hour Factor	0.84	0.84	0.84	0.88	0.88	0.88	0.82	0.82	0.82	0.86	0.86	0.86
Percent Heavy Veh, %	39	3	18	2	2	2	8	10	2	2	9	19
Cap, veh/h	299	807	312	465	451	550	388	1675	555	378	1648	469
Arrive On Green	0.12	0.23	0.23	0.13	0.24	0.24	0.12	0.35	0.35	0.11	0.34	0.34
Sat Flow, veh/h	2443	3526	1364	3456	1870	1565	3291	4782	1584	3456	4823	1372
Grp Volume(v), veh/h	105	135	94	181	423	390	318	1556	177	228	1537	253
Grp Sat Flow(s),veh/h/ln	1221	1763	1364	1728	1870	1565	1646	1594	1584	1728	1608	1372
Q Serve(g_s), s	4.7	3.6	6.8	5.7	26.3	25.6	11.2	37.2	9.7	7.5	36.5	17.7
Cycle Q Clear(g_c), s	4.7	3.6	6.8	5.7	26.3	25.6	11.2	37.2	9.7	7.5	36.5	17.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	299	807	312	465	451	550	388	1675	555	378	1648	469
V/C Ratio(X)	0.35	0.17	0.30	0.39	0.94	0.71	0.82	0.93	0.32	0.60	0.93	0.54
Avail Cap(c_a), veh/h	309	807	312	582	946	965	555	2821	934	437	2235	636
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	47.8	36.7	37.9	46.9	44.2	33.4	51.1	37.1	28.2	50.4	37.7	31.5
Incr Delay (d2), s/veh	0.3	0.0	0.2	0.2	4.2	0.6	4.3	2.3	0.1	0.9	5.4	0.4
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	1.4	1.5	2.2	2.4	12.3	9.4	4.7	13.9	3.6	3.2	14.5	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.0	36.7	38.1	47.1	48.4	34.0	55.4	39.4	28.3	51.2	43.2	31.9
LnGrp LOS	D	D	D	D	D	C	E	D	C	D	D	C
Approach Vol, veh/h		334			994			2051			2018	
Approach Delay, s/veh		40.7			42.5			40.9			42.7	
Approach LOS		D			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	47.4	20.7	33.0	18.7	46.4	19.2	34.4				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	9.5	39.2	7.7	8.8	13.2	38.5	6.7	28.3				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.1	0.0	1.9	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	41.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	57	44	39	1946	1757	101
v/c Ratio	0.17	0.16	0.10	0.54	0.55	0.11
Control Delay	24.7	10.4	23.8	4.7	8.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	10.4	23.8	4.7	8.7	3.6
Queue Length 50th (ft)	8	0	5	99	83	2
Queue Length 95th (ft)	19	9	17	113	201	22
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1194	893	1376	4769	3235	902
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.03	0.41	0.54	0.11
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↖	↖↖	↖↖	↑↑↑	↓↓↓	↘
Traffic Volume (veh/h)	41	32	33	1635	1476	85
Future Volume (veh/h)	41	32	33	1635	1476	85
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1470	1248	1722	1781	1781	1544
Adj Flow Rate, veh/h	57	44	39	1946	1757	101
Peak Hour Factor	0.72	0.72	0.84	0.84	0.84	0.84
Percent Heavy Veh, %	29	44	12	8	8	24
Cap, veh/h	315	216	194	3028	2065	556
Arrive On Green	0.12	0.12	0.06	0.62	0.42	0.42
Sat Flow, veh/h	2716	1861	3182	5024	5024	1309
Grp Volume(v), veh/h	57	44	39	1946	1757	101
Grp Sat Flow(s),veh/h/ln	1358	931	1591	1621	1621	1309
Q Serve(g_s), s	0.8	0.9	0.5	10.5	13.6	2.0
Cycle Q Clear(g_c), s	0.8	0.9	0.5	10.5	13.6	2.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	315	216	194	3028	2065	556
V/C Ratio(X)	0.18	0.20	0.20	0.64	0.85	0.18
Avail Cap(c_a), veh/h	1630	1117	1909	3502	3502	942
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	16.6	16.7	18.6	4.9	10.8	7.5
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.2	0.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.5	0.1	0.7	2.7	0.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.7	16.8	18.8	5.1	11.2	7.5
LnGrp LOS	B	B	B	A	B	A
Approach Vol, veh/h				1985	1858	
Approach Delay, s/veh				5.4	11.0	
Approach LOS				A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		32.1		9.5	8.2	23.9
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		12.5		2.9	2.5	15.6
Green Ext Time (p_c), s		2.6		0.0	0.0	2.1

Intersection Summary

HCM 6th Ctrl Delay	8.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Background plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	93	489	1450	169	543	1213
v/c Ratio	0.16	0.82	0.70	0.09	0.60	0.54
Control Delay	27.2	18.5	20.8	2.8	32.0	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	18.5	20.8	2.8	32.0	7.8
Queue Length 50th (ft)	19	38	182	7	84	114
Queue Length 95th (ft)	37	110	317	18	131	242
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1158	795	2314	2310	1334	2677
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.62	0.63	0.07	0.41	0.45
Intersection Summary						

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	77	406	1247	145	467	1043
Future Volume (veh/h)	77	406	1247	145	467	1043
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1826	1826	1767	1811	1811	1752
Adj Flow Rate, veh/h	93	489	1450	169	543	1213
Peak Hour Factor	0.83	0.83	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	5	5	9	6	6	10
Cap, veh/h	999	458	1854	1839	718	1948
Arrive On Green	0.30	0.30	0.38	0.38	0.15	0.59
Sat Flow, veh/h	3374	1547	4982	2701	4864	3416
Grp Volume(v), veh/h	93	489	1450	169	543	1213
Grp Sat Flow(s),veh/h/ln	1687	1547	1608	1351	1621	1664
Q Serve(g_s), s	1.7	25.0	22.3	1.8	9.0	20.1
Cycle Q Clear(g_c), s	1.7	25.0	22.3	1.8	9.0	20.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	999	458	1854	1839	718	1948
V/C Ratio(X)	0.09	1.07	0.78	0.09	0.76	0.62
Avail Cap(c_a), veh/h	999	458	2000	1920	1153	1948
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.5	29.7	22.9	4.6	34.5	11.4
Incr Delay (d2), s/veh	0.0	61.0	2.1	0.0	1.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	16.5	7.7	0.4	3.4	5.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.5	90.7	25.0	4.6	36.2	12.1
LnGrp LOS	C	F	C	A	D	B
Approach Vol, veh/h	582		1619			1756
Approach Delay, s/veh	79.6		22.9			19.6
Approach LOS	E		C			B
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	17.0	37.9			54.9	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	11.0	24.3			22.1	27.0
Green Ext Time (p_c), s	1.4	8.1			8.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	29.7
HCM 6th LOS	C

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Background plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	5	79	157	69	93	147	190	1566	26	242	1839
v/c Ratio	0.02	0.27	0.26	0.26	0.17	0.22	0.81	0.78	0.03	0.60	0.94
Control Delay	45.0	40.4	4.6	48.0	28.4	3.9	72.2	32.6	0.1	53.6	43.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	40.4	4.6	48.0	28.4	3.9	72.2	32.6	0.1	53.6	43.3
Queue Length 50th (ft)	3	48	0	41	43	0	124	333	0	80	~483
Queue Length 95th (ft)	16	86	35	101	98	34	#328	#652	0	#157	#828
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	302	424	636	270	616	695	261	2036	759	458	1959
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.19	0.25	0.26	0.15	0.21	0.73	0.77	0.03	0.53	0.94

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	4	69	137	60	81	128	173	1425	24	215	1619	18
Future Volume (veh/h)	4	69	137	60	81	128	173	1425	24	215	1619	18
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		1.00	1.00		1.00	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	1870	1559	1870	1796	1841	1663	1856	1737	1870	1811	1752	1752
Adj Flow Rate, veh/h	5	79	157	69	93	147	190	1566	26	242	1819	20
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.91	0.91	0.91	0.89	0.89	0.89
Percent Heavy Veh, %	2	23	2	7	4	16	3	11	2	6	10	10
Cap, veh/h	37	220	421	220	458	506	221	1908	638	370	1892	21
Arrive On Green	0.02	0.14	0.14	0.13	0.25	0.25	0.12	0.40	0.40	0.11	0.39	0.39
Sat Flow, veh/h	1781	1559	1585	1711	1841	1409	1767	4742	1585	3346	4877	54
Grp Volume(v), veh/h	5	79	157	69	93	147	190	1566	26	242	1189	650
Grp Sat Flow(s),veh/h/ln	1781	1559	1585	1711	1841	1409	1767	1581	1585	1673	1594	1742
Q Serve(g_s), s	0.3	4.6	8.0	3.6	4.0	7.4	10.5	29.3	1.0	6.9	36.1	36.2
Cycle Q Clear(g_c), s	0.3	4.6	8.0	3.6	4.0	7.4	10.5	29.3	1.0	6.9	36.1	36.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	37	220	421	220	458	506	221	1908	638	370	1237	676
V/C Ratio(X)	0.14	0.36	0.37	0.31	0.20	0.29	0.86	0.82	0.04	0.65	0.96	0.96
Avail Cap(c_a), veh/h	287	361	565	258	458	506	249	1908	638	438	1253	684
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	47.7	38.6	29.7	39.3	29.5	22.8	42.6	26.5	18.0	42.3	29.6	29.6
Incr Delay (d2), s/veh	0.6	0.4	0.2	0.3	0.1	0.1	21.1	2.8	0.0	1.6	16.7	24.8
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	0.1	1.7	3.0	1.5	1.7	0.0	5.7	10.6	0.3	2.8	15.5	18.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.3	39.0	29.9	39.6	29.6	22.9	63.7	29.3	18.0	43.9	46.3	54.4
LnGrp LOS	D	D	C	D	C	C	E	C	B	D	D	D
Approach Vol, veh/h		241			309			1782			2081	
Approach Delay, s/veh		33.3			28.6			32.8			48.6	
Approach LOS		C			C			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	45.7	17.8	19.8	17.4	44.3	7.1	30.5				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	8.9	31.3	5.6	10.0	12.5	38.2	2.3	9.4				
Green Ext Time (p_c), s	0.0	1.8	0.0	0.0	0.0	0.4	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	40.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5.9					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	22	6	50	13	5	36
Future Vol, veh/h	22	6	50	13	5	36
Conflicting Peds, #/hr	0	3	3	0	4	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	69	69	60	60	68	68
Heavy Vehicles, %	5	33	27	23	20	58
Mvmt Flow	32	9	83	22	7	53

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	44	0	232 42
Stage 1	-	-	-	-	40 -
Stage 2	-	-	-	-	192 -
Critical Hdwy	-	-	4.37	-	6.6 6.78
Critical Hdwy Stg 1	-	-	-	-	5.6 -
Critical Hdwy Stg 2	-	-	-	-	5.6 -
Follow-up Hdwy	-	-	2.443	-	3.68 3.822
Pot Cap-1 Maneuver	-	-	1418	-	718 890
Stage 1	-	-	-	-	938 -
Stage 2	-	-	-	-	799 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1414	-	671 886
Mov Cap-2 Maneuver	-	-	-	-	671 -
Stage 1	-	-	-	-	935 -
Stage 2	-	-	-	-	749 -

Approach	EB	WB	NB
HCM Control Delay, s	0	6.1	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	853	-	-	1414	-
HCM Lane V/C Ratio	0.071	-	-	0.059	-
HCM Control Delay (s)	9.5	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.2	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Background plus SMP 39 & 40
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	47	9	47	54	13	7	0	23	4	0	3
Future Vol, veh/h	4	47	9	47	54	13	7	0	23	4	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	11	11	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	69	69	69	72	72	72	75	75	75	44	44	44
Heavy Vehicles, %	25	45	11	19	28	31	33	2	26	2	2	2
Mvmt Flow	6	68	13	65	75	18	9	0	31	9	0	7

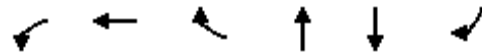
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	93	0	0	81	0	0	305	310	86	327	307	84
Stage 1	-	-	-	-	-	-	87	87	-	214	214	-
Stage 2	-	-	-	-	-	-	218	223	-	113	93	-
Critical Hdwy	4.35	-	-	4.29	-	-	7.43	6.52	6.46	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.425	-	-	2.371	-	-	3.797	4.018	3.534	3.518	4.018	3.318
Pot Cap-1 Maneuver	1369	-	-	1416	-	-	591	605	910	626	607	975
Stage 1	-	-	-	-	-	-	849	823	-	788	725	-
Stage 2	-	-	-	-	-	-	719	719	-	892	818	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1369	-	-	1416	-	-	563	572	900	574	574	975
Mov Cap-2 Maneuver	-	-	-	-	-	-	563	572	-	574	574	-
Stage 1	-	-	-	-	-	-	845	819	-	784	689	-
Stage 2	-	-	-	-	-	-	679	684	-	848	814	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			3.2			9.8			10.3		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	790	1369	-	-	1416	-	-	697
HCM Lane V/C Ratio	0.051	0.004	-	-	0.046	-	-	0.023
HCM Control Delay (s)	9.8	7.6	0	-	7.7	0	-	10.3
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	98	100	547	815	733	703
v/c Ratio	0.35	0.35	0.59	0.78	0.30	0.54
Control Delay	25.2	25.2	15.6	19.2	4.8	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	25.2	15.6	19.2	4.8	2.3
Queue Length 50th (ft)	33	34	67	207	43	0
Queue Length 95th (ft)	72	73	116	#375	82	17
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	521	531	1371	1061	3095	1456
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.19	0.40	0.77	0.24	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↙	↖	↗		↑			↕	↘	
Traffic Volume (vph)	0	0	0	163	21	509	0	668	0	0	586	562	
Future Volume (vph)	0	0	0	163	21	509	0	668	0	0	586	562	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1631	2707		1863			3539	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1631	2707		1863			3539	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.82	0.82	0.82	0.80	0.80	0.80	
Adj. Flow (vph)	0	0	0	175	23	547	0	815	0	0	732	702	
RTOR Reduction (vph)	0	0	0	0	0	105	0	0	0	0	0	221	
Lane Group Flow (vph)	0	0	0	98	100	442	0	815	0	0	733	482	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	5%	5%	2%	2%	2%	2%	2%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				10.9	10.9	18.6		34.5			42.2	42.2	
Effective Green, g (s)				10.9	10.9	18.6		34.5			42.2	42.2	
Actuated g/C Ratio				0.18	0.18	0.30		0.56			0.69	0.69	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				283	288	817		1043			2424	1071	
v/s Ratio Prot								c0.44			0.21		
v/s Ratio Perm				0.06	0.06	c0.16						0.31	
v/c Ratio				0.35	0.35	0.54		0.78			0.30	0.45	
Uniform Delay, d1				22.2	22.2	17.9		10.6			3.9	4.4	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.3	0.3	0.4		3.6			0.0	0.1	
Delay (s)				22.5	22.5	18.3		14.2			3.9	4.5	
Level of Service				C	C	B		B			A	A	
Approach Delay (s)		0.0			19.4			14.2			4.2		
Approach LOS		A			B			B			A		
Intersection Summary													
HCM 2000 Control Delay			10.7		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.75										
Actuated Cycle Length (s)			61.6		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			60.3%		ICU Level of Service					B			
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp
























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	520	458	491	95	428
v/c Ratio	0.57	0.50	0.40	0.15	0.30
Control Delay	10.5	3.0	6.6	2.4	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	3.0	6.6	2.4	5.9
Queue Length 50th (ft)	26	0	18	0	14
Queue Length 95th (ft)	44	13	42	12	34
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3393	2200	3003	1386	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.21	0.16	0.07	0.12

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background plus SMP 39 & 40

Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					 			 	
Traffic Volume (vph)	458	0	403	0	0	0	0	461	102	0	394	0
Future Volume (vph)	458	0	403	0	0	0	0	461	102	0	394	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3002	1386		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3002	1386		3505	
Peak-hour factor, PHF	0.88	0.88	0.88	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	520	0	458	0	0	0	0	480	106	0	428	0
RTOR Reduction (vph)	0	0	337	0	0	0	0	2	56	0	0	0
Lane Group Flow (vph)	520	0	121	0	0	0	0	489	39	0	428	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	6%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	6.5		6.5					10.1	10.1		10.1	
Effective Green, g (s)	6.5		6.5					10.1	10.1		10.1	
Actuated g/C Ratio	0.26		0.26					0.41	0.41		0.41	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	907		586					1232	569		1439	
v/s Ratio Prot								c0.16			0.12	
v/s Ratio Perm	c0.15		0.05						0.03			
v/c Ratio	0.57		0.21					0.40	0.07		0.30	
Uniform Delay, d1	7.8		7.0					5.1	4.4		4.9	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.5		0.1					0.1	0.0		0.0	
Delay (s)	8.4		7.1					5.2	4.4		4.9	
Level of Service	A		A					A	A		A	
Approach Delay (s)		7.8			0.0			5.1			4.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.4					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.47									
Actuated Cycle Length (s)			24.6					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			33.6%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	561	391	10	17	235	929	14	59	828	23	376
v/c Ratio	0.63	0.27	0.01	0.12	0.34	0.52	0.11	0.10	0.59	0.04	0.24
Control Delay	37.4	21.1	0.0	48.2	33.9	3.0	48.5	27.6	28.8	15.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.4	21.1	0.0	48.2	33.9	3.0	48.5	27.6	28.8	15.7	0.4
Queue Length 50th (ft)	85	57	0	7	48	9	6	6	115	6	0
Queue Length 95th (ft)	204	192	0	40	135	60	26	16	263	26	0
Internal Link Dist (ft)		745			868			219		816	
Turn Bay Length (ft)	400		305	350			110		600		420
Base Capacity (vph)	1410	1503	722	375	1014	2492	324	1693	3369	1284	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.26	0.01	0.05	0.23	0.37	0.04	0.03	0.25	0.02	0.24

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔	↑↑	↔↔	↔	↑↑↔		↔↔↔	↑	↔
Traffic Volume (veh/h)	527	368	9	16	226	892	10	30	11	762	21	346
Future Volume (veh/h)	527	368	9	16	226	892	10	30	11	762	21	346
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		0.99	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	1870	1870	1870	1870	1870	1841	1870	1796	1796	1856	1618	1870
Adj Flow Rate, veh/h	561	391	10	17	235	929	14	43	16	828	23	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.69	0.69	0.69	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	4	2	7	7	3	19	2
Cap, veh/h	749	1475	654	36	1017	1379	24	251	83	1095	445	
Arrive On Green	0.15	0.42	0.42	0.02	0.29	0.29	0.01	0.07	0.07	0.22	0.28	0.00
Sat Flow, veh/h	5023	3554	1576	1781	3554	2710	1781	3627	1203	4983	1618	1585
Grp Volume(v), veh/h	561	391	10	17	235	929	14	38	21	828	23	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1576	1781	1777	1355	1781	1635	1562	1661	1618	1585
Q Serve(g_s), s	7.5	5.1	0.3	0.7	3.5	18.0	0.5	0.8	0.9	10.9	0.7	0.0
Cycle Q Clear(g_c), s	7.5	5.1	0.3	0.7	3.5	18.0	0.5	0.8	0.9	10.9	0.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.77	1.00		1.00
Lane Grp Cap(c), veh/h	749	1475	654	36	1017	1379	24	226	108	1095	445	
V/C Ratio(X)	0.75	0.27	0.02	0.47	0.23	0.67	0.58	0.17	0.19	0.76	0.05	
Avail Cap(c_a), veh/h	1437	1475	654	382	1017	1379	331	1169	558	3564	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)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	28.5	13.4	12.0	33.9	19.1	13.0	34.3	30.6	30.7	25.5	18.6	0.0
Incr Delay (d2), s/veh	0.6	0.1	0.0	3.6	0.1	1.3	7.8	0.3	0.6	0.8	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	2.8	1.8	0.1	0.3	1.3	4.7	0.3	0.3	0.3	4.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	13.5	12.0	37.5	19.2	14.3	42.1	30.9	31.3	26.3	18.7	0.0
LnGrp LOS	C	B	B	D	B	B	D	C	C	C	B	
Approach Vol, veh/h		962			1181			73			851	A
Approach Delay, s/veh		22.6			15.6			33.2			26.1	
Approach LOS		C			B			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.4	25.3	19.4	10.8	5.4	34.3	5.0	25.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	9.5	20.0	12.9	2.9	2.7	7.1	2.5	2.7				
Green Ext Time (p_c), s	0.9	0.0	2.5	0.2	0.0	2.2	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	21.1
HCM 6th LOS	C

Notes

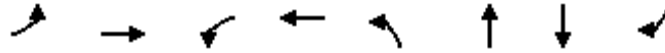
- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	374	818	34	648	101	97	80	514
v/c Ratio	0.56	0.42	0.15	0.55	0.30	0.29	0.27	0.58
Control Delay	33.6	19.6	39.2	28.8	30.0	24.8	36.3	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	19.6	39.2	28.8	30.0	24.8	36.3	6.8
Queue Length 50th (ft)	67	72	12	64	35	26	27	0
Queue Length 95th (ft)	196	222	58	146	114	95	111	55
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1468	3575	504	3425	525	518	516	1162
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.23	0.07	0.19	0.19	0.19	0.16	0.44
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



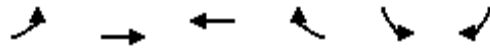
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑↔		↔	↑↑↑		↔	↔			↔	↔↔
Traffic Volume (vph)	359	764	21	29	506	52	141	16	36	44	34	504
Future Volume (vph)	359	764	21	29	506	52	141	16	36	44	34	504
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5013		1770	5991		1681	1614			1812	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5013		1770	5991		1681	1614			1812	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	374	796	22	34	588	60	145	16	37	45	35	514
RTOR Reduction (vph)	0	2	0	0	15	0	0	17	0	0	0	431
Lane Group Flow (vph)	374	816	0	34	633	0	101	80	0	0	80	83
Confl. Peds. (#/hr)							1		9			
Confl. Bikes (#/hr)							2		1			1
Heavy Vehicles (%)	2%	3%	5%	2%	8%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	14.7	29.3		3.2	17.8		15.0	15.0			12.4	12.4
Effective Green, g (s)	14.7	29.3		3.2	17.8		15.0	15.0			12.4	12.4
Actuated g/C Ratio	0.19	0.38		0.04	0.23		0.19	0.19			0.16	0.16
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	653	1902		73	1381		326	313			291	447
v/s Ratio Prot	c0.11	c0.16		0.02	0.11		c0.06	0.05			c0.04	0.03
v/s Ratio Perm												
v/c Ratio	0.57	0.43		0.47	0.46		0.31	0.26			0.27	0.18
Uniform Delay, d1	28.4	17.7		36.2	25.6		26.7	26.4			28.5	28.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.0	0.1		1.7	0.1		0.4	0.3			0.2	0.1
Delay (s)	29.4	17.8		37.9	25.6		27.1	26.7			28.6	28.1
Level of Service	C	B		D	C		C	C			C	C
Approach Delay (s)		21.4			26.3			26.9			28.2	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	17.3
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	106	800	495	40	43	131
v/c Ratio	0.10	0.34	0.33	0.06	0.08	0.14
Control Delay	18.3	4.9	12.8	4.3	19.1	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	4.9	12.8	4.3	19.1	5.7
Queue Length 50th (ft)	10	50	57	0	9	0
Queue Length 95th (ft)	39	71	86	13	41	22
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2117	3505	3135	1451	944	1547
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.23	0.16	0.03	0.05	0.08

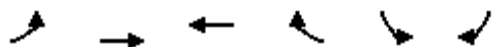
Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↖	↗↗	↖↖	↗	↖	↗↗
Traffic Volume (veh/h)	102	768	480	39	40	123
Future Volume (veh/h)	102	768	480	39	40	123
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1856	1781	1856	1870	1870
Adj Flow Rate, veh/h	106	800	495	40	43	131
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	3	8	3	2	2
Cap, veh/h	607	1911	891	403	389	609
Arrive On Green	0.18	0.54	0.26	0.26	0.22	0.22
Sat Flow, veh/h	3456	3618	3474	1531	1781	2790
Grp Volume(v), veh/h	106	800	495	40	43	131
Grp Sat Flow(s),veh/h/ln	1728	1763	1692	1531	1781	1395
Q Serve(g_s), s	1.0	5.2	4.9	0.8	0.7	1.5
Cycle Q Clear(g_c), s	1.0	5.2	4.9	0.8	0.7	1.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	607	1911	891	403	389	609
V/C Ratio(X)	0.17	0.42	0.56	0.10	0.11	0.22
Avail Cap(c_a), veh/h	2228	3636	3927	1776	919	1439
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.6	5.3	12.3	10.8	12.1	12.4
Incr Delay (d2), s/veh	0.1	0.1	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.7	1.3	0.2	0.3	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.7	5.3	12.5	10.8	12.2	12.5
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		906	535		174	
Approach Delay, s/veh		6.3	12.4		12.4	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	10.8	15.5			26.3	12.5
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.0	6.9			7.2	3.5
Green Ext Time (p_c), s	0.2	2.1			3.5	0.3

Intersection Summary

HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues

4: W Jack London Blvd & Wolf House Dr



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	14	820	529	14	24	40
v/c Ratio	0.02	0.60	0.42	0.01	0.04	0.07
Control Delay	24.9	9.9	10.4	7.6	18.3	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	9.9	10.4	7.6	18.3	7.9
Queue Length 50th (ft)	3	136	70	1	4	0
Queue Length 95th (ft)	25	453	344	13	22	14
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1311	1804	1579	1385	1021	947
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.45	0.34	0.01	0.02	0.04

Intersection Summary

HCM 6th Signalized Intersection Summary
 4: W Jack London Blvd & Wolf House Dr

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	795	492	13	17	28
Future Volume (veh/h)	14	795	492	13	17	28
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1856	1781	1870	1811	1841
Adj Flow Rate, veh/h	14	820	529	14	24	40
Peak Hour Factor	0.97	0.97	0.93	0.93	0.70	0.70
Percent Heavy Veh, %	2	3	8	2	6	4
Cap, veh/h	65	1033	692	601	237	214
Arrive On Green	0.04	0.56	0.39	0.39	0.14	0.14
Sat Flow, veh/h	1781	1856	1781	1546	1725	1560
Grp Volume(v), veh/h	14	820	529	14	24	40
Grp Sat Flow(s),veh/h/ln	1781	1856	1781	1546	1725	1560
Q Serve(g_s), s	0.2	10.7	7.9	0.2	0.4	0.7
Cycle Q Clear(g_c), s	0.2	10.7	7.9	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	65	1033	692	601	237	214
V/C Ratio(X)	0.21	0.79	0.76	0.02	0.10	0.19
Avail Cap(c_a), veh/h	1758	2747	2637	2289	1135	1026
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.2	5.4	8.1	5.7	11.5	11.6
Incr Delay (d2), s/veh	1.2	0.5	0.7	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.4	1.3	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.4	5.9	8.8	5.7	11.5	11.8
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		834	543		64	
Approach Delay, s/veh		6.0	8.7		11.7	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.1	17.1			22.2	8.2
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.2	9.9			12.7	2.7
Green Ext Time (p_c), s	0.0	2.0			3.6	0.1

Intersection Summary

HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
 5: SMP 39 West Dwy/Ambassador Dwy & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	59.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕			↕			↕	
Traffic Vol, veh/h	0	773	45	57	414	0	97	0	134	0	0	0
Future Vol, veh/h	0	773	45	57	414	0	97	0	134	0	0	0
Conflicting Peds, #/hr	1	0	0	0	0	1	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	180	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	92	92	94	94	92	92	92	25	92	25
Heavy Vehicles, %	2	2	18	16	5	2	18	2	16	2	2	2
Mvmt Flow	0	899	49	62	440	0	105	0	146	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	441	0	0	948	0	0	1488	1489	924	1562	1513	441
Stage 1	-	-	-	-	-	-	924	924	-	565	565	-
Stage 2	-	-	-	-	-	-	564	565	-	997	948	-
Critical Hdwy	4.12	-	-	4.26	-	-	7.28	6.52	6.36	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.344	-	-	3.662	4.018	3.444	3.518	4.018	3.318
Pot Cap-1 Maneuver	1119	-	-	670	-	-	~ 94	124	308	91	120	616
Stage 1	-	-	-	-	-	-	303	348	-	510	508	-
Stage 2	-	-	-	-	-	-	483	508	-	294	339	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1118	-	-	670	-	-	~ 85	109	308	43	105	615
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 85	109	-	43	105	-
Stage 1	-	-	-	-	-	-	303	348	-	509	445	-
Stage 2	-	-	-	-	-	-	424	445	-	155	339	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			1.3			\$ 399.1			0		
HCM LOS							F			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	147	1118	-	-	670	-	-	-
HCM Lane V/C Ratio	1.708	-	-	-	0.092	-	-	-
HCM Control Delay (s)	\$ 399.1	0	-	-	10.9	0	-	0
HCM Lane LOS	F	A	-	-	B	A	-	A
HCM 95th %tile Q(veh)	18.2	0	-	-	0.3	-	-	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
6: SMP 39 East Dwy/Airport Dwy & W Jack London Blvd

Background plus SMP 39 & 40
Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	77.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗			↕			↕			↕	
Traffic Vol, veh/h	2	854	44	63	376	0	101	0	133	0	0	1
Future Vol, veh/h	2	854	44	63	376	0	101	0	133	0	0	1
Conflicting Peds, #/hr	0	0	0	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	300	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	92	92	90	90	92	92	92	25	92	25
Heavy Vehicles, %	2	3	18	16	3	2	18	2	15	2	2	2
Mvmt Flow	2	970	48	68	418	0	110	0	145	0	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	418	0	0	1018	0	0	1554	1552	994	1625	1576	418
Stage 1	-	-	-	-	-	-	998	998	-	554	554	-
Stage 2	-	-	-	-	-	-	556	554	-	1071	1022	-
Critical Hdwy	4.12	-	-	4.26	-	-	7.28	6.52	6.35	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.28	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.344	-	-	3.662	4.018	3.435	3.518	4.018	3.318
Pot Cap-1 Maneuver	1141	-	-	630	-	-	~ 84	113	281	82	110	635
Stage 1	-	-	-	-	-	-	274	322	-	517	514	-
Stage 2	-	-	-	-	-	-	488	514	-	267	313	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1141	-	-	630	-	-	~ 74	97	281	35	94	635
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 74	97	-	35	94	-
Stage 1	-	-	-	-	-	-	273	321	-	516	442	-
Stage 2	-	-	-	-	-	-	417	442	-	129	312	-

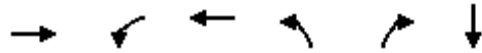
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	\$ 535.5	10.7
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	127	1141	-	-	630	-	-	635
HCM Lane V/C Ratio	2.003	0.002	-	-	0.109	-	-	0.006
HCM Control Delay (s)	\$ 535.5	8.2	-	-	11.4	0	-	10.7
HCM Lane LOS	F	A	-	-	B	A	-	B
HCM 95th %tile Q(veh)	20.6	0	-	-	0.4	-	-	0

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues

7: Discovery Dr & W Jack London Blvd



Lane Group	EBT	WBL	WBT	NBL	NBR	SBT
Lane Group Flow (vph)	1137	9	441	30	20	18
v/c Ratio	0.41	0.03	0.15	0.08	0.06	0.05
Control Delay	6.9	22.5	3.2	21.1	0.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	22.5	3.2	21.1	0.4	0.3
Queue Length 50th (ft)	0	1	0	4	0	0
Queue Length 95th (ft)	273	16	61	24	0	0
Internal Link Dist (ft)	419		723			182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	2775	1039	3345	1358	919	566
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.01	0.13	0.02	0.02	0.03

Intersection Summary

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑		↖		↗		↕	
Traffic Volume (veh/h)	0	971	18	8	406	0	19	0	13	8	0	2
Future Volume (veh/h)	0	971	18	8	406	0	19	0	13	8	0	2
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		1.00	1.00		1.00	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	0	1826	1826	1530	1811	0	1870	0	1337	1870	1870	1870
Adj Flow Rate, veh/h	0	1116	21	9	441	0	30	0	20	14	0	4
Peak Hour Factor	0.87	0.87	0.87	0.92	0.92	0.92	0.64	0.64	0.64	0.56	0.56	0.56
Percent Heavy Veh, %	0	5	5	25	6	0	2	0	38	2	2	2
Cap, veh/h	0	1735	33	28	2252	0	0	0	0	38	0	11
Arrive On Green	0.00	0.50	0.50	0.02	0.65	0.00	0.00	0.00	0.00	0.03	0.00	0.03
Sat Flow, veh/h	0	3573	66	1457	3532	0		0		1348	0	385
Grp Volume(v), veh/h	0	556	581	9	441	0		0.0		18	0	0
Grp Sat Flow(s),veh/h/ln	0	1735	1812	1457	1721	0				1734	0	0
Q Serve(g_s), s	0.0	6.9	6.9	0.2	1.5	0.0				0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	6.9	6.9	0.2	1.5	0.0				0.3	0.0	0.0
Prop In Lane	0.00		0.04	1.00		0.00				0.78		0.22
Lane Grp Cap(c), veh/h	0	864	903	28	2252	0				48	0	0
V/C Ratio(X)	0.00	0.64	0.64	0.32	0.20	0.00				0.37	0.00	0.00
Avail Cap(c_a), veh/h	0	1778	1858	1493	3527	0				711	0	0
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	1.00	1.00	1.00	0.00				1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.4	5.4	14.2	2.0	0.0				14.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.6	0.6	2.4	0.0	0.0				1.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0				0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.6	0.1	0.0	0.0				0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.0	6.0	16.6	2.0	0.0				15.7	0.0	0.0
LnGrp LOS	A	A	A	B	A	A				B	A	A
Approach Vol, veh/h		1137			450							18
Approach Delay, s/veh		6.0			2.3							15.7
Approach LOS		A			A							B
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	4.6	19.9		4.8		24.4						
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3						
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0						
Max Q Clear Time (g_c+I1), s	2.2	8.9		2.3		3.5						
Green Ext Time (p_c), s	0.0	5.7		0.0		2.2						

Intersection Summary

HCM 6th Ctrl Delay	5.1
HCM 6th LOS	A

Notes

User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Background plus SMP 39 & 40
Timing Plan: PM Peak

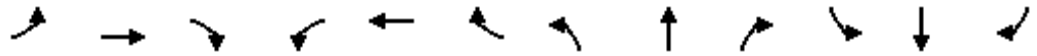


Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	1101	21	452	6	72
v/c Ratio	0.01	0.44	0.09	0.18	0.02	0.20
Control Delay	20.0	6.2	19.9	4.6	19.0	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	6.2	19.9	4.6	19.0	2.1
Queue Length 50th (ft)	1	67	4	21	1	0
Queue Length 95th (ft)	7	195	24	65	10	2
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	590	2922	570	3199	1230	807
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.38	0.04	0.14	0.00	0.09
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕			↕	↗		↕	
Traffic Volume (veh/h)	3	992	10	19	411	0	5	0	60	0	0	0
Future Volume (veh/h)	3	992	10	19	411	0	5	0	60	0	0	0
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		1.00	1.00		1.00	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	1870	1826	1826	774	1811	1811	1870	1870	1203	1870	1870	1870
Adj Flow Rate, veh/h	3	1090	11	21	452	0	6	0	72	0	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.83	0.83	0.83	0.25	0.25	0.25
Percent Heavy Veh, %	2	5	5	76	6	6	2	2	47	2	2	2
Cap, veh/h	10	1620	16	31	1710	0	216	0	123	0	5	0
Arrive On Green	0.01	0.46	0.46	0.04	0.50	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3518	35	737	3532	0	1781	0	1020	0	1870	0
Grp Volume(v), veh/h	3	537	564	21	452	0	6	0	72	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1735	1819	737	1721	0	1781	0	1020	0	1870	0
Q Serve(g_s), s	0.1	8.6	8.6	1.0	2.7	0.0	0.1	0.0	2.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	8.6	8.6	1.0	2.7	0.0	0.1	0.0	2.4	0.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	799	838	31	1710	0	216	0	123	0	5	0
V/C Ratio(X)	0.29	0.67	0.67	0.68	0.26	0.00	0.03	0.00	0.58	0.00	0.00	0.00
Avail Cap(c_a), veh/h	605	1717	1800	417	3406	0	1259	0	721	0	635	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	17.5	7.5	7.5	16.7	5.1	0.0	13.7	0.0	14.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.7	0.7	9.1	0.1	0.0	0.0	0.0	1.6	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.5	1.6	0.2	0.4	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	8.2	8.2	25.8	5.2	0.0	13.7	0.0	16.3	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	A	A	A
Approach Vol, veh/h		1104			473			78				0
Approach Delay, s/veh		8.2			6.1			16.1				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	21.6		0.0	4.2	22.9		8.3				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.0	10.6		0.0	2.1	4.7		4.4				
Green Ext Time (p_c), s	0.0	5.6		0.0	0.0	2.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	215	579	303	140	243	337	113	1385	161	312	1576	120
v/c Ratio	0.54	0.87	0.68	0.28	0.66	0.51	0.28	0.81	0.25	0.67	0.91	0.22
Control Delay	54.8	59.0	22.2	49.2	51.5	24.1	51.4	38.8	6.7	56.7	44.4	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.8	59.0	22.2	49.2	51.5	24.1	51.4	38.8	6.7	56.7	44.4	4.9
Queue Length 50th (ft)	71	211	58	44	160	140	36	311	6	106	369	0
Queue Length 95th (ft)	#160	316	170	101	274	263	87	493	59	#246	583	37
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	395	1761	832	621	1011	656	581	3159	1057	465	2905	845
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.33	0.36	0.23	0.24	0.51	0.19	0.44	0.15	0.67	0.54	0.14

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↔	↔↔	↑	↔	↔↔	↑↑↑	↔	↔↔	↑↑↑	↔
Traffic Volume (veh/h)	198	533	279	125	216	300	108	1330	155	281	1418	108
Future Volume (veh/h)	198	533	279	125	216	300	108	1330	155	281	1418	108
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		1.00	1.00		1.00	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	1604	1870	1767	1870	1870	1870	1767	1841	1870	1870	1826	1604
Adj Flow Rate, veh/h	215	579	303	140	243	337	112	1385	161	312	1576	120
Peak Hour Factor	0.92	0.92	0.92	0.89	0.89	0.89	0.96	0.96	0.96	0.90	0.90	0.90
Percent Heavy Veh, %	20	2	9	2	2	2	9	4	2	2	5	20
Cap, veh/h	408	695	292	501	379	511	406	1741	549	413	1703	464
Arrive On Green	0.14	0.20	0.20	0.15	0.20	0.20	0.12	0.35	0.35	0.12	0.34	0.34
Sat Flow, veh/h	2963	3554	1495	3456	1870	1585	3264	5025	1585	3456	4985	1359
Grp Volume(v), veh/h	215	579	303	140	243	337	112	1385	161	312	1576	120
Grp Sat Flow(s),veh/h/ln	1481	1777	1495	1728	1870	1585	1632	1675	1585	1728	1662	1359
Q Serve(g_s), s	7.3	17.0	21.2	3.9	12.9	19.9	3.4	27.0	8.0	9.5	33.1	6.9
Cycle Q Clear(g_c), s	7.3	17.0	21.2	3.9	12.9	19.9	3.4	27.0	8.0	9.5	33.1	6.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	408	695	292	501	379	511	406	1741	549	413	1703	464
V/C Ratio(X)	0.53	0.83	1.04	0.28	0.64	0.66	0.28	0.80	0.29	0.75	0.93	0.26
Avail Cap(c_a), veh/h	409	695	292	636	1033	1065	601	3237	1021	477	2523	688
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	43.5	42.0	43.7	41.4	39.7	31.7	43.1	32.0	25.8	46.3	34.4	25.8
Incr Delay (d2), s/veh	0.6	8.1	62.6	0.1	0.7	0.5	0.1	0.3	0.1	4.7	3.6	0.1
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	2.6	7.9	12.6	1.6	5.8	7.3	1.3	10.2	2.9	4.2	13.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.2	50.1	106.3	41.5	40.4	32.2	43.3	32.3	25.9	51.0	38.1	25.9
LnGrp LOS	D	D	F	D	D	C	D	C	C	D	D	C
Approach Vol, veh/h		1097			720			1658			2008	
Approach Delay, s/veh		64.5			36.8			32.5			39.4	
Approach LOS		E			D			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	43.5	20.5	27.0	18.2	42.9	19.7	27.8				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	11.5	29.0	5.9	23.2	5.4	35.1	9.3	21.9				
Green Ext Time (p_c), s	0.0	1.6	0.0	0.0	0.0	2.1	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	42.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Background plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	103	78	22	1640	2021	53
v/c Ratio	0.25	0.19	0.07	0.45	0.60	0.06
Control Delay	22.8	8.2	21.5	4.5	8.0	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	8.2	21.5	4.5	8.0	3.6
Queue Length 50th (ft)	13	0	2	73	103	2
Queue Length 95th (ft)	27	9	12	95	259	17
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1461	1237	1169	4988	3365	826
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.06	0.02	0.33	0.60	0.06
Intersection Summary						

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶↶	↷↷	↶↶	↑↑↑	↑↑↑	↷
Traffic Volume (veh/h)	69	52	20	1525	1758	46
Future Volume (veh/h)	69	52	20	1525	1758	46
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1663	1678	1233	1841	1826	1381
Adj Flow Rate, veh/h	103	78	22	1640	2021	53
Peak Hour Factor	0.67	0.67	0.93	0.93	0.87	0.87
Percent Heavy Veh, %	16	15	45	4	5	35
Cap, veh/h	422	344	85	3140	2310	542
Arrive On Green	0.14	0.14	0.04	0.62	0.46	0.46
Sat Flow, veh/h	3072	2502	2278	5191	5149	1171
Grp Volume(v), veh/h	103	78	22	1640	2021	53
Grp Sat Flow(s),veh/h/ln	1536	1251	1139	1675	1662	1171
Q Serve(g_s), s	1.4	1.3	0.4	8.3	16.8	1.2
Cycle Q Clear(g_c), s	1.4	1.3	0.4	8.3	16.8	1.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	422	344	85	3140	2310	542
V/C Ratio(X)	0.24	0.23	0.26	0.52	0.88	0.10
Avail Cap(c_a), veh/h	1675	1364	1242	3287	3261	766
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	17.7	17.6	21.5	4.8	11.1	6.9
Incr Delay (d2), s/veh	0.1	0.1	0.6	0.1	1.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.9	0.1	0.8	3.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.8	17.7	22.0	4.8	12.7	6.9
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	181			1662	2074	
Approach Delay, s/veh	17.8			5.1	12.6	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		34.9		11.0	7.4	27.4
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		10.3		3.4	2.4	18.8
Green Ext Time (p_c), s		2.0		0.0	0.0	2.5

Intersection Summary

HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues

11: Isabel Ave & Stanley Blvd



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	91	601	1103	92	482	1562
v/c Ratio	0.11	0.87	0.61	0.05	0.54	0.75
Control Delay	23.2	24.3	21.0	1.0	31.7	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	24.3	21.0	1.0	31.7	13.6
Queue Length 50th (ft)	16	79	150	0	74	255
Queue Length 95th (ft)	38	#304	228	6	121	383
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1261	840	2517	2247	1467	2791
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.72	0.44	0.04	0.33	0.56

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	83	547	1004	84	429	1390
Future Volume (veh/h)	83	547	1004	84	429	1390
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1811	1841	1870	1811
Adj Flow Rate, veh/h	91	601	1103	92	482	1562
Peak Hour Factor	0.91	0.91	0.91	0.91	0.89	0.89
Percent Heavy Veh, %	2	2	6	4	2	6
Cap, veh/h	1142	524	1689	1846	684	1849
Arrive On Green	0.33	0.33	0.34	0.34	0.14	0.54
Sat Flow, veh/h	3456	1585	5107	2745	5023	3532
Grp Volume(v), veh/h	91	601	1103	92	482	1562
Grp Sat Flow(s),veh/h/ln	1728	1585	1648	1373	1674	1721
Q Serve(g_s), s	1.4	25.0	14.3	0.9	6.9	29.1
Cycle Q Clear(g_c), s	1.4	25.0	14.3	0.9	6.9	29.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1142	524	1689	1846	684	1849
V/C Ratio(X)	0.08	1.15	0.65	0.05	0.71	0.84
Avail Cap(c_a), veh/h	1142	524	2288	2178	1328	1849
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	17.4	25.3	21.1	4.2	31.2	14.8
Incr Delay (d2), s/veh	0.0	86.7	0.6	0.0	1.3	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	21.2	4.8	0.2	2.6	9.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.4	112.0	21.7	4.2	32.6	18.8
LnGrp LOS	B	F	C	A	C	B
Approach Vol, veh/h	692		1195			2044
Approach Delay, s/veh	99.6		20.4			22.0
Approach LOS	F		C			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	14.8	31.3			46.1	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	8.9	16.3			31.1	27.0
Green Ext Time (p_c), s	1.4	9.5			3.3	0.0
Intersection Summary						
HCM 6th Ctrl Delay			35.2			
HCM 6th LOS			D			

Queues
12: Isabel Ave & Airway Blvd

Background plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	12	117	280	34	63	268	165	1822	31	266	1741
v/c Ratio	0.04	0.36	0.43	0.12	0.13	0.34	0.76	0.90	0.04	0.67	0.88
Control Delay	44.8	40.0	8.1	45.0	28.3	3.5	67.9	37.2	0.1	54.0	36.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	40.0	8.1	45.0	28.3	3.5	67.9	37.2	0.1	54.0	36.1
Queue Length 50th (ft)	7	72	28	20	28	0	106	410	0	88	396
Queue Length 95th (ft)	30	123	83	61	74	49	#273	#796	0	#172	#723
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	274	457	680	275	573	806	256	2043	702	449	1983
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.26	0.41	0.12	0.11	0.33	0.64	0.89	0.04	0.59	0.88

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	11	105	252	31	57	244	150	1658	28	231	1506	9
Future Volume (veh/h)	11	105	252	31	57	244	150	1658	28	231	1506	9
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		1.00	1.00		1.00	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	1767	1737	1870	1870	1870	1870	1870	1811	1796	1826	1796	1796
Adj Flow Rate, veh/h	12	117	280	34	63	268	165	1822	31	266	1731	10
Peak Hour Factor	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.87	0.87	0.87
Percent Heavy Veh, %	9	11	2	2	2	2	2	6	7	5	7	7
Cap, veh/h	77	306	454	166	418	537	197	1927	593	388	1983	11
Arrive On Green	0.05	0.18	0.18	0.09	0.22	0.22	0.11	0.39	0.39	0.12	0.39	0.39
Sat Flow, veh/h	1682	1737	1582	1781	1870	1585	1781	4944	1522	3374	5031	29
Grp Volume(v), veh/h	12	117	280	34	63	268	165	1822	31	266	1125	616
Grp Sat Flow(s),veh/h/ln	1682	1737	1582	1781	1870	1585	1781	1648	1522	1687	1635	1791
Q Serve(g_s), s	0.7	5.7	14.7	1.7	2.6	12.9	8.7	34.0	1.2	7.2	30.4	30.4
Cycle Q Clear(g_c), s	0.7	5.7	14.7	1.7	2.6	12.9	8.7	34.0	1.2	7.2	30.4	30.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	77	306	454	166	418	537	197	1927	593	388	1289	706
V/C Ratio(X)	0.16	0.38	0.62	0.20	0.15	0.50	0.84	0.95	0.05	0.69	0.87	0.87
Avail Cap(c_a), veh/h	282	418	556	280	418	537	261	2018	621	459	1334	731
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	43.8	34.8	29.6	40.0	29.8	25.2	41.7	28.2	18.2	40.6	26.7	26.7
Incr Delay (d2), s/veh	0.3	0.3	0.6	0.2	0.1	0.3	13.0	9.6	0.0	2.3	6.2	10.5
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	0.3	2.3	5.4	0.7	1.1	4.6	4.4	13.9	0.4	3.0	11.8	13.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.2	35.1	30.1	40.3	29.9	25.4	54.7	37.8	18.2	42.9	32.9	37.3
LnGrp LOS	D	D	C	D	C	C	D	D	B	D	C	D
Approach Vol, veh/h		409			365			2018			2007	
Approach Delay, s/veh		31.9			27.6			38.9			35.6	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.0	43.0	13.9	22.6	15.6	43.5	9.4	27.2				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	9.2	36.0	3.7	16.7	10.7	32.4	2.7	14.9				
Green Ext Time (p_c), s	0.0	1.2	0.0	0.1	0.0	1.5	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	36.0
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	6.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	18	10	32	15	7	66
Future Vol, veh/h	18	10	32	15	7	66
Conflicting Peds, #/hr	0	1	1	0	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	73	73	68	68
Heavy Vehicles, %	2	10	41	33	29	29
Mvmt Flow	23	13	44	21	10	97

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	37	0	143 31
Stage 1	-	-	-	-	31 -
Stage 2	-	-	-	-	112 -
Critical Hdwy	-	-	4.51	-	6.69 6.49
Critical Hdwy Stg 1	-	-	-	-	5.69 -
Critical Hdwy Stg 2	-	-	-	-	5.69 -
Follow-up Hdwy	-	-	2.569	-	3.761 3.561
Pot Cap-1 Maneuver	-	-	1356	-	790 971
Stage 1	-	-	-	-	926 -
Stage 2	-	-	-	-	850 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1355	-	761 970
Mov Cap-2 Maneuver	-	-	-	-	761 -
Stage 1	-	-	-	-	925 -
Stage 2	-	-	-	-	819 -

Approach	EB	WB	NB
HCM Control Delay, s	0	5.3	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	945	-	-	1355	-
HCM Lane V/C Ratio	0.114	-	-	0.032	-
HCM Control Delay (s)	9.3	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Background plus SMP 39 & 40
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	4.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	82	1	16	39	18	4	5	50	12	2	3
Future Vol, veh/h	3	82	1	16	39	18	4	5	50	12	2	3
Conflicting Peds, #/hr	1	0	0	0	0	1	14	0	6	6	0	14
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	77	77	77	71	71	71	67	67	67
Heavy Vehicles, %	2	23	2	6	41	67	50	2	16	2	2	2
Mvmt Flow	3	84	1	21	51	23	6	7	70	18	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	75	0	0	85	0	0	213	208	91	241	197	78
Stage 1	-	-	-	-	-	-	91	91	-	106	106	-
Stage 2	-	-	-	-	-	-	122	117	-	135	91	-
Critical Hdwy	4.12	-	-	4.16	-	-	7.6	6.52	6.36	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.6	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.6	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.254	-	-	3.95	4.018	3.444	3.518	4.018	3.318
Pot Cap-1 Maneuver	1524	-	-	1487	-	-	652	689	929	713	699	983
Stage 1	-	-	-	-	-	-	810	820	-	900	807	-
Stage 2	-	-	-	-	-	-	779	799	-	868	820	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1523	-	-	1487	-	-	630	677	924	641	686	969
Mov Cap-2 Maneuver	-	-	-	-	-	-	630	677	-	641	686	-
Stage 1	-	-	-	-	-	-	808	818	-	897	794	-
Stage 2	-	-	-	-	-	-	751	786	-	789	818	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.6	9.6	10.4
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	870	1523	-	-	1487	-	-	687
HCM Lane V/C Ratio	0.096	0.002	-	-	0.014	-	-	0.037
HCM Control Delay (s)	9.6	7.4	0	-	7.5	0	-	10.4
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	136	135	670	944	1120	633
v/c Ratio	0.36	0.36	0.66	0.96	0.49	0.51
Control Delay	24.3	24.2	18.9	38.6	7.5	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.3	24.2	18.9	38.6	7.5	2.2
Queue Length 50th (ft)	49	49	107	337	101	0
Queue Length 95th (ft)	93	93	160	#659	181	36
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	509	511	1437	987	2878	1405
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.26	0.47	0.96	0.39	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↙	↖	↗		↑			↘	↙	
Traffic Volume (vph)	0	0	0	238	4	596	0	840	0	0	1019	576	
Future Volume (vph)	0	0	0	238	4	596	0	840	0	0	1019	576	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1681	1688	2787		1863			3539	1583	
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1681	1688	2787		1863			3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.89	0.89	0.89	0.89	0.89	0.89	0.91	0.91	0.91	
Adj. Flow (vph)	0	0	0	267	4	670	0	944	0	0	1120	633	
RTOR Reduction (vph)	0	0	0	0	0	65	0	0	0	0	0	222	
Lane Group Flow (vph)	0	0	0	136	135	605	0	944	0	0	1120	411	
Confl. Bikes (#/hr)									1				
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				14.7	14.7	22.6		35.1			43.0	43.0	
Effective Green, g (s)				14.7	14.7	22.6		35.1			43.0	43.0	
Actuated g/C Ratio				0.22	0.22	0.34		0.53			0.65	0.65	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				373	374	951		987			2298	1028	
v/s Ratio Prot								c0.51			0.32		
v/s Ratio Perm				0.08	0.08	c0.22						0.26	
v/c Ratio				0.36	0.36	0.64		0.96			0.49	0.40	
Uniform Delay, d1				21.8	21.8	18.3		14.8			5.9	5.5	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	1.0		18.7			0.1	0.1	
Delay (s)				22.0	22.0	19.4		33.5			6.0	5.6	
Level of Service				C	C	B		C			A	A	
Approach Delay (s)		0.0			20.1			33.5			5.9		
Approach LOS		A			C			C			A		
Intersection Summary													
HCM 2000 Control Delay			16.7		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.89										
Actuated Cycle Length (s)			66.2		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			72.4%		ICU Level of Service					C			
Analysis Period (min)			15										
c Critical Lane Group													

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp



Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	493	520	1125	391	834
v/c Ratio	0.58	0.61	0.66	0.42	0.46
Control Delay	16.1	10.5	8.7	2.3	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	10.5	8.7	2.3	6.6
Queue Length 50th (ft)	42	24	69	0	43
Queue Length 95th (ft)	92	63	161	30	93
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2556	2061	3106	1358	3324
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.25	0.36	0.29	0.25

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Background plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖↗					↖↗	↖		↖↗	
Traffic Volume (vph)	394	0	416	0	0	0	0	1039	417	0	717	0
Future Volume (vph)	394	0	416	0	0	0	0	1039	417	0	717	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.91	0.91		0.95	
Frbp, ped/bikes	1.00		1.00					1.00	0.99		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					0.99	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2682					3307	1421		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2682					3307	1421		3539	
Peak-hour factor, PHF	0.80	0.80	0.80	0.92	0.92	0.92	0.96	0.96	0.96	0.86	0.86	0.86
Adj. Flow (vph)	492	0	520	0	0	0	0	1082	434	0	834	0
RTOR Reduction (vph)	0	0	187	0	0	0	0	4	186	0	0	0
Lane Group Flow (vph)	493	0	333	0	0	0	0	1121	205	0	834	0
Confl. Peds. (#/hr)									3			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	6%	2%	2%	2%	2%	4%	2%	2%	2%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	9.2		9.2					18.9	18.9		18.9	
Effective Green, g (s)	9.2		9.2					18.9	18.9		18.9	
Actuated g/C Ratio	0.25		0.25					0.52	0.52		0.52	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	874		683					1731	743		1852	
v/s Ratio Prot								c0.34			0.24	
v/s Ratio Perm	c0.14		0.12						0.14			
v/c Ratio	0.56		0.49					0.65	0.28		0.45	
Uniform Delay, d1	11.7		11.4					6.2	4.8		5.4	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	0.5		0.2					0.6	0.1		0.1	
Delay (s)	12.2		11.6					6.8	4.9		5.4	
Level of Service	B		B					A	A		A	
Approach Delay (s)		11.9			0.0			6.3			5.4	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.8					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			36.1					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			52.0%					ICU Level of Service			A	
Analysis Period (min)			15									
c Critical Lane Group												

Appendix F – Cumulative Conditions Intersection Level of Service and Queueing Work Sheets

Queues

Cumulative (2040)

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: AM Peak



























Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	208	54	7	302	441	4	89	3	313	142	458
v/c Ratio	0.32	0.04	0.03	0.37	0.31	0.02	0.19	0.01	0.37	0.21	0.54
Control Delay	30.7	15.9	37.2	23.4	2.1	38.0	24.8	0.0	28.1	15.6	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.7	15.9	37.2	23.4	2.1	38.0	24.8	0.0	28.1	15.6	4.5
Queue Length 50th (ft)	21	5	1	44	0	0	9	0	31	15	0
Queue Length 95th (ft)	74	27	10	125	28	7	29	0	101	55	61
Internal Link Dist (ft)		745		868			216			816	
Turn Bay Length (ft)	400		350			110		110	600		420
Base Capacity (vph)	1865	2318	784	2030	2646	639	1657	541	4181	1848	1521
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.02	0.01	0.15	0.17	0.01	0.05	0.01	0.07	0.08	0.30

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative (2040)
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	50	0	6	278	406	4	82	3	288	131	421
Future Volume (veh/h)	191	50	0	6	278	406	4	82	3	288	131	421
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		1.00	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	1870	1856	1870	1530	1870	1856	1411	522	418	1856	685	1885
Adj Flow Rate, veh/h	208	54	0	7	302	441	4	89	3	313	142	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	2	25	2	3	33	93	100	3	82	1
Cap, veh/h	497	1153	518	26	843	1051	11	157	39	726	327	
Arrive On Green	0.10	0.33	0.00	0.01	0.24	0.24	0.00	0.11	0.11	0.15	0.25	0.00
Sat Flow, veh/h	5023	3526	1585	2826	3554	2732	2607	1424	353	4983	1301	1598
Grp Volume(v), veh/h	208	54	0	7	302	441	4	89	3	313	142	0
Grp Sat Flow(s),veh/h/ln	1674	1763	1585	1413	1777	1366	1303	475	353	1661	651	1598
Q Serve(g_s), s	1.8	0.5	0.0	0.1	3.3	5.6	0.1	2.8	0.4	2.7	4.3	0.0
Cycle Q Clear(g_c), s	1.8	0.5	0.0	0.1	3.3	5.6	0.1	2.8	0.4	2.7	4.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	497	1153	518	26	843	1051	11	157	39	726	327	
V/C Ratio(X)	0.42	0.05	0.00	0.27	0.36	0.42	0.35	0.57	0.08	0.43	0.43	
Avail Cap(c_a), veh/h	2125	2662	1197	896	2307	2176	717	994	247	5269	1945	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.0	10.9	0.0	23.3	15.0	10.7	23.5	20.0	18.9	18.4	14.9	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.0	0.3	0.3	6.9	2.4	0.6	0.3	0.7	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.2	0.0	0.0	1.1	1.3	0.0	0.3	0.0	0.9	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	10.9	0.0	25.3	15.3	11.0	30.3	22.4	19.5	18.7	15.6	0.0
LnGrp LOS	C	B	A	C	B	B	C	C	B	B	B	
Approach Vol, veh/h		262			750			96			455	A
Approach Delay, s/veh		18.3			12.9			22.6			17.7	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	16.5	10.9	11.2	4.4	20.8	4.2	17.9				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	3.8	7.6	4.7	4.8	2.1	2.5	2.1	6.3				
Green Ext Time (p_c), s	0.3	3.6	0.9	0.4	0.0	0.3	0.0	0.8				

Intersection Summary

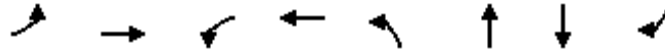
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Notes

- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- User approved changes to right turn type.
- Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	73	247	17	782	8	8	14	14
v/c Ratio	0.05	0.07	0.03	0.22	0.01	0.01	0.02	0.01
Control Delay	26.1	11.4	32.9	15.9	21.4	17.4	31.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	11.4	32.9	15.9	21.4	17.4	31.5	0.0
Queue Length 50th (ft)	3	0	2	27	1	1	2	0
Queue Length 95th (ft)	47	66	34	158	15	13	29	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2471	4211	1031	5084	983	1000	940	1781
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.06	0.02	0.15	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative (2040)

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	239	1	16	704	16	10	1	4	9	4	13
Future Volume (vph)	71	239	1	16	704	16	10	1	4	9	4	13
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	4985		1656	6385		1504	1529			1509	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	4985		1656	6385		1504	1529			1509	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	246	1	17	765	17	11	1	4	10	4	14
RTOR Reduction (vph)	0	0	0	0	2	0	0	4	0	0	0	13
Lane Group Flow (vph)	73	247	0	17	780	0	8	4	0	0	14	1
Confl. Peds. (#/hr)			3			3			3			
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	4%	4%	2%	9%	2%	2%	14%	2%	2%	17%	33%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	6.3	25.9		0.8	20.4		4.8	4.8			2.6	2.6
Effective Green, g (s)	6.3	25.9		0.8	20.4		4.8	4.8			2.6	2.6
Actuated g/C Ratio	0.12	0.50		0.02	0.40		0.09	0.09			0.05	0.05
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	412	2511		25	2534		140	142			76	140
v/s Ratio Prot	c0.02	0.05		c0.01	c0.12		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.18	0.10		0.68	0.31		0.06	0.03			0.18	0.01
Uniform Delay, d1	20.2	6.7		25.2	10.6		21.2	21.2			23.4	23.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	0.0		46.7	0.0		0.1	0.1			0.4	0.0
Delay (s)	20.4	6.7		71.9	10.7		21.4	21.2			23.8	23.2
Level of Service	C	A		E	B		C	C			C	C
Approach Delay (s)		9.8			12.0			21.3			23.5	
Approach LOS		A			B			C			C	

Intersection Summary

HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	17.3
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues
3: W Jack London Blvd & Livermore Outlets Dr

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	73	204	765	48	11	45
v/c Ratio	0.06	0.08	0.36	0.05	0.02	0.04
Control Delay	16.0	3.4	11.1	4.5	17.2	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	3.4	11.1	4.5	17.2	7.2
Queue Length 50th (ft)	8	10	97	0	3	0
Queue Length 95th (ft)	23	19	144	16	13	11
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2391	3438	3304	1461	1128	1792
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.06	0.23	0.03	0.01	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative (2040)
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	67	188	704	44	10	41
Future Volume (veh/h)	67	188	704	44	10	41
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1826	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	204	765	48	11	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	5	2	2	2	2
Cap, veh/h	507	2097	1208	526	215	337
Arrive On Green	0.15	0.60	0.34	0.34	0.12	0.12
Sat Flow, veh/h	3456	3561	3647	1548	1781	2790
Grp Volume(v), veh/h	73	204	765	48	11	45
Grp Sat Flow(s),veh/h/ln	1728	1735	1777	1548	1781	1395
Q Serve(g_s), s	0.6	0.8	6.1	0.7	0.2	0.5
Cycle Q Clear(g_c), s	0.6	0.8	6.1	0.7	0.2	0.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	507	2097	1208	526	215	337
V/C Ratio(X)	0.14	0.10	0.63	0.09	0.05	0.13
Avail Cap(c_a), veh/h	2550	4096	4720	2056	1052	1647
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.6	2.8	9.4	7.6	13.2	13.3
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.3	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	2.8	9.6	7.6	13.2	13.4
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		277	813		56	
Approach Delay, s/veh		5.4	9.5		13.3	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	16.8			25.8	8.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.6	8.1			2.8	2.5
Green Ext Time (p_c), s	0.1	3.4			0.8	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues
4: W Jack London Blvd & Wolf House Dr

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	4	212	774	22	32	38
v/c Ratio	0.00	0.08	0.29	0.02	0.04	0.05
Control Delay	14.0	3.1	6.0	5.8	12.7	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	3.1	6.0	5.8	12.7	7.2
Queue Length 50th (ft)	0	0	0	0	0	0
Queue Length 95th (ft)	8	19	143	12	29	20
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1582	3471	3387	1478	1409	1268
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.06	0.23	0.01	0.02	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Cumulative (2040)
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	195	712	20	29	35
Future Volume (veh/h)	4	195	712	20	29	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1841	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	212	774	22	32	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	4	2	2	2	2
Cap, veh/h	19	1822	1309	570	267	237
Arrive On Green	0.01	0.52	0.37	0.37	0.15	0.15
Sat Flow, veh/h	1781	3589	3647	1546	1781	1585
Grp Volume(v), veh/h	4	212	774	22	32	38
Grp Sat Flow(s),veh/h/ln	1781	1749	1777	1546	1781	1585
Q Serve(g_s), s	0.1	0.9	5.0	0.3	0.4	0.6
Cycle Q Clear(g_c), s	0.1	0.9	5.0	0.3	0.4	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	19	1822	1309	570	267	237
V/C Ratio(X)	0.21	0.12	0.59	0.04	0.12	0.16
Avail Cap(c_a), veh/h	1893	5575	5665	2465	1262	1123
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.8	3.4	7.2	5.7	10.4	10.5
Incr Delay (d2), s/veh	3.8	0.0	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.7	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.6	3.5	7.4	5.7	10.5	10.6
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		216	796		70	
Approach Delay, s/veh		3.7	7.3		10.5	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	15.7			20.0	8.2
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	7.0			2.9	2.6
Green Ext Time (p_c), s	0.0	3.4			0.8	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
 5: W Jack London Blvd & Ambassador Dwy

Cumulative (2040)
 Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	211	734	0	0	1
Future Vol, veh/h	3	211	734	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	4	2	2	2	100
Mvmt Flow	3	229	798	0	0	1

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	798	0	-	0	919 399
Stage 1	-	-	-	-	798 -
Stage 2	-	-	-	-	121 -
Critical Hdwy	5.1	-	-	-	6.84 8.9
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.7	-	-	-	3.52 4.3
Pot Cap-1 Maneuver	572	-	-	-	270 392
Stage 1	-	-	-	-	404 -
Stage 2	-	-	-	-	891 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	572	-	-	-	269 392
Mov Cap-2 Maneuver	-	-	-	-	269 -
Stage 1	-	-	-	-	402 -
Stage 2	-	-	-	-	891 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	572	-	-	-	392
HCM Lane V/C Ratio	0.006	-	-	-	0.003
HCM Control Delay (s)	11.3	-	-	-	14.2
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC
6: W Jack London Blvd & Airport Dwy

Cumulative (2040)
Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	210	744	1	4	0
Future Vol, veh/h	3	210	744	1	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	4	2	100	33	2
Mvmt Flow	3	228	809	1	4	0

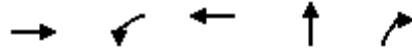
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	810	0	-	0	930 405
Stage 1	-	-	-	-	810 -
Stage 2	-	-	-	-	120 -
Critical Hdwy	4.14	-	-	-	7.46 6.94
Critical Hdwy Stg 1	-	-	-	-	6.46 -
Critical Hdwy Stg 2	-	-	-	-	6.46 -
Follow-up Hdwy	2.22	-	-	-	3.83 3.32
Pot Cap-1 Maneuver	812	-	-	-	215 595
Stage 1	-	-	-	-	328 -
Stage 2	-	-	-	-	807 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	812	-	-	-	214 595
Mov Cap-2 Maneuver	-	-	-	-	214 -
Stage 1	-	-	-	-	327 -
Stage 2	-	-	-	-	807 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	22.2
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	812	-	-	-	214
HCM Lane V/C Ratio	0.004	-	-	-	0.02
HCM Control Delay (s)	9.5	-	-	-	22.2
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Queues
7: Discovery Dr & W Jack London Blvd

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	231	25	784	25	14
v/c Ratio	0.09	0.04	0.27	0.04	0.03
Control Delay	4.7	14.1	3.1	13.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	14.1	3.1	13.3	0.1
Queue Length 50th (ft)	0	1	0	0	0
Queue Length 95th (ft)	37	25	66	24	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	3022	1340	3539	1211	847
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.22	0.02	0.02
Intersection Summary					

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Cumulative (2040)
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	188	25	23	721	0	23	0	13	0	0	0
Future Volume (veh/h)	0	188	25	23	721	0	23	0	13	0	0	0
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		1.00	1.00		1.00	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	0	1826	1826	1589	1870	0	1870	1870	1070	1870	1870	1870
Adj Flow Rate, veh/h	0	204	27	25	784	0	25	0	14	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	21	2	0	2	2	56	2	2	2
Cap, veh/h	0	1004	131	77	1913	0	152	0	78	0	8	0
Arrive On Green	0.00	0.33	0.33	0.05	0.54	0.00	0.09	0.00	0.09	0.00	0.00	0.00
Sat Flow, veh/h	0	3176	403	1513	3647	0	1781	0	907	0	1870	0
Grp Volume(v), veh/h	0	114	117	25	784	0	25	0	14	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1735	1753	1513	1777	0	1781	0	907	0	1870	0
Q Serve(g_s), s	0.0	1.2	1.2	0.4	3.2	0.0	0.3	0.0	0.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.2	1.2	0.4	3.2	0.0	0.3	0.0	0.4	0.0	0.0	0.0
Prop In Lane	0.00		0.23	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	565	571	77	1913	0	152	0	78	0	8	0
V/C Ratio(X)	0.00	0.20	0.21	0.32	0.41	0.00	0.16	0.00	0.18	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2105	2127	1836	4312	0	1441	0	734	0	908	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	6.0	6.0	11.3	3.4	0.0	10.5	0.0	10.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	0.9	0.1	0.0	0.2	0.0	0.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.1	6.2	12.2	3.5	0.0	10.7	0.0	10.9	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		231			809			39				0
Approach Delay, s/veh		6.2			3.8			10.8				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.3	13.3		0.0		18.6		6.1				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	3.2		0.0		5.2		2.4				
Green Ext Time (p_c), s	0.0	0.9		0.0		4.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.5
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	226	73	784	13	60
v/c Ratio	0.01	0.12	0.16	0.31	0.04	0.14
Control Delay	18.3	9.3	16.5	5.4	17.6	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	9.3	16.5	5.4	17.6	0.7
Queue Length 50th (ft)	1	20	13	41	2	0
Queue Length 95th (ft)	7	39	55	118	17	1
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	884	2969	888	3359	835	791
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.08	0.08	0.23	0.02	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Cumulative (2040)
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	3	198	10	67	721	0	12	0	55	0	0	0
Future Volume (veh/h)	3	198	10	67	721	0	12	0	55	0	0	0
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		1.00	1.00		1.00	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	1870	1796	1796	1322	1870	1870	1870	1870	996	1870	1870	1870
Adj Flow Rate, veh/h	3	215	11	73	784	0	13	0	60	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	7	7	39	2	2	2	2	61	2	2	2
Cap, veh/h	10	939	48	155	1429	0	220	0	104	0	7	0
Arrive On Green	0.01	0.28	0.28	0.12	0.40	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3300	168	1259	3647	0	1781	0	844	0	1870	0
Grp Volume(v), veh/h	3	111	115	73	784	0	13	0	60	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1706	1761	1259	1777	0	1781	0	844	0	1870	0
Q Serve(g_s), s	0.0	1.4	1.4	1.5	4.8	0.0	0.2	0.0	1.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.4	1.4	1.5	4.8	0.0	0.2	0.0	1.9	0.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	485	501	155	1429	0	220	0	104	0	7	0
V/C Ratio(X)	0.29	0.23	0.23	0.47	0.55	0.00	0.06	0.00	0.58	0.00	0.00	0.00
Avail Cap(c_a), veh/h	753	2105	2173	888	4384	0	1570	0	744	0	791	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	14.0	7.8	7.8	11.6	6.5	0.0	11.0	0.0	11.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.2	0.2	0.8	0.2	0.0	0.0	0.0	1.9	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.3	0.3	0.6	0.0	0.1	0.0	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.7	7.9	7.9	12.4	6.8	0.0	11.0	0.0	13.6	0.0	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		229			857			73				0
Approach Delay, s/veh		8.1			7.2			13.1				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	13.4		0.0	4.2	16.7		7.5				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.5	3.4		0.0	2.0	6.8		3.9				
Green Ext Time (p_c), s	0.1	0.9		0.0	0.0	4.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	79	128	76	222	430	502	255	1852	209	287	1886	165
v/c Ratio	0.35	0.15	0.18	0.63	0.93	0.84	0.76	0.91	0.28	0.89	0.93	0.24
Control Delay	75.5	47.9	0.9	79.0	86.4	51.1	86.7	50.7	11.2	100.3	52.8	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.5	47.9	0.9	79.0	86.4	51.1	86.7	50.7	11.2	100.3	52.8	9.6
Queue Length 50th (ft)	40	56	0	118	447	406	138	656	40	156	669	21
Queue Length 95th (ft)	76	87	0	177	587	552	200	#883	112	#275	#963	84
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	225	1196	554	430	700	595	426	2067	765	322	2034	685
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.11	0.14	0.52	0.61	0.84	0.60	0.90	0.27	0.89	0.93	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Cumulative (2040)
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	73	118	70	204	396	462	235	1704	192	264	1735	152
Future Volume (veh/h)	73	118	70	204	396	462	235	1704	192	264	1735	152
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		0.99	1.00		1.00	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	1218	1841	1648	1870	1870	1870	1856	1752	1870	1870	1767	1707
Adj Flow Rate, veh/h	79	128	76	222	430	502	255	1852	209	287	1886	165
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	46	4	17	2	2	2	3	10	2	2	9	13
Cap, veh/h	195	1026	404	327	564	612	293	1910	633	306	1942	583
Arrive On Green	0.09	0.29	0.29	0.09	0.30	0.30	0.09	0.40	0.40	0.09	0.40	0.40
Sat Flow, veh/h	2251	3497	1377	3456	1870	1565	3428	4782	1584	3456	4823	1447
Grp Volume(v), veh/h	79	128	76	222	430	502	255	1852	209	287	1886	165
Grp Sat Flow(s),veh/h/ln	1125	1749	1377	1728	1870	1565	1714	1594	1584	1728	1608	1447
Q Serve(g_s), s	5.6	4.5	7.0	10.5	35.3	48.8	12.4	64.2	15.5	14.0	64.9	13.0
Cycle Q Clear(g_c), s	5.6	4.5	7.0	10.5	35.3	48.8	12.4	64.2	15.5	14.0	64.9	13.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	195	1026	404	327	564	612	293	1910	633	306	1942	583
V/C Ratio(X)	0.41	0.12	0.19	0.68	0.76	0.82	0.87	0.97	0.33	0.94	0.97	0.28
Avail Cap(c_a), veh/h	199	1026	404	408	663	695	405	1978	655	306	1942	583
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	73.2	43.9	44.7	74.1	53.6	46.4	76.5	49.8	35.2	76.7	49.6	34.1
Incr Delay (d2), s/veh	0.5	0.0	0.1	1.9	3.5	6.1	11.1	13.4	0.1	34.8	14.2	0.1
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	1.6	2.0	2.4	4.7	16.9	19.6	5.8	27.0	6.0	7.6	27.9	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.7	43.9	44.8	76.0	57.1	52.4	87.5	63.2	35.3	111.4	63.8	34.2
LnGrp LOS	E	D	D	E	E	D	F	E	D	F	E	C
Approach Vol, veh/h		283			1154			2316			2338	
Approach Delay, s/veh		52.5			58.7			63.4			67.5	
Approach LOS		D			E			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	73.4	20.7	55.5	19.2	73.9	19.3	56.8				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	16.0	66.2	12.5	9.0	14.4	66.9	7.6	50.8				
Green Ext Time (p_c), s	0.0	1.4	0.0	0.1	0.0	0.0	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	63.6
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	42	39	28	2264	2121	66
v/c Ratio	0.12	0.14	0.07	0.59	0.58	0.07
Control Delay	22.7	10.2	22.1	4.7	7.7	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	10.2	22.1	4.7	7.7	3.5
Queue Length 50th (ft)	6	0	4	130	115	2
Queue Length 95th (ft)	20	13	14	168	#324	21
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1233	920	1478	4803	3662	964
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.02	0.47	0.58	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative (2040)
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	39	36	26	2083	1951	61
Future Volume (veh/h)	39	36	26	2083	1951	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1411	1189	1737	1781	1781	1470
Adj Flow Rate, veh/h	42	39	28	2264	2121	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	33	48	11	8	8	29
Cap, veh/h	256	174	147	3225	2396	614
Arrive On Green	0.10	0.10	0.05	0.66	0.49	0.49
Sat Flow, veh/h	2607	1773	3209	5024	5024	1246
Grp Volume(v), veh/h	42	39	28	2264	2121	66
Grp Sat Flow(s),veh/h/ln	1303	886	1605	1621	1621	1246
Q Serve(g_s), s	0.7	0.9	0.4	13.4	17.9	1.3
Cycle Q Clear(g_c), s	0.7	0.9	0.4	13.4	17.9	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	256	174	147	3225	2396	614
V/C Ratio(X)	0.16	0.22	0.19	0.70	0.89	0.11
Avail Cap(c_a), veh/h	1426	970	1755	3225	3192	818
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	18.9	19.0	21.0	4.9	10.4	6.2
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.6	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	0.8	3.8	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.0	19.2	21.2	5.4	12.6	6.2
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	81			2292	2187	
Approach Delay, s/veh	19.1			5.6	12.4	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.5		9.2	7.8	28.7
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		15.4		2.9	2.4	19.9
Green Ext Time (p_c), s		3.1		0.0	0.0	2.6

Intersection Summary

HCM 6th Ctrl Delay	9.1
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	112	505	1765	212	655	1508
v/c Ratio	0.19	0.85	0.83	0.11	0.70	0.65
Control Delay	28.4	21.9	26.1	4.0	35.0	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	21.9	26.1	4.0	35.0	9.7
Queue Length 50th (ft)	24	48	271	14	107	180
Queue Length 95th (ft)	47	175	#499	30	168	376
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1046	754	2129	2230	1205	2496
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.67	0.83	0.10	0.54	0.60

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative (2040)
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶↷	↶	↶↶↶	↶↷	↶↷↶	↶↶
Traffic Volume (veh/h)	103	465	1624	195	603	1387
Future Volume (veh/h)	103	465	1624	195	603	1387
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1811	1811	1781	1811	1796	1767
Adj Flow Rate, veh/h	112	505	1765	212	655	1508
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	8	6	7	9
Cap, veh/h	935	429	1895	1807	815	2044
Arrive On Green	0.28	0.28	0.39	0.39	0.17	0.61
Sat Flow, veh/h	3346	1535	5024	2701	4824	3445
Grp Volume(v), veh/h	112	505	1765	212	655	1508
Grp Sat Flow(s),veh/h/ln	1673	1535	1621	1351	1608	1678
Q Serve(g_s), s	2.2	25.0	31.1	2.5	11.7	28.6
Cycle Q Clear(g_c), s	2.2	25.0	31.1	2.5	11.7	28.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	935	429	1895	1807	815	2044
V/C Ratio(X)	0.12	1.18	0.93	0.12	0.80	0.74
Avail Cap(c_a), veh/h	935	429	1902	1811	1078	2044
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	24.0	32.2	26.2	5.3	35.8	12.4
Incr Delay (d2), s/veh	0.1	101.8	9.0	0.0	3.4	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	20.9	12.1	0.6	4.5	8.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.1	134.0	35.1	5.4	39.1	14.0
LnGrp LOS	C	F	D	A	D	B
Approach Vol, veh/h	617		1977			2163
Approach Delay, s/veh	114.0		31.9			21.6
Approach LOS	F		C			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	19.6	40.4			60.0	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	13.7	33.1			30.6	27.0
Green Ext Time (p_c), s	1.4	1.8			3.7	0.0

Intersection Summary

HCM 6th Ctrl Delay	37.9
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Cumulative (2040)
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	7	101	201	87	118	187	253	2021	35	315	2193
v/c Ratio	0.03	0.37	0.34	0.35	0.22	0.25	1.07	1.08	0.05	0.80	1.21
Control Delay	45.0	42.4	10.4	49.7	29.2	3.5	124.0	77.7	0.1	63.3	133.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	42.4	10.4	49.7	29.2	3.5	124.0	77.7	0.1	63.3	133.0
Queue Length 50th (ft)	4	63	32	53	55	0	~188	~563	0	105	~661
Queue Length 95th (ft)	21	110	80	126	124	43	#459	#942	0	#235	#1068
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	276	391	600	246	578	757	236	1875	704	418	1805
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.26	0.34	0.35	0.20	0.25	1.07	1.08	0.05	0.75	1.21

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Cumulative (2040)
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	6	93	185	80	109	172	233	1859	32	290	1993	25
Future Volume (veh/h)	6	93	185	80	109	172	233	1859	32	290	1993	25
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		1.00	1.00		1.00	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	1870	1559	1870	1796	1841	1663	1841	1752	1870	1811	1767	1767
Adj Flow Rate, veh/h	7	101	201	87	118	187	253	2021	35	315	2166	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	23	2	7	4	16	4	10	2	6	9	9
Cap, veh/h	50	213	434	230	447	500	240	1942	643	375	1871	23
Arrive On Green	0.03	0.14	0.14	0.13	0.24	0.24	0.14	0.41	0.41	0.11	0.38	0.38
Sat Flow, veh/h	1781	1559	1585	1711	1841	1409	1753	4782	1585	3346	4909	61
Grp Volume(v), veh/h	7	101	201	87	118	187	253	2021	35	315	1418	775
Grp Sat Flow(s),veh/h/ln	1781	1559	1585	1711	1841	1409	1753	1594	1585	1673	1608	1755
Q Serve(g_s), s	0.4	6.1	10.8	4.7	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Cycle Q Clear(g_c), s	0.4	6.1	10.8	4.7	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	50	213	434	230	447	500	240	1942	643	375	1225	669
V/C Ratio(X)	0.14	0.47	0.46	0.38	0.26	0.37	1.05	1.04	0.05	0.84	1.16	1.16
Avail Cap(c_a), veh/h	279	350	573	251	447	500	240	1942	643	425	1225	669
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	48.5	40.8	30.9	40.4	31.3	24.6	44.2	30.4	18.5	44.5	31.7	31.7
Incr Delay (d2), s/veh	0.5	0.6	0.3	0.4	0.1	0.2	73.3	32.0	0.0	11.5	80.2	87.5
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	0.2	2.3	4.0	2.0	2.3	3.3	10.7	20.3	0.5	4.4	27.5	31.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	41.4	31.2	40.8	31.5	24.7	117.5	62.4	18.5	56.0	111.9	119.2
LnGrp LOS	D	D	C	D	C	C	F	F	B	E	F	F
Approach Vol, veh/h		309			392			2309			2508	
Approach Delay, s/veh		34.9			30.3			67.8			107.1	
Approach LOS		C			C			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	47.3	18.7	19.8	19.0	44.8	7.9	30.6				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	11.4	43.5	6.7	12.8	16.0	41.0	2.4	12.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	81.1
HCM 6th LOS	F

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	29	7	24	17	7	32
Future Vol, veh/h	29	7	24	17	7	32
Conflicting Peds, #/hr	0	4	4	0	6	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	40	44	25	20	77
Mvmt Flow	32	8	26	18	8	35

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	44	0	116
Stage 1	-	-	-	-	40
Stage 2	-	-	-	-	76
Critical Hdwy	-	-	4.54	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.596	-	3.68
Pot Cap-1 Maneuver	-	-	1333	-	839
Stage 1	-	-	-	-	938
Stage 2	-	-	-	-	903
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1328	-	814
Mov Cap-2 Maneuver	-	-	-	-	814
Stage 1	-	-	-	-	934
Stage 2	-	-	-	-	880

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	838	-	-	1328	-
HCM Lane V/C Ratio	0.051	-	-	0.02	-
HCM Control Delay (s)	9.5	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative (2040)
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	47	12	34	29	17	10	0	25	6	0	4
Future Vol, veh/h	6	47	12	34	29	17	10	0	25	6	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	15	15	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	53	13	22	45	33	33	2	35	2	2	2
Mvmt Flow	7	51	13	37	32	18	11	0	27	7	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	50	0	0	64	0	0	189	196	73	215	193	41
Stage 1	-	-	-	-	-	-	72	72	-	115	115	-
Stage 2	-	-	-	-	-	-	117	124	-	100	78	-
Critical Hdwy	4.35	-	-	4.32	-	-	7.43	6.52	6.55	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.425	-	-	2.398	-	-	3.797	4.018	3.615	3.518	4.018	3.318
Pot Cap-1 Maneuver	1421	-	-	1420	-	-	708	699	904	742	702	1030
Stage 1	-	-	-	-	-	-	866	835	-	890	800	-
Stage 2	-	-	-	-	-	-	818	793	-	906	830	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1421	-	-	1420	-	-	688	677	891	692	680	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	688	677	-	692	680	-
Stage 1	-	-	-	-	-	-	862	831	-	886	778	-
Stage 2	-	-	-	-	-	-	793	772	-	861	826	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			3.2			9.6			9.6		
HCM LOS							A			A		

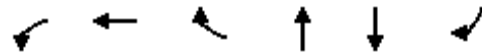
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	822	1421	-	-	1420	-	-	797
HCM Lane V/C Ratio	0.046	0.005	-	-	0.026	-	-	0.014
HCM Control Delay (s)	9.6	7.5	0	-	7.6	0	-	9.6
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

Queues

Cumulative (2040)

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Timing Plan: AM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	133	134	737	960	800	822
v/c Ratio	0.35	0.35	0.70	1.01	0.36	0.63
Control Delay	24.7	24.5	19.9	53.6	6.8	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	24.5	19.9	53.6	6.8	3.1
Queue Length 50th (ft)	48	49	128	~417	77	0
Queue Length 95th (ft)	100	100	189	#735	116	38
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	466	474	1412	948	2737	1401
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.28	0.52	1.01	0.29	0.59

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.



















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative (2040)

Timing Plan: AM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	220	28	685	0	883	0	0	736	756	
Future Volume (vph)	0	0	0	220	28	685	0	883	0	0	736	756	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1631	2707		1863			3505	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1631	2707		1863			3505	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	237	30	737	0	960	0	0	800	822	
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	0	0	0	296	
Lane Group Flow (vph)	0	0	0	133	134	678	0	960	0	0	800	526	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	5%	5%	2%	2%	2%	2%	3%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				16.4	16.4	25.4		35.2			44.2	44.2	
Effective Green, g (s)				16.4	16.4	25.4		35.2			44.2	44.2	
Actuated g/C Ratio				0.24	0.24	0.37		0.51			0.64	0.64	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				380	387	995		949			2241	1000	
v/s Ratio Prot								c0.52			0.23		
v/s Ratio Perm				0.08	0.08	c0.25						0.34	
v/c Ratio				0.35	0.35	0.68		1.01			0.36	0.53	
Uniform Delay, d1				21.9	21.9	18.4		16.9			5.8	6.8	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	1.5		32.1			0.0	0.2	
Delay (s)				22.1	22.1	20.0		49.1			5.8	7.0	
Level of Service				C	C	B		D			A	A	
Approach Delay (s)		0.0			20.5			49.1			6.4		
Approach LOS		A			C			D			A		
Intersection Summary													
HCM 2000 Control Delay			21.8		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.93										
Actuated Cycle Length (s)			69.1		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			77.8%		ICU Level of Service					D			
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative (2040)

Timing Plan: AM Peak




















Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	670	395	571	143	520
v/c Ratio	0.65	0.42	0.46	0.12	0.38
Control Delay	11.3	2.6	7.8	2.0	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	2.6	7.8	2.0	7.0
Queue Length 50th (ft)	36	0	25	0	22
Queue Length 95th (ft)	72	15	58	9	51
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3262	2130	3139	2682	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.19	0.18	0.05	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative (2040)
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	616	0	363	0	0	0	0	548	137	0	478	0
Future Volume (vph)	616	0	363	0	0	0	0	548	137	0	478	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.95	0.88		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3139	2682		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3139	2682		3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	670	0	395	0	0	0	0	571	143	0	520	0
RTOR Reduction (vph)	0	0	275	0	0	0	0	0	86	0	0	0
Lane Group Flow (vph)	670	0	120	0	0	0	0	571	57	0	520	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	6%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	8.1		8.1					10.6	10.6		10.6	
Effective Green, g (s)	8.1		8.1					10.6	10.6		10.6	
Actuated g/C Ratio	0.30		0.30					0.40	0.40		0.40	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	1041		673					1246	1064		1391	
v/s Ratio Prot								c0.18			0.15	
v/s Ratio Perm	c0.20		0.05						0.02			
v/c Ratio	0.64		0.18					0.46	0.05		0.37	
Uniform Delay, d1	8.1		6.8					5.9	5.0		5.7	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	1.0		0.0					0.1	0.0		0.1	
Delay (s)	9.1		6.9					6.0	5.0		5.8	
Level of Service	A		A					A	A		A	
Approach Delay (s)		8.3			0.0			5.8			5.8	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.9					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			26.7					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			77.6%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative (2040)

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	754	509	13	21	276	1010	14	45	16	1002	30	507
v/c Ratio	0.67	0.34	0.02	0.10	0.42	0.54	0.07	0.09	0.06	0.68	0.02	0.32
Control Delay	39.6	24.5	0.1	51.9	39.1	4.1	52.8	40.3	0.4	32.4	15.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	24.5	0.1	51.9	39.1	4.1	52.8	40.3	0.4	32.4	15.9	0.5
Queue Length 50th (ft)	136	89	0	5	71	28	4	8	0	173	5	0
Queue Length 95th (ft)	#340	267	0	24	166	106	18	23	0	319	15	0
Internal Link Dist (ft)		745			868			218			816	
Turn Bay Length (ft)	400		305	350			110		110	600		420
Base Capacity (vph)	1153	1496	726	595	825	2369	515	1458	538	2884	2175	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.34	0.02	0.04	0.33	0.43	0.03	0.03	0.03	0.35	0.01	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative (2040)
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↔	↔↔	↑↑	↔↔	↔↔	↑↑↑	↔	↔↔↔	↑↑	↔
Traffic Volume (veh/h)	709	478	12	20	265	970	13	41	15	922	28	466
Future Volume (veh/h)	709	478	12	20	265	970	13	41	15	922	28	466
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		0.99	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1796	1752	1870	1589	1870
Adj Flow Rate, veh/h	754	509	13	21	276	1010	14	45	16	1002	30	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	7	10	2	21	2
Cap, veh/h	920	1467	651	81	899	1398	46	335	100	1262	924	
Arrive On Green	0.18	0.41	0.41	0.02	0.25	0.25	0.01	0.07	0.07	0.25	0.31	0.00
Sat Flow, veh/h	5023	3554	1577	3456	3554	2754	3456	4904	1459	5023	3019	1585
Grp Volume(v), veh/h	754	509	13	21	276	1010	14	45	16	1002	30	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1577	1728	1777	1377	1728	1635	1459	1674	1509	1585
Q Serve(g_s), s	11.4	7.8	0.4	0.5	5.0	20.0	0.3	0.7	0.8	14.7	0.6	0.0
Cycle Q Clear(g_c), s	11.4	7.8	0.4	0.5	5.0	20.0	0.3	0.7	0.8	14.7	0.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	920	1467	651	81	899	1398	46	335	100	1262	924	
V/C Ratio(X)	0.82	0.35	0.02	0.26	0.31	0.72	0.30	0.13	0.16	0.79	0.03	
Avail Cap(c_a), veh/h	1271	1467	651	656	899	1398	569	1552	461	3179	924	
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	0.00
Uniform Delay (d), s/veh	31.0	15.9	13.7	37.9	23.9	15.3	38.6	34.6	34.7	27.7	19.2	0.0
Incr Delay (d2), s/veh	2.2	0.1	0.0	0.6	0.2	1.9	1.3	0.1	0.6	0.9	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	4.5	2.9	0.1	0.2	1.9	6.4	0.1	0.3	0.3	5.6	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.2	16.0	13.7	38.5	24.1	17.2	40.0	34.7	35.2	28.6	19.2	0.0
LnGrp LOS	C	B	B	D	C	B	D	C	D	C	B	
Approach Vol, veh/h		1276			1307			75			1032	A
Approach Delay, s/veh		26.1			19.0			35.8			28.3	
Approach LOS		C			B			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.5	25.3	23.8	11.4	5.8	37.9	5.1	30.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	13.4	22.0	16.7	2.8	2.5	9.8	2.3	2.6				
Green Ext Time (p_c), s	1.1	0.0	3.1	0.2	0.0	2.8	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

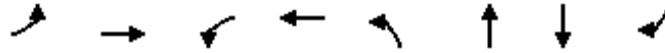
Cumulative (2040)
Timing Plan: PM Peak

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative (2040)
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	504	975	42	524	136	131	107	693
v/c Ratio	0.66	0.52	0.19	0.44	0.43	0.41	0.35	0.66
Control Delay	35.7	23.0	44.4	29.8	36.4	31.1	39.7	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	23.0	44.4	29.8	36.4	31.1	39.7	6.8
Queue Length 50th (ft)	97	129	16	52	54	44	40	0
Queue Length 95th (ft)	274	287	76	134	165	143	148	59
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1373	3382	471	3350	490	484	482	1251
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.29	0.09	0.16	0.28	0.27	0.22	0.55
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative (2040)

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↘		↖	↑↑↑		↖	↕			↖	↗↘
Traffic Volume (vph)	484	908	28	39	412	70	189	22	48	60	45	679
Future Volume (vph)	484	908	28	39	412	70	189	22	48	60	45	679
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5058		1770	6254		1681	1615			1811	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5058		1770	6254		1681	1615			1811	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	504	946	29	42	448	76	195	23	49	61	46	693
RTOR Reduction (vph)	0	3	0	0	28	0	0	16	0	0	0	576
Lane Group Flow (vph)	504	972	0	42	496	0	136	115	0	0	107	117
Confl. Peds. (#/hr)							1		12			
Confl. Bikes (#/hr)							3		1			1
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%	2%	2%	3%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	18.3	30.4		5.3	17.4		15.6	15.6			13.9	13.9
Effective Green, g (s)	18.3	30.4		5.3	17.4		15.6	15.6			13.9	13.9
Actuated g/C Ratio	0.22	0.37		0.06	0.21		0.19	0.19			0.17	0.17
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	761	1863		113	1319		317	305			305	469
v/s Ratio Prot	c0.15	c0.19		0.02	0.08		c0.08	0.07			c0.06	0.04
v/s Ratio Perm												
v/c Ratio	0.66	0.52		0.37	0.38		0.43	0.38			0.35	0.25
Uniform Delay, d1	29.3	20.4		37.0	27.9		29.5	29.2			30.3	29.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.0	0.1		0.8	0.1		0.7	0.6			0.3	0.1
Delay (s)	31.2	20.5		37.8	28.0		30.2	29.8			30.6	29.9
Level of Service	C	C		D	C		C	C			C	C
Approach Delay (s)		24.2			28.7			30.0			30.0	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	82.5	Sum of lost time (s)	17.3
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative (2040)

Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	145	950	389	54	57	177
v/c Ratio	0.18	0.49	0.36	0.11	0.14	0.22
Control Delay	18.4	6.6	13.4	4.2	19.1	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	6.6	13.4	4.2	19.1	5.3
Queue Length 50th (ft)	14	63	43	0	11	0
Queue Length 95th (ft)	50	87	67	15	50	26
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2018	3539	3319	1449	832	1404
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.27	0.12	0.04	0.07	0.13

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative (2040)
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	139	912	377	52	54	166
Future Volume (veh/h)	139	912	377	52	54	166
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1856	1870	1870
Adj Flow Rate, veh/h	145	950	389	54	57	177
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	3	2	2
Cap, veh/h	681	1941	894	384	404	633
Arrive On Green	0.20	0.55	0.25	0.25	0.23	0.23
Sat Flow, veh/h	3456	3647	3647	1525	1781	2790
Grp Volume(v), veh/h	145	950	389	54	57	177
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1525	1781	1395
Q Serve(g_s), s	1.4	6.8	3.8	1.1	1.0	2.1
Cycle Q Clear(g_c), s	1.4	6.8	3.8	1.1	1.0	2.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	681	1941	894	384	404	633
V/C Ratio(X)	0.21	0.49	0.44	0.14	0.14	0.28
Avail Cap(c_a), veh/h	2107	3467	3900	1674	869	1361
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.8	5.8	12.9	11.9	12.7	13.1
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.1	1.1	0.3	0.4	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.9	5.8	13.0	12.0	12.7	13.2
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		1095	443		234	
Approach Delay, s/veh		6.9	12.9		13.1	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.1	15.6			27.7	13.3
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.4	5.8			8.8	4.1
Green Ext Time (p_c), s	0.3	1.6			4.3	0.4

Intersection Summary

HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
4: W Jack London Blvd & Wolf House Dr

Cumulative (2040)
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	20	977	423	18	25	41
v/c Ratio	0.03	0.41	0.19	0.02	0.03	0.06
Control Delay	18.5	7.4	9.0	6.7	12.4	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	7.4	9.0	6.7	12.4	5.6
Queue Length 50th (ft)	2	65	23	0	3	0
Queue Length 95th (ft)	27	195	113	13	23	19
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1475	3539	3266	1420	1201	1107
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.28	0.13	0.01	0.02	0.04
Intersection Summary						

HCM 6th Signalized Intersection Summary
4: W Jack London Blvd & Wolf House Dr

Cumulative (2040)
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↗	↑	↙	↘
Traffic Volume (veh/h)	19	948	393	17	23	38
Future Volume (veh/h)	19	948	393	17	23	38
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1811	1841
Adj Flow Rate, veh/h	20	977	423	18	25	41
Peak Hour Factor	0.97	0.97	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	6	4
Cap, veh/h	91	1898	1221	530	246	222
Arrive On Green	0.05	0.53	0.34	0.34	0.14	0.14
Sat Flow, veh/h	1781	3647	3647	1542	1725	1560
Grp Volume(v), veh/h	20	977	423	18	25	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1542	1725	1560
Q Serve(g_s), s	0.3	5.1	2.6	0.2	0.4	0.7
Cycle Q Clear(g_c), s	0.3	5.1	2.6	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	91	1898	1221	530	246	222
V/C Ratio(X)	0.22	0.51	0.35	0.03	0.10	0.18
Avail Cap(c_a), veh/h	1859	5562	5562	2413	1200	1085
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.1	4.3	7.0	6.3	10.7	10.9
Incr Delay (d2), s/veh	0.9	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.4	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.0	4.4	7.1	6.3	10.8	11.0
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		997	441		66	
Approach Delay, s/veh		4.6	7.1		10.9	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.5	15.2			20.7	8.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.3	4.6			7.1	2.7
Green Ext Time (p_c), s	0.0	1.7			4.5	0.1

Intersection Summary

HCM 6th Ctrl Delay	5.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
5: W Jack London Blvd & Ambassador Dwy

Cumulative (2040)
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	980	418	0	0	0
Future Vol, veh/h	0	980	418	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	94	94	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1065	445	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	445	0	-	0	978 223
Stage 1	-	-	-	-	445 -
Stage 2	-	-	-	-	533 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	1112	-	-	-	248 780
Stage 1	-	-	-	-	613 -
Stage 2	-	-	-	-	553 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1112	-	-	-	248 780
Mov Cap-2 Maneuver	-	-	-	-	248 -
Stage 1	-	-	-	-	613 -
Stage 2	-	-	-	-	553 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1112	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

HCM 6th TWSC
6: W Jack London Blvd & Airport Dwy

Cumulative (2040)
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	967	427	0	0	1
Future Vol, veh/h	3	967	427	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1051	464	0	0	1

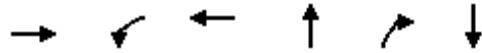
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	464	0	-	0	996
Stage 1	-	-	-	-	464
Stage 2	-	-	-	-	532
Critical Hdwy	4.14	-	-	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	2.22	-	-	-	3.52
Pot Cap-1 Maneuver	1094	-	-	-	241
Stage 1	-	-	-	-	599
Stage 2	-	-	-	-	553
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1094	-	-	-	240
Mov Cap-2 Maneuver	-	-	-	-	240
Stage 1	-	-	-	-	597
Stage 2	-	-	-	-	553

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1094	-	-	-	770
HCM Lane V/C Ratio	0.003	-	-	-	0.001
HCM Control Delay (s)	8.3	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues
7: Discovery Dr & W Jack London Blvd

Cumulative (2040)
Timing Plan: PM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1055	13	418	25	18	14
v/c Ratio	0.37	0.04	0.14	0.06	0.05	0.04
Control Delay	6.6	21.4	3.3	20.2	0.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	21.4	3.3	20.2	0.3	0.2
Queue Length 50th (ft)	0	1	0	3	0	0
Queue Length 95th (ft)	255	20	57	31	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	2884	1139	3475	946	656	628
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.01	0.12	0.03	0.03	0.02
Intersection Summary						

HCM 6th Signalized Intersection Summary

7: Discovery Dr & W Jack London Blvd

Cumulative (2040)
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	948	23	12	385	0	23	0	17	10	0	3
Future Volume (veh/h)	0	948	23	12	385	0	23	0	17	10	0	3
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		1.00	1.00		1.00	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	0	1870	1870	1530	1870	0	1870	1870	1278	1870	1870	1870
Adj Flow Rate, veh/h	0	1030	25	13	418	0	25	0	18	11	0	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	25	2	0	2	2	42	2	2	2
Cap, veh/h	0	1480	36	39	1948	0	153	0	93	30	0	8
Arrive On Green	0.00	0.42	0.42	0.03	0.55	0.00	0.09	0.00	0.09	0.02	0.00	0.02
Sat Flow, veh/h	0	3637	86	1457	3647	0	1781	0	1083	1363	0	372
Grp Volume(v), veh/h	0	516	539	13	418	0	25	0	18	14	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1853	1457	1777	0	1781	0	1083	1735	0	0
Q Serve(g_s), s	0.0	9.2	9.2	0.3	2.3	0.0	0.5	0.0	0.6	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	9.2	9.2	0.3	2.3	0.0	0.5	0.0	0.6	0.3	0.0	0.0
Prop In Lane	0.00		0.05	1.00		0.00	1.00		1.00	0.79		0.21
Lane Grp Cap(c), veh/h	0	742	774	39	1948	0	153	0	93	38	0	0
V/C Ratio(X)	0.00	0.70	0.70	0.33	0.21	0.00	0.16	0.00	0.19	0.37	0.00	0.00
Avail Cap(c_a), veh/h	0	1379	1438	1131	2758	0	922	0	560	539	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.2	9.2	18.5	4.5	0.0	16.4	0.0	16.4	18.6	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.8	1.8	0.0	0.0	0.2	0.0	0.4	2.3	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.1	2.2	0.1	0.3	0.0	0.2	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.1	10.1	20.3	4.5	0.0	16.6	0.0	16.8	20.9	0.0	0.0
LnGrp LOS	A	B	B	C	A	A	B	A	B	C	A	A
Approach Vol, veh/h		1055			431			43				14
Approach Delay, s/veh		10.1			5.0			16.7				20.9
Approach LOS		B			A			B				C
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.0	21.4		4.8		26.5		7.3				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	11.2		2.3		4.3		2.6				
Green Ext Time (p_c), s	0.0	4.9		0.0		2.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative (2040)
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	4	1077	28	426	8	87
v/c Ratio	0.01	0.50	0.12	0.18	0.02	0.24
Control Delay	21.5	9.0	21.8	5.1	20.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	9.0	21.8	5.1	20.7	3.6
Queue Length 50th (ft)	1	64	6	20	2	0
Queue Length 95th (ft)	9	191	29	61	13	14
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	606	2848	566	3198	1128	752
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.38	0.05	0.13	0.01	0.12
Intersection Summary						

HCM 6th Signalized Intersection Summary
 8: Voyager St & W Jack London Blvd

Cumulative (2040)
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗		↕	
Traffic Volume (veh/h)	4	978	13	26	392	0	7	0	80	0	0	0
Future Volume (veh/h)	4	978	13	26	392	0	7	0	80	0	0	0
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		1.00	1.00		1.00	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	1870	1870	1870	788	1870	1870	1870	1870	1203	1870	1870	1870
Adj Flow Rate, veh/h	4	1063	14	28	426	0	8	0	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	75	2	2	2	2	47	2	2	2
Cap, veh/h	14	1584	21	41	1733	0	242	0	139	0	5	0
Arrive On Green	0.01	0.44	0.44	0.05	0.49	0.00	0.14	0.00	0.14	0.00	0.00	0.00
Sat Flow, veh/h	1781	3590	47	751	3647	0	1781	0	1020	0	1870	0
Grp Volume(v), veh/h	4	526	551	28	426	0	8	0	87	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1861	751	1777	0	1781	0	1020	0	1870	0
Q Serve(g_s), s	0.1	8.5	8.5	1.3	2.5	0.0	0.1	0.0	2.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	8.5	8.5	1.3	2.5	0.0	0.1	0.0	2.9	0.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	14	784	821	41	1733	0	243	0	139	0	5	0
V/C Ratio(X)	0.29	0.67	0.67	0.69	0.25	0.00	0.03	0.00	0.63	0.00	0.00	0.00
Avail Cap(c_a), veh/h	592	1723	1804	416	3446	0	1234	0	706	0	622	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	17.8	8.0	8.0	16.8	5.4	0.0	13.5	0.0	14.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.4	0.7	0.7	7.4	0.1	0.0	0.0	0.0	1.7	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.7	1.8	0.3	0.4	0.0	0.0	0.0	0.6	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	8.8	8.7	24.2	5.4	0.0	13.5	0.0	16.5	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	A	A	A
Approach Vol, veh/h		1081			454			95				0
Approach Delay, s/veh		8.8			6.6			16.2				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	21.2		0.0	4.3	22.9		8.9				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.3	10.5		0.0	2.1	4.5		4.9				
Green Ext Time (p_c), s	0.0	5.4		0.0	0.0	2.1		0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative (2040)
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	138	666	284	179	264	439	99	1810	206	412	2053	89
v/c Ratio	0.39	1.05	0.66	0.43	0.77	0.74	0.28	0.85	0.27	1.06	0.95	0.13
Control Delay	61.9	101.3	23.7	61.1	66.5	40.3	61.1	39.9	9.4	118.9	48.4	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.9	101.3	23.7	61.1	66.5	40.3	61.1	39.9	9.4	118.9	48.4	1.3
Queue Length 50th (ft)	55	~325	66	71	212	270	39	493	30	~188	601	0
Queue Length 95th (ft)	113	422	178	140	345	458	86	709	97	#409	#899	9
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	350	1467	743	517	834	592	502	2631	903	388	2455	757
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.45	0.38	0.35	0.32	0.74	0.20	0.69	0.23	1.06	0.84	0.12

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Cumulative (2040)
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↔	↔↔	↑	↔	↔↔	↑↑↑	↔	↔↔	↑↑↑	↔
Traffic Volume (veh/h)	127	613	261	165	243	404	95	1738	198	379	1889	82
Future Volume (veh/h)	127	613	261	165	243	404	95	1738	198	379	1889	82
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		1.00	1.00		1.00	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	1707	1870	1826	1870	1856	1870	1826	1841	1870	1870	1826	1663
Adj Flow Rate, veh/h	138	666	284	179	264	439	99	1810	206	412	2053	89
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Percent Heavy Veh, %	13	2	5	2	3	2	5	4	2	2	5	16
Cap, veh/h	334	892	388	391	480	578	328	1912	603	367	1942	549
Arrive On Green	0.11	0.25	0.25	0.11	0.26	0.26	0.10	0.38	0.38	0.11	0.39	0.39
Sat Flow, veh/h	3155	3554	1546	3456	1856	1585	3374	5025	1585	3456	4985	1409
Grp Volume(v), veh/h	138	666	284	179	264	439	99	1810	206	412	2053	89
Grp Sat Flow(s),veh/h/ln	1577	1777	1546	1728	1856	1585	1687	1675	1585	1728	1662	1409
Q Serve(g_s), s	5.8	24.4	23.8	6.8	17.4	34.3	3.9	49.2	13.1	15.0	55.0	5.8
Cycle Q Clear(g_c), s	5.8	24.4	23.8	6.8	17.4	34.3	3.9	49.2	13.1	15.0	55.0	5.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	334	892	388	391	480	578	328	1912	603	367	1942	549
V/C Ratio(X)	0.41	0.75	0.73	0.46	0.55	0.76	0.30	0.95	0.34	1.12	1.06	0.16
Avail Cap(c_a), veh/h	335	892	388	490	789	842	478	2492	786	367	1942	549
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	59.0	48.7	48.5	58.5	45.2	39.4	59.3	42.3	31.1	63.1	43.1	28.1
Incr Delay (d2), s/veh	0.3	3.1	6.1	0.3	0.4	1.2	0.2	6.5	0.1	84.2	37.4	0.1
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	2.3	10.9	9.6	3.0	7.9	13.1	1.6	20.5	4.9	10.8	28.3	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.3	51.8	54.6	58.8	45.6	40.5	59.5	48.8	31.2	147.3	80.5	28.1
LnGrp LOS	E	D	D	E	D	D	E	D	C	F	F	C
Approach Vol, veh/h		1088			882			2115			2554	
Approach Delay, s/veh		53.5			45.8			47.6			89.4	
Approach LOS		D			D			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	59.5	20.7	41.2	18.4	60.8	19.6	42.3				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	17.0	51.2	8.8	26.4	5.9	57.0	7.8	36.3				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	64.4
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative (2040)
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	32	49	20	2153	2448	42
v/c Ratio	0.08	0.14	0.07	0.53	0.64	0.05
Control Delay	22.6	9.3	22.7	4.1	8.8	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	9.3	22.7	4.1	8.8	4.0
Queue Length 50th (ft)	5	0	3	114	146	2
Queue Length 95th (ft)	16	14	12	146	#441	16
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1413	1163	1055	5036	3819	864
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.02	0.43	0.64	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative (2040)
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	29	45	19	2002	2252	39
Future Volume (veh/h)	29	45	19	2002	2252	39
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1678	1663	1100	1856	1841	1248
Adj Flow Rate, veh/h	32	49	20	2153	2448	42
Peak Hour Factor	0.92	0.92	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	15	16	54	3	4	44
Cap, veh/h	295	236	69	3463	2684	565
Arrive On Green	0.10	0.10	0.03	0.68	0.53	0.53
Sat Flow, veh/h	3100	2480	2032	5233	5191	1058
Grp Volume(v), veh/h	32	49	20	2153	2448	42
Grp Sat Flow(s),veh/h/ln	1550	1240	1016	1689	1675	1058
Q Serve(g_s), s	0.5	0.9	0.5	11.5	21.8	0.9
Cycle Q Clear(g_c), s	0.5	0.9	0.5	11.5	21.8	0.9
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	295	236	69	3463	2684	565
V/C Ratio(X)	0.11	0.21	0.29	0.62	0.91	0.07
Avail Cap(c_a), veh/h	1572	1258	1030	3463	3058	644
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	20.4	20.6	23.2	4.3	10.4	5.6
Incr Delay (d2), s/veh	0.1	0.2	0.8	0.3	4.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.6	0.1	0.8	5.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.4	20.7	24.1	4.5	14.4	5.6
LnGrp LOS	C	C	C	A	B	A
Approach Vol, veh/h	81			2173	2490	
Approach Delay, s/veh	20.6			4.7	14.3	
Approach LOS	C			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		39.9		9.4	7.4	32.5
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		13.5		2.9	2.5	23.8
Green Ext Time (p_c), s		2.9		0.0	0.0	2.5

Intersection Summary

HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative (2040)
Timing Plan: PM Peak















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	122	762	1442	124	535	1975
v/c Ratio	0.12	1.03	0.76	0.06	0.64	0.96
Control Delay	25.0	59.5	27.1	2.1	38.2	29.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	59.5	27.1	2.1	38.2	29.0
Queue Length 50th (ft)	26	-292	249	4	101	492
Queue Length 95th (ft)	50	#536	326	13	136	#674
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	979	737	1972	2014	1138	2333
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	1.03	0.73	0.06	0.47	0.85

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative (2040)
 Timing Plan: PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	112	701	1327	114	492	1817
Future Volume (veh/h)	112	701	1327	114	492	1817
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1826	1841	1870	1826
Adj Flow Rate, veh/h	122	762	1442	124	535	1975
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	5	4	2	5
Cap, veh/h	1039	476	1903	1873	720	2009
Arrive On Green	0.30	0.30	0.38	0.38	0.14	0.58
Sat Flow, veh/h	3456	1585	5149	2745	5023	3561
Grp Volume(v), veh/h	122	762	1442	124	535	1975
Grp Sat Flow(s),veh/h/ln	1728	1585	1662	1373	1674	1735
Q Serve(g_s), s	2.1	25.0	20.9	1.2	8.5	46.3
Cycle Q Clear(g_c), s	2.1	25.0	20.9	1.2	8.5	46.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1039	476	1903	1873	720	2009
V/C Ratio(X)	0.12	1.60	0.76	0.07	0.74	0.98
Avail Cap(c_a), veh/h	1039	476	2098	1981	1208	2009
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.1	29.1	22.4	4.4	34.2	17.1
Incr Delay (d2), s/veh	0.0	279.4	1.7	0.0	1.5	16.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	45.9	7.4	0.3	3.3	18.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.1	308.4	24.0	4.4	35.7	33.3
LnGrp LOS	C	F	C	A	D	C
Approach Vol, veh/h	884		1566			2510
Approach Delay, s/veh	268.8		22.5			33.8
Approach LOS	F		C			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	16.4	37.2			53.7	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	10.5	22.9			48.3	27.0
Green Ext Time (p_c), s	1.4	8.8			0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			72.1			
HCM 6th LOS			E			

Queues
12: Isabel Ave & Airway Blvd

Cumulative (2040)
Timing Plan: PM Peak



























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	16	153	368	46	84	357	220	2217	41	337	2127
v/c Ratio	0.06	0.48	0.56	0.17	0.17	0.45	0.88	1.08	0.06	0.80	1.10
Control Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	75.1	0.2	60.5	83.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	75.1	0.2	60.5	83.6
Queue Length 50th (ft)	9	97	89	27	39	31	146	~635	0	113	~614
Queue Length 95th (ft)	35	157	170	76	93	118	#388	#1040	0	#257	#1012
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	267	449	656	269	564	796	251	2058	689	440	1938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.34	0.56	0.17	0.15	0.45	0.88	1.08	0.06	0.77	1.10

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Cumulative (2040)
 Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	141	339	42	77	328	202	2040	38	310	1945	12
Future Volume (veh/h)	15	141	339	42	77	328	202	2040	38	310	1945	12
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		1.00	1.00		1.00	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	1752	1737	1870	1870	1870	1870	1870	1841	1781	1826	1811	1811
Adj Flow Rate, veh/h	16	153	368	46	84	357	220	2217	41	337	2114	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	11	2	2	2	2	2	4	8	5	6	6
Cap, veh/h	94	367	538	184	483	594	229	1861	559	393	1816	11
Arrive On Green	0.06	0.21	0.21	0.10	0.26	0.26	0.13	0.37	0.37	0.12	0.36	0.36
Sat Flow, veh/h	1668	1737	1583	1781	1870	1585	1781	5025	1510	3374	5070	31
Grp Volume(v), veh/h	16	153	368	46	84	357	220	2217	41	337	1374	753
Grp Sat Flow(s),veh/h/ln	1668	1737	1583	1781	1870	1585	1781	1675	1510	1687	1648	1805
Q Serve(g_s), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Cycle Q Clear(g_c), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	94	367	538	184	483	594	229	1861	559	393	1181	647
V/C Ratio(X)	0.17	0.42	0.68	0.25	0.17	0.60	0.96	1.19	0.07	0.86	1.16	1.16
Avail Cap(c_a), veh/h	245	367	538	245	483	594	229	1861	559	403	1181	647
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	48.9	37.1	30.9	44.9	31.3	27.5	47.2	34.3	22.2	47.2	34.9	34.9
Incr Delay (d2), s/veh	0.3	0.3	3.0	0.3	0.1	1.2	47.9	91.7	0.0	15.5	83.2	90.1
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	0.4	3.4	8.4	1.1	1.7	7.4	8.8	31.1	0.7	5.2	28.2	32.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.3	37.4	33.9	45.2	31.4	28.7	95.1	126.0	22.2	62.8	118.1	125.1
LnGrp LOS	D	D	C	D	C	C	F	F	C	E	F	F
Approach Vol, veh/h		537			487			2478			2464	
Approach Delay, s/veh		35.3			30.7			121.5			112.7	
Approach LOS		D			C			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	46.1	16.3	28.8	19.0	44.8	11.1	33.9				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	12.7	42.3	4.6	23.8	15.4	41.0	3.0	21.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	102.7
HCM 6th LOS	F

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
 13: Atlantis Ct & Discovery Dr

Cumulative (2040)
 Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	12	23	19	9	35
Future Vol, veh/h	25	12	23	19	9	35
Conflicting Peds, #/hr	0	1	1	0	4	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	13	56	38	33	50
Mvmt Flow	27	13	25	21	10	38

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	41	0	110 35
Stage 1	-	-	-	-	35 -
Stage 2	-	-	-	-	75 -
Critical Hdwy	-	-	4.66	-	6.73 6.7
Critical Hdwy Stg 1	-	-	-	-	5.73 -
Critical Hdwy Stg 2	-	-	-	-	5.73 -
Follow-up Hdwy	-	-	2.704	-	3.797 3.75
Pot Cap-1 Maneuver	-	-	1282	-	818 916
Stage 1	-	-	-	-	913 -
Stage 2	-	-	-	-	875 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1281	-	798 915
Mov Cap-2 Maneuver	-	-	-	-	798 -
Stage 1	-	-	-	-	912 -
Stage 2	-	-	-	-	854 -

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	888	-	-	1281	-
HCM Lane V/C Ratio	0.054	-	-	0.02	-
HCM Control Delay (s)	9.3	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative (2040)
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	57	1	10	32	25	4	7	34	16	3	4
Future Vol, veh/h	4	57	1	10	32	25	4	7	34	16	3	4
Conflicting Peds, #/hr	1	0	0	0	0	1	19	0	9	9	0	19
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	31	2	2	55	65	67	2	13	2	2	2
Mvmt Flow	4	58	1	11	35	27	4	8	37	17	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	63	0	0	59	0	0	160	152	68	170	139	69
Stage 1	-	-	-	-	-	-	67	67	-	72	72	-
Stage 2	-	-	-	-	-	-	93	85	-	98	67	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.77	6.52	6.33	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.77	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	4.103	4.018	3.417	3.518	4.018	3.318
Pot Cap-1 Maneuver	1540	-	-	1545	-	-	680	740	965	794	752	994
Stage 1	-	-	-	-	-	-	803	839	-	938	835	-
Stage 2	-	-	-	-	-	-	776	824	-	908	839	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1539	-	-	1545	-	-	658	732	957	745	744	975
Mov Cap-2 Maneuver	-	-	-	-	-	-	658	732	-	745	744	-
Stage 1	-	-	-	-	-	-	801	836	-	934	828	-
Stage 2	-	-	-	-	-	-	750	817	-	855	836	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			1.1			9.3			9.8		
HCM LOS							A			A		

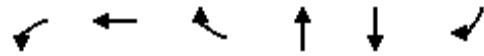
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	879	1539	-	-	1545	-	-	777
HCM Lane V/C Ratio	0.056	0.003	-	-	0.007	-	-	0.032
HCM Control Delay (s)	9.3	7.3	0	-	7.3	0	-	9.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative (2040)

Timing Plan: PM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	177	178	873	1172	1466	842
v/c Ratio	0.42	0.42	0.75	1.32	0.66	0.64
Control Delay	27.1	27.0	22.2	172.5	10.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	27.0	22.2	172.5	10.5	3.0
Queue Length 50th (ft)	67	67	176	~688	206	0
Queue Length 95th (ft)	144	144	246	#1079	267	36
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	459	461	1419	891	2597	1385
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.39	0.62	1.32	0.56	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.



















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative (2040)

Timing Plan: PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	320	6	803	0	1078	0	0	1349	775	
Future Volume (vph)	0	0	0	320	6	803	0	1078	0	0	1349	775	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1681	1689	2787		1863			3539	1583	
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1681	1689	2787		1863			3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	348	7	873	0	1172	0	0	1466	842	
RTOR Reduction (vph)	0	0	0	0	0	27	0	0	0	0	0	312	
Lane Group Flow (vph)	0	0	0	177	178	846	0	1172	0	0	1466	530	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				18.7	18.7	29.8		35.2			46.3	46.3	
Effective Green, g (s)				18.7	18.7	29.8		35.2			46.3	46.3	
Actuated g/C Ratio				0.25	0.25	0.41		0.48			0.63	0.63	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				427	429	1129		892			2229	997	
v/s Ratio Prot								c0.63			0.41		
v/s Ratio Perm				0.11	0.11	c0.30						0.33	
v/c Ratio				0.41	0.41	0.75		1.31			0.66	0.53	
Uniform Delay, d1				22.8	22.8	18.7		19.1			8.6	7.6	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	2.4		149.2			0.5	0.3	
Delay (s)				23.1	23.1	21.1		168.4			9.1	7.8	
Level of Service				C	C	C		F			A	A	
Approach Delay (s)		0.0			21.7			168.4			8.7		
Approach LOS		A			C			F			A		
Intersection Summary													
HCM 2000 Control Delay			51.8		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio			1.12										
Actuated Cycle Length (s)			73.5		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			92.2%		ICU Level of Service					F			
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative (2040)

Timing Plan: PM Peak

























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	576	521	1217	584	1025
v/c Ratio	0.64	0.62	0.65	0.34	0.55
Control Delay	18.9	14.4	8.9	1.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	14.4	8.9	1.2	7.7
Queue Length 50th (ft)	59	39	85	0	66
Queue Length 95th (ft)	146	117	184	17	145
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2305	1922	3140	2478	3140
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.27	0.39	0.24	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative (2040)
 Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					 	 		 	
Traffic Volume (vph)	530	0	479	0	0	0	0	1168	561	0	943	0
Future Volume (vph)	530	0	479	0	0	0	0	1168	561	0	943	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.95	0.88		0.95	
Frbp, ped/bikes	1.00		1.00					1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2787					3539	2719		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2787					3539	2719		3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	576	0	521	0	0	0	0	1217	584	0	1025	0
RTOR Reduction (vph)	0	0	113	0	0	0	0	0	270	0	0	0
Lane Group Flow (vph)	576	0	408	0	0	0	0	1217	314	0	1025	0
Confl. Peds. (#/hr)									4			
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	11.0		11.0					22.1	22.1		22.1	
Effective Green, g (s)	11.0		11.0					22.1	22.1		22.1	
Actuated g/C Ratio	0.27		0.27					0.54	0.54		0.54	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	918		745					1902	1462		1902	
v/s Ratio Prot								c0.34			0.29	
v/s Ratio Perm	c0.17		0.15						0.12			
v/c Ratio	0.63		0.55					0.64	0.21		0.54	
Uniform Delay, d1	13.2		12.9					6.7	5.0		6.2	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	1.0		0.4					0.5	0.0		0.1	
Delay (s)	14.2		13.4					7.2	5.0		6.3	
Level of Service	B		B					A	A		A	
Approach Delay (s)		13.8			0.0			6.5			6.3	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.5								HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			41.1								Sum of lost time (s)	8.0
Intersection Capacity Utilization			67.7%								ICU Level of Service	C
Analysis Period (min)			15									

c Critical Lane Group

Appendix G – Cumulative plus Project(s) Conditions Intersection Level of Service and Queueing Work Sheets

Queues

Cumulative plus SMP 39

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: AM Peak



























Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	208	84	7	312	500	4	89	3	500	142	458
v/c Ratio	0.33	0.06	0.03	0.38	0.31	0.02	0.21	0.01	0.50	0.19	0.29
Control Delay	33.7	17.9	40.7	26.0	1.9	41.0	28.0	0.0	28.0	14.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	17.9	40.7	26.0	1.9	41.0	28.0	0.0	28.0	14.9	0.5
Queue Length 50th (ft)	25	9	1	51	0	1	10	0	57	16	0
Queue Length 95th (ft)	78	42	10	141	30	7	32	0	156	54	0
Internal Link Dist (ft)		745		868			220			816	
Turn Bay Length (ft)	400		350			110		110	600		420
Base Capacity (vph)	1707	2140	767	1858	2571	622	1517	506	3689	1832	1599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.04	0.01	0.17	0.19	0.01	0.06	0.01	0.14	0.08	0.29

Intersection Summary

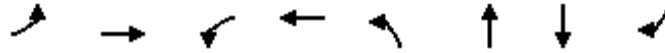
HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative plus SMP 39
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	191	77	0	6	287	460	4	82	3	460	131	421
Future Volume (veh/h)	191	77	0	6	287	460	4	82	3	460	131	421
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		1.00	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	1870	1856	1870	1648	1870	1826	1530	522	418	1767	685	1885
Adj Flow Rate, veh/h	208	84	0	7	312	500	4	89	3	500	142	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	2	17	2	5	25	93	100	9	82	1
Cap, veh/h	470	1180	531	28	890	1126	12	154	38	789	351	
Arrive On Green	0.09	0.33	0.00	0.01	0.25	0.25	0.00	0.11	0.11	0.17	0.27	0.00
Sat Flow, veh/h	5023	3526	1585	3045	3554	2688	2826	1424	353	4745	1301	1598
Grp Volume(v), veh/h	208	84	0	7	312	500	4	89	3	500	142	0
Grp Sat Flow(s),veh/h/ln	1674	1763	1585	1522	1777	1344	1413	475	353	1582	651	1598
Q Serve(g_s), s	2.0	0.8	0.0	0.1	3.6	6.7	0.1	3.0	0.4	5.0	4.5	0.0
Cycle Q Clear(g_c), s	2.0	0.8	0.0	0.1	3.6	6.7	0.1	3.0	0.4	5.0	4.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	470	1180	531	28	890	1126	12	154	38	789	351	
V/C Ratio(X)	0.44	0.07	0.00	0.25	0.35	0.44	0.33	0.58	0.08	0.63	0.40	
Avail Cap(c_a), veh/h	1988	2490	1120	904	2158	2086	727	930	231	4694	1820	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.7	11.5	0.0	24.9	15.6	10.6	25.1	21.5	20.3	19.6	15.1	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.7	0.2	0.3	5.7	2.6	0.6	0.6	0.6	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.3	0.0	0.0	1.2	1.5	0.0	0.3	0.0	1.6	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.9	11.5	0.0	26.5	15.8	10.8	30.7	24.0	20.9	20.3	15.7	0.0
LnGrp LOS	C	B	A	C	B	B	C	C	C	C	B	
Approach Vol, veh/h		292			819			96			642	A
Approach Delay, s/veh		18.9			12.9			24.2			19.3	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	18.0	12.4	11.5	4.5	22.2	4.2	19.6				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	4.0	8.7	7.0	5.0	2.1	2.8	2.1	6.5				
Green Ext Time (p_c), s	0.3	3.9	1.4	0.4	0.0	0.4	0.0	0.8				
Intersection Summary												
HCM 6th Ctrl Delay			16.6									
HCM 6th LOS			B									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
User approved changes to right turn type.												
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.												

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	73	453	17	851	8	8	14	14
v/c Ratio	0.05	0.13	0.03	0.23	0.01	0.01	0.02	0.01
Control Delay	26.3	11.0	33.1	15.9	21.6	17.6	31.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	11.0	33.1	15.9	21.6	17.6	31.6	0.0
Queue Length 50th (ft)	4	0	2	30	1	1	2	0
Queue Length 95th (ft)	47	117	34	172	15	13	29	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2453	3968	1054	5026	1013	1009	988	1772
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.11	0.02	0.17	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	71	438	1	16	767	16	10	1	4	9	4	13
Future Volume (vph)	71	438	1	16	767	16	10	1	4	9	4	13
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	4705		1703	6326		1559	1551			1595	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	4705		1703	6326		1559	1551			1595	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	452	1	17	834	17	11	1	4	10	4	14
RTOR Reduction (vph)	0	0	0	0	2	0	0	4	0	0	0	13
Lane Group Flow (vph)	73	453	0	17	849	0	8	4	0	0	14	1
Confl. Peds. (#/hr)			3			3			3			
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	4%	10%	100%	6%	3%	2%	10%	2%	2%	11%	25%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	6.3	26.3		0.8	20.8		4.8	4.8			2.6	2.6
Effective Green, g (s)	6.3	26.3		0.8	20.8		4.8	4.8			2.6	2.6
Actuated g/C Ratio	0.12	0.51		0.02	0.40		0.09	0.09			0.05	0.05
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	409	2388		26	2540		144	143			80	139
v/s Ratio Prot	c0.02	0.10		c0.01	c0.13		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.18	0.19		0.65	0.33		0.06	0.03			0.17	0.01
Uniform Delay, d1	20.4	6.9		25.4	10.7		21.4	21.4			23.6	23.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	0.0		37.0	0.0		0.1	0.1			0.4	0.0
Delay (s)	20.6	7.0		62.3	10.7		21.6	21.4			24.0	23.4
Level of Service	C	A		E	B		C	C			C	C
Approach Delay (s)		8.8			11.8			21.5			23.7	
Approach LOS		A			B			C			C	

Intersection Summary

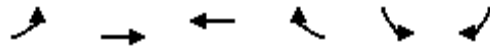
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	51.8	Sum of lost time (s)	17.3
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 39

Timing Plan: AM Peak



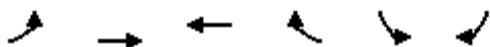
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	73	421	834	48	11	45
v/c Ratio	0.06	0.17	0.38	0.05	0.02	0.04
Control Delay	17.0	3.3	11.0	4.3	18.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	3.3	11.0	4.3	18.1	7.5
Queue Length 50th (ft)	9	23	109	0	3	0
Queue Length 95th (ft)	24	37	159	16	14	11
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2355	3252	3206	1433	1113	1769
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.13	0.26	0.03	0.01	0.03

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	67	387	767	44	10	41
Future Volume (veh/h)	67	387	767	44	10	41
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1737	1856	1870	1870	1870
Adj Flow Rate, veh/h	73	421	834	48	11	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	11	3	2	2	2
Cap, veh/h	500	2040	1272	558	213	334
Arrive On Green	0.14	0.62	0.36	0.36	0.12	0.12
Sat Flow, veh/h	3456	3387	3618	1548	1781	2790
Grp Volume(v), veh/h	73	421	834	48	11	45
Grp Sat Flow(s),veh/h/ln	1728	1650	1763	1548	1781	1395
Q Serve(g_s), s	0.7	2.0	7.0	0.7	0.2	0.5
Cycle Q Clear(g_c), s	0.7	2.0	7.0	0.7	0.2	0.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	500	2040	1272	558	213	334
V/C Ratio(X)	0.15	0.21	0.66	0.09	0.05	0.13
Avail Cap(c_a), veh/h	2437	3724	4475	1965	1005	1574
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.2	3.0	9.5	7.5	13.8	14.0
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	1.5	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.3	3.0	9.7	7.5	13.9	14.0
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		494	882		56	
Approach Delay, s/veh		4.5	9.6		14.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.1	18.1			27.2	8.2
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.7	9.0			4.0	2.5
Green Ext Time (p_c), s	0.1	3.8			1.7	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues

Cumulative plus SMP 39

4: W Jack London Blvd & Wolf House Dr

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	4	428	842	22	32	38
v/c Ratio	0.01	0.19	0.37	0.02	0.04	0.06
Control Delay	14.8	4.5	7.8	6.3	13.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	4.5	7.8	6.3	13.9	7.3
Queue Length 50th (ft)	1	24	54	1	4	0
Queue Length 95th (ft)	8	37	159	13	29	20
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1555	3252	3354	1478	1272	1149
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.13	0.25	0.01	0.03	0.03

Intersection Summary

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↷
Traffic Volume (veh/h)	4	394	775	20	29	35
Future Volume (veh/h)	4	394	775	20	29	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1737	1856	1870	1870	1870
Adj Flow Rate, veh/h	4	428	842	22	32	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	11	3	2	2	2
Cap, veh/h	19	1769	1372	602	264	235
Arrive On Green	0.01	0.54	0.39	0.39	0.15	0.15
Sat Flow, veh/h	1781	3387	3618	1547	1781	1585
Grp Volume(v), veh/h	4	428	842	22	32	38
Grp Sat Flow(s),veh/h/ln	1781	1650	1763	1547	1781	1585
Q Serve(g_s), s	0.1	2.0	5.6	0.3	0.5	0.6
Cycle Q Clear(g_c), s	0.1	2.0	5.6	0.3	0.5	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	19	1769	1372	602	264	235
V/C Ratio(X)	0.21	0.24	0.61	0.04	0.12	0.16
Avail Cap(c_a), veh/h	1815	5044	5389	2364	1210	1077
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.4	3.6	7.2	5.6	10.9	10.9
Incr Delay (d2), s/veh	3.8	0.0	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.8	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.2	3.7	7.4	5.6	11.0	11.1
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		432	864		70	
Approach Delay, s/veh		3.8	7.3		11.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	16.8			21.1	8.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	7.6			4.0	2.6
Green Ext Time (p_c), s	0.0	3.8			1.7	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.4
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
 5: SMP 39 West Dwy/Ambassador Dwy & W Jack London Blvd

Cumulative plus SMP 39
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Traffic Vol, veh/h	3	311	99	134	767	0	30	0	43	0	0	1
Future Vol, veh/h	3	311	99	134	767	0	30	0	43	0	0	1
Conflicting Peds, #/hr	0	0	0	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	180	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	33	9	17	16	2	2	17	2	19	2	2	100
Mvmt Flow	3	338	108	146	834	0	33	0	47	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	834	0	0	446	0	0	1107	1524	223	1301	1578	417
Stage 1	-	-	-	-	-	-	398	398	-	1126	1126	-
Stage 2	-	-	-	-	-	-	709	1126	-	175	452	-
Critical Hdwy	4.76	-	-	4.42	-	-	7.84	6.54	7.28	7.54	6.54	8.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.84	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.84	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.53	-	-	2.36	-	-	3.67	4.02	3.49	3.52	4.02	4.3
Pot Cap-1 Maneuver	624	-	-	1017	-	-	147	117	731	118	108	379
Stage 1	-	-	-	-	-	-	560	601	-	218	278	-
Stage 2	-	-	-	-	-	-	358	278	-	810	569	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	624	-	-	1017	-	-	130	100	731	98	92	379
Mov Cap-2 Maneuver	-	-	-	-	-	-	130	100	-	98	92	-
Stage 1	-	-	-	-	-	-	557	598	-	217	238	-
Stage 2	-	-	-	-	-	-	306	238	-	755	566	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.4			25.7			14.5		
HCM LOS							D			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	252	624	-	-	1017	-	-	379
HCM Lane V/C Ratio	0.315	0.005	-	-	0.143	-	-	0.003
HCM Control Delay (s)	25.7	10.8	-	-	9.1	-	-	14.5
HCM Lane LOS	D	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.3	0	-	-	0.5	-	-	0

HCM 6th TWSC
6: SMP 39 East Dwy/Airport Dwy & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕		↵	↕			↕			↕	
Traffic Vol, veh/h	3	253	100	136	878	1	33	0	43	4	0	0
Future Vol, veh/h	3	253	100	136	878	1	33	0	43	4	0	0
Conflicting Peds, #/hr	0	0	0	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	300	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	7	18	16	4	100	18	2	14	25	2	2
Mvmt Flow	3	275	109	148	954	1	36	0	47	4	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	955	0	0	384	0	0	1109	1587	192	1395	1641	478
Stage 1	-	-	-	-	-	-	336	336	-	1251	1251	-
Stage 2	-	-	-	-	-	-	773	1251	-	144	390	-
Critical Hdwy	4.14	-	-	4.42	-	-	7.86	6.54	7.18	8	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.86	5.54	-	7	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.86	5.54	-	7	5.54	-
Follow-up Hdwy	2.22	-	-	2.36	-	-	3.68	4.02	3.44	3.75	4.02	3.32
Pot Cap-1 Maneuver	715	-	-	1077	-	-	145	107	781	82	99	534
Stage 1	-	-	-	-	-	-	609	640	-	151	242	-
Stage 2	-	-	-	-	-	-	324	242	-	781	606	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	715	-	-	1077	-	-	129	92	781	69	85	534
Mov Cap-2 Maneuver	-	-	-	-	-	-	129	92	-	69	85	-
Stage 1	-	-	-	-	-	-	607	637	-	150	209	-
Stage 2	-	-	-	-	-	-	279	209	-	731	604	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.2			27.1			60.7		
HCM LOS							D			F		

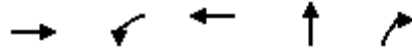
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	244	715	-	-	1077	-	-	69
HCM Lane V/C Ratio	0.339	0.005	-	-	0.137	-	-	0.063
HCM Control Delay (s)	27.1	10.1	-	-	8.9	-	-	60.7
HCM Lane LOS	D	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	1.4	0	-	-	0.5	-	-	0.2

Queues

7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 39

Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	325	25	1077	25	14
v/c Ratio	0.12	0.05	0.38	0.04	0.03
Control Delay	4.6	15.3	3.4	14.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	15.3	3.4	14.5	0.1
Queue Length 50th (ft)	0	2	0	1	0
Queue Length 95th (ft)	52	25	102	24	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	2885	1312	3438	1169	819
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.02	0.31	0.02	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary
7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	274	25	23	991	0	23	0	13	0	0	0
Future Volume (veh/h)	0	274	25	23	991	0	23	0	13	0	0	0
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		1.00	1.00		1.00	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	0	1781	1781	1604	1826	0	1870	1870	1100	1870	1870	1870
Adj Flow Rate, veh/h	0	298	27	25	1077	0	25	0	14	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	8	8	20	5	0	2	2	54	2	2	2
Cap, veh/h	0	1023	92	78	1868	0	152	0	80	0	8	0
Arrive On Green	0.00	0.33	0.33	0.05	0.54	0.00	0.09	0.00	0.09	0.00	0.00	0.00
Sat Flow, veh/h	0	3229	283	1527	3561	0	1781	0	932	0	1870	0
Grp Volume(v), veh/h	0	160	165	25	1077	0	25	0	14	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1692	1730	1527	1735	0	1781	0	932	0	1870	0
Q Serve(g_s), s	0.0	1.7	1.8	0.4	5.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.7	1.8	0.4	5.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Prop In Lane	0.00		0.16	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	551	564	78	1868	0	152	0	80	0	8	0
V/C Ratio(X)	0.00	0.29	0.29	0.32	0.58	0.00	0.16	0.00	0.18	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2052	2098	1852	4207	0	1440	0	754	0	907	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	6.2	6.2	11.3	3.8	0.0	10.5	0.0	10.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.9	0.2	0.0	0.2	0.0	0.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.4	6.4	12.2	4.0	0.0	10.7	0.0	10.9	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		325			1102			39				0
Approach Delay, s/veh		6.4			4.2			10.8				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.3	13.4		0.0		18.6		6.1				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	3.8		0.0		7.1		2.3				
Green Ext Time (p_c), s	0.0	1.3		0.0		6.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	320	73	1077	13	60
v/c Ratio	0.01	0.17	0.18	0.43	0.04	0.15
Control Delay	18.7	9.3	17.1	6.2	17.9	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	9.3	17.1	6.2	17.9	0.8
Queue Length 50th (ft)	1	30	13	64	2	0
Queue Length 95th (ft)	7	54	55	182	17	1
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	818	2873	880	3263	853	781
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.11	0.08	0.33	0.02	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary

8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	3	284	10	67	991	0	12	0	55	0	0	0
Future Volume (veh/h)	3	284	10	67	991	0	12	0	55	0	0	0
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		1.00	1.00		1.00	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	1870	1752	1752	1322	1826	1826	1870	1870	981	1870	1870	1870
Adj Flow Rate, veh/h	3	309	11	73	1077	0	13	0	60	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	39	5	5	2	2	62	2	2	2
Cap, veh/h	10	1211	43	148	1671	0	209	0	98	0	6	0
Arrive On Green	0.01	0.37	0.37	0.12	0.48	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3276	116	1259	3561	0	1781	0	831	0	1870	0
Grp Volume(v), veh/h	3	157	163	73	1077	0	13	0	60	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1664	1728	1259	1735	0	1781	0	831	0	1870	0
Q Serve(g_s), s	0.1	2.2	2.2	1.8	7.9	0.0	0.2	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	2.2	2.2	1.8	7.9	0.0	0.2	0.0	2.3	0.0	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	615	639	148	1671	0	209	0	98	0	6	0
V/C Ratio(X)	0.29	0.25	0.26	0.49	0.64	0.00	0.06	0.00	0.61	0.00	0.00	0.00
Avail Cap(c_a), veh/h	635	1731	1797	748	3607	0	1323	0	618	0	667	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	16.7	7.4	7.4	13.9	6.6	0.0	13.2	0.0	14.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.2	0.2	0.9	0.3	0.0	0.0	0.0	2.3	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.4	0.4	0.4	1.1	0.0	0.1	0.0	0.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.4	7.5	7.5	14.9	6.9	0.0	13.2	0.0	16.4	0.0	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		323			1150			73				0
Approach Delay, s/veh		7.7			7.4			15.9				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	17.7		0.0	4.2	21.5		8.0				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.8	4.2		0.0	2.1	9.9		4.3				
Green Ext Time (p_c), s	0.1	1.3		0.0	0.0	6.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	116	155	105	222	515	502	350	1852	209	287	1886	279
v/c Ratio	0.53	0.16	0.22	0.67	0.96	0.78	0.94	0.96	0.29	0.95	1.03	0.46
Control Delay	85.6	46.1	4.0	86.0	88.6	44.5	106.8	61.1	12.6	116.5	79.5	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.6	46.1	4.0	86.0	88.6	44.5	106.8	61.1	12.6	116.5	79.5	22.7
Queue Length 50th (ft)	65	68	0	127	569	406	204	743	45	169	-841	117
Queue Length 95th (ft)	108	102	27	182	730	548	#325	#936	118	#288	#1018	225
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	220	1144	528	403	656	647	384	1938	727	302	1831	611
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.14	0.20	0.55	0.79	0.78	0.91	0.96	0.29	0.95	1.03	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	107	143	97	204	474	462	322	1704	192	264	1735	257
Future Volume (veh/h)	107	143	97	204	474	462	322	1704	192	264	1735	257
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		0.99	1.00		1.00	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	1307	1856	1633	1870	1870	1870	1796	1752	1870	1870	1767	1633
Adj Flow Rate, veh/h	116	155	105	222	515	502	350	1852	209	287	1886	279
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	40	3	18	2	2	2	7	10	2	2	9	18
Cap, veh/h	212	1042	403	325	564	612	385	1908	632	305	1790	514
Arrive On Green	0.09	0.30	0.30	0.09	0.30	0.30	0.12	0.40	0.40	0.09	0.37	0.37
Sat Flow, veh/h	2415	3526	1365	3456	1870	1565	3319	4782	1584	3456	4823	1384
Grp Volume(v), veh/h	116	155	105	222	515	502	350	1852	209	287	1886	279
Grp Sat Flow(s),veh/h/ln	1208	1763	1365	1728	1870	1565	1659	1594	1584	1728	1608	1384
Q Serve(g_s), s	7.8	5.5	10.0	10.6	45.2	49.1	17.7	64.7	15.6	14.1	63.2	27.0
Cycle Q Clear(g_c), s	7.8	5.5	10.0	10.6	45.2	49.1	17.7	64.7	15.6	14.1	63.2	27.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	212	1042	403	325	564	612	385	1908	632	305	1790	514
V/C Ratio(X)	0.55	0.15	0.26	0.68	0.91	0.82	0.91	0.97	0.33	0.94	1.05	0.54
Avail Cap(c_a), veh/h	213	1042	403	406	659	691	390	1967	651	305	1790	514
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	74.4	44.2	45.8	74.7	57.3	46.6	74.4	50.2	35.4	77.2	53.5	42.2
Incr Delay (d2), s/veh	1.7	0.0	0.1	2.0	14.5	6.2	24.0	13.7	0.1	36.1	37.0	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.4	3.4	4.7	23.2	19.7	8.7	27.2	6.0	7.7	31.0	9.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.1	44.2	45.9	76.6	71.8	52.8	98.3	63.8	35.5	113.3	90.5	42.8
LnGrp LOS	E	D	D	E	E	D	F	E	D	F	F	D
Approach Vol, veh/h		376			1239			2411			2452	
Approach Delay, s/veh		54.5			65.0			66.4			87.8	
Approach LOS		D			E			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	73.7	20.7	56.1	24.4	69.0	19.6	57.2				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	16.1	66.7	12.6	12.0	19.7	65.2	9.8	51.1				
Green Ext Time (p_c), s	0.0	1.3	0.0	0.1	0.0	0.0	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	73.5
HCM 6th LOS	E

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	42	39	28	2359	2150	66
v/c Ratio	0.12	0.14	0.07	0.61	0.59	0.07
Control Delay	22.7	10.2	22.2	4.9	7.8	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	10.2	22.2	4.9	7.8	3.5
Queue Length 50th (ft)	6	0	4	140	118	2
Queue Length 95th (ft)	20	13	14	184	#367	21
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1233	926	1464	4803	3662	972
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04	0.02	0.49	0.59	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	39	36	26	2170	1978	61
Future Volume (veh/h)	39	36	26	2170	1978	61
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1411	1203	1722	1781	1781	1485
Adj Flow Rate, veh/h	42	39	28	2359	2150	66
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	33	47	12	8	8	28
Cap, veh/h	255	176	146	3241	2419	626
Arrive On Green	0.10	0.10	0.05	0.67	0.50	0.50
Sat Flow, veh/h	2607	1795	3182	5024	5024	1259
Grp Volume(v), veh/h	42	39	28	2359	2150	66
Grp Sat Flow(s),veh/h/ln	1303	897	1591	1621	1621	1259
Q Serve(g_s), s	0.7	0.9	0.4	14.5	18.4	1.3
Cycle Q Clear(g_c), s	0.7	0.9	0.4	14.5	18.4	1.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	255	176	146	3241	2419	626
V/C Ratio(X)	0.16	0.22	0.19	0.73	0.89	0.11
Avail Cap(c_a), veh/h	1409	970	1720	3241	3155	816
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	19.1	19.2	21.2	5.0	10.5	6.2
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.7	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	1.0	4.0	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.2	19.5	21.5	5.7	12.8	6.2
LnGrp LOS	B	B	C	A	B	A
Approach Vol, veh/h	81			2387	2216	
Approach Delay, s/veh	19.3			5.9	12.6	
Approach LOS	B			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		37.0		9.2	7.8	29.2
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		16.5		2.9	2.4	20.4
Green Ext Time (p_c), s		3.3		0.0	0.0	2.6

Intersection Summary

HCM 6th Ctrl Delay	9.3
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	112	561	1804	212	673	1520
v/c Ratio	0.17	0.89	0.90	0.11	0.72	0.68
Control Delay	27.6	27.8	32.1	4.1	36.9	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	27.8	32.1	4.1	36.9	11.4
Queue Length 50th (ft)	25	83	333	15	121	241
Queue Length 95th (ft)	47	#276	#520	30	172	381
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	998	741	2015	2130	1150	2384
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.76	0.90	0.10	0.59	0.64

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶↶	↶	↶↶↶	↶↶	↶↶↶	↶↶
Traffic Volume (veh/h)	103	516	1660	195	619	1398
Future Volume (veh/h)	103	516	1660	195	619	1398
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1811	1826	1767	1811	1796	1767
Adj Flow Rate, veh/h	112	561	1804	212	673	1520
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	5	9	6	7	9
Cap, veh/h	930	430	1876	1801	830	2051
Arrive On Green	0.28	0.28	0.39	0.39	0.17	0.61
Sat Flow, veh/h	3346	1547	4982	2701	4824	3445
Grp Volume(v), veh/h	112	561	1804	212	673	1520
Grp Sat Flow(s),veh/h/ln	1673	1547	1608	1351	1608	1678
Q Serve(g_s), s	2.3	25.0	32.9	2.6	12.1	29.0
Cycle Q Clear(g_c), s	2.3	25.0	32.9	2.6	12.1	29.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	930	430	1876	1801	830	2051
V/C Ratio(X)	0.12	1.30	0.96	0.12	0.81	0.74
Avail Cap(c_a), veh/h	930	430	1876	1801	1072	2051
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	24.3	32.5	26.8	5.4	35.8	12.4
Incr Delay (d2), s/veh	0.1	153.2	13.0	0.0	3.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	27.2	13.3	0.6	4.7	8.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.3	185.7	39.9	5.5	39.5	14.0
LnGrp LOS	C	F	D	A	D	B
Approach Vol, veh/h	673		2016			2193
Approach Delay, s/veh	158.9		36.2			21.9
Approach LOS	F		D			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	20.0	40.5			60.5	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	14.1	34.9			31.0	27.0
Green Ext Time (p_c), s	1.4	0.1			3.4	0.0

Intersection Summary

HCM 6th Ctrl Delay	46.7
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	7	101	201	87	118	187	253	2058	35	315	2307
v/c Ratio	0.03	0.37	0.34	0.36	0.22	0.25	1.07	1.10	0.05	0.80	1.29
Control Delay	45.0	42.5	10.4	49.9	29.2	3.5	124.0	85.0	0.1	63.3	164.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	42.5	10.4	49.9	29.2	3.5	124.0	85.0	0.1	63.3	164.3
Queue Length 50th (ft)	4	63	32	53	55	0	~188	~582	0	105	~724
Queue Length 95th (ft)	21	110	80	127	124	43	#459	#965	0	#235	#1146
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	276	387	600	243	578	757	236	1875	704	418	1790
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.26	0.34	0.36	0.20	0.25	1.07	1.10	0.05	0.75	1.29

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	6	93	185	80	109	172	233	1893	32	290	2098	25
Future Volume (veh/h)	6	93	185	80	109	172	233	1893	32	290	2098	25
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		1.00	1.00		1.00	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	1870	1544	1870	1781	1841	1663	1841	1752	1870	1811	1752	1752
Adj Flow Rate, veh/h	7	101	201	87	118	187	253	2058	35	315	2280	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	24	2	8	4	16	4	10	2	6	10	10
Cap, veh/h	50	211	434	228	447	500	240	1942	643	375	1857	22
Arrive On Green	0.03	0.14	0.14	0.13	0.24	0.24	0.14	0.41	0.41	0.11	0.38	0.38
Sat Flow, veh/h	1781	1544	1585	1697	1841	1409	1753	4782	1585	3346	4872	58
Grp Volume(v), veh/h	7	101	201	87	118	187	253	2058	35	315	1491	816
Grp Sat Flow(s),veh/h/ln	1781	1544	1585	1697	1841	1409	1753	1594	1585	1673	1594	1741
Q Serve(g_s), s	0.4	6.2	10.8	4.8	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Cycle Q Clear(g_c), s	0.4	6.2	10.8	4.8	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	50	211	434	228	447	500	240	1942	643	375	1215	664
V/C Ratio(X)	0.14	0.48	0.46	0.38	0.26	0.37	1.05	1.06	0.05	0.84	1.23	1.23
Avail Cap(c_a), veh/h	279	347	573	249	447	500	240	1942	643	425	1215	664
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	48.5	40.8	30.9	40.4	31.3	24.6	44.2	30.4	18.5	44.5	31.7	31.7
Incr Delay (d2), s/veh	0.5	0.6	0.3	0.4	0.1	0.2	73.3	38.5	0.0	11.5	109.7	116.2
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	0.2	2.3	4.0	2.0	2.3	3.3	10.7	21.4	0.5	4.4	32.3	36.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	41.4	31.2	40.8	31.5	24.7	117.5	68.9	18.5	56.0	141.3	147.9
LnGrp LOS	D	D	C	D	C	C	F	F	B	E	F	F
Approach Vol, veh/h		309			392			2346			2622	
Approach Delay, s/veh		34.9			30.3			73.4			133.1	
Approach LOS		C			C			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	47.3	18.7	19.8	19.0	44.8	7.9	30.6				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	11.4	43.5	6.8	12.8	16.0	41.0	2.4	12.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	95.9
HCM 6th LOS	F

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	29	7	24	17	7	32
Future Vol, veh/h	29	7	24	17	7	32
Conflicting Peds, #/hr	0	4	4	0	6	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	43	43	24	14	78
Mvmt Flow	32	8	26	18	8	35

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	44	0	116
Stage 1	-	-	-	-	40
Stage 2	-	-	-	-	76
Critical Hdwy	-	-	4.53	-	6.54
Critical Hdwy Stg 1	-	-	-	-	5.54
Critical Hdwy Stg 2	-	-	-	-	5.54
Follow-up Hdwy	-	-	2.587	-	3.626
Pot Cap-1 Maneuver	-	-	1338	-	852
Stage 1	-	-	-	-	952
Stage 2	-	-	-	-	917
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1333	-	826
Mov Cap-2 Maneuver	-	-	-	-	826
Stage 1	-	-	-	-	948
Stage 2	-	-	-	-	893

Approach	EB	WB	NB
HCM Control Delay, s	0	4.5	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	839	-	-	1333	-
HCM Lane V/C Ratio	0.051	-	-	0.02	-
HCM Control Delay (s)	9.5	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative plus SMP 39
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	47	12	34	29	17	10	0	25	6	0	4
Future Vol, veh/h	6	47	12	34	29	17	10	0	25	6	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	15	15	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	17	53	8	21	45	35	33	2	36	2	2	2
Mvmt Flow	7	51	13	37	32	18	11	0	27	7	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	50	0	0	64	0	0	189	196	73	215	193	41
Stage 1	-	-	-	-	-	-	72	72	-	115	115	-
Stage 2	-	-	-	-	-	-	117	124	-	100	78	-
Critical Hdwy	4.27	-	-	4.31	-	-	7.43	6.52	6.56	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.353	-	-	2.389	-	-	3.797	4.018	3.624	3.518	4.018	3.318
Pot Cap-1 Maneuver	1466	-	-	1426	-	-	708	699	902	742	702	1030
Stage 1	-	-	-	-	-	-	866	835	-	890	800	-
Stage 2	-	-	-	-	-	-	818	793	-	906	830	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1466	-	-	1426	-	-	688	677	889	692	680	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-	688	677	-	692	680	-
Stage 1	-	-	-	-	-	-	862	831	-	886	778	-
Stage 2	-	-	-	-	-	-	793	772	-	861	826	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.7			3.2			9.6			9.6		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	821	1466	-	-	1426	-	-	797
HCM Lane V/C Ratio	0.046	0.004	-	-	0.026	-	-	0.014
HCM Control Delay (s)	9.6	7.5	0	-	7.6	0	-	9.6
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	133	134	737	973	842	822
v/c Ratio	0.35	0.34	0.70	1.03	0.37	0.63
Control Delay	24.5	24.4	20.1	57.0	7.0	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	24.4	20.1	57.0	7.0	3.1
Queue Length 50th (ft)	48	49	128	~464	82	0
Queue Length 95th (ft)	101	100	190	#750	124	38
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	466	475	1414	949	2766	1401
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.28	0.52	1.03	0.30	0.59

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative plus SMP 39

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↖	↖	↖↖		↑			↑↑	↖	
Traffic Volume (vph)	0	0	0	220	28	685	0	895	0	0	775	756	
Future Volume (vph)	0	0	0	220	28	685	0	895	0	0	775	756	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1634	2707		1863			3539	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1634	2707		1863			3539	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	237	30	737	0	973	0	0	842	822	
RTOR Reduction (vph)	0	0	0	0	0	56	0	0	0	0	0	298	
Lane Group Flow (vph)	0	0	0	133	134	681	0	973	0	0	842	524	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	4%	5%	2%	2%	2%	2%	2%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				16.5	16.5	25.3		35.2			44.0	44.0	
Effective Green, g (s)				16.5	16.5	25.3		35.2			44.0	44.0	
Actuated g/C Ratio				0.24	0.24	0.37		0.51			0.64	0.64	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				383	390	992		950			2256	997	
v/s Ratio Prot								c0.52			0.24		
v/s Ratio Perm				0.08	0.08	c0.25						0.34	
v/c Ratio				0.35	0.34	0.69		1.02			0.37	0.53	
Uniform Delay, d1				21.8	21.8	18.5		16.9			5.9	6.8	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	1.6		35.5			0.0	0.2	
Delay (s)				22.0	22.0	20.1		52.4			6.0	7.0	
Level of Service				C	C	C		D			A	A	
Approach Delay (s)		0.0			20.6			52.4			6.5		
Approach LOS		A			C			D			A		
Intersection Summary													
HCM 2000 Control Delay			22.7		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.94										
Actuated Cycle Length (s)			69.0		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			78.4%		ICU Level of Service					D			
Analysis Period (min)			15										

c Critical Lane Group

Queues

Cumulative plus SMP 39

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Timing Plan: AM Peak

























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	670	539	641	129	562
v/c Ratio	0.65	0.53	0.38	0.22	0.41
Control Delay	11.2	3.4	6.8	2.8	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	3.4	6.8	2.8	7.2
Queue Length 50th (ft)	36	2	19	0	23
Queue Length 95th (ft)	65	19	41	17	52
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3311	2160	4256	1298	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.25	0.15	0.10	0.16

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 39
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					  			 	
Traffic Volume (vph)	616	0	496	0	0	0	0	602	137	0	517	0
Future Volume (vph)	616	0	496	0	0	0	0	602	137	0	517	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.86	0.86		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					4255	1298		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					4255	1298		3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	670	0	539	0	0	0	0	627	143	0	562	0
RTOR Reduction (vph)	0	0	347	0	0	0	0	4	78	0	0	0
Lane Group Flow (vph)	670	0	192	0	0	0	0	637	51	0	562	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	7%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	7.9		7.9					10.3	10.3		10.3	
Effective Green, g (s)	7.9		7.9					10.3	10.3		10.3	
Actuated g/C Ratio	0.30		0.30					0.39	0.39		0.39	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	1035		669					1672	510		1377	
v/s Ratio Prot								0.15			c0.16	
v/s Ratio Perm	c0.20		0.09						0.04			
v/c Ratio	0.65		0.29					0.38	0.10		0.41	
Uniform Delay, d1	7.9		7.0					5.7	5.0		5.7	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	1.1		0.1					0.1	0.0		0.1	
Delay (s)	9.0		7.1					5.7	5.1		5.8	
Level of Service	A		A					A	A		A	
Approach Delay (s)		8.1			0.0			5.6			5.8	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.9					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.51									
Actuated Cycle Length (s)			26.2					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			77.1%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative plus SMP 39

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	754	521	13	21	304	1189	14	45	16	1086	30	507
v/c Ratio	0.73	0.34	0.02	0.11	0.41	0.62	0.08	0.10	0.06	0.69	0.03	0.32
Control Delay	46.0	26.0	0.1	58.4	40.0	4.3	59.3	46.6	0.5	34.5	19.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	26.0	0.1	58.4	40.0	4.3	59.3	46.6	0.5	34.5	19.2	0.5
Queue Length 50th (ft)	158	104	0	6	86	36	4	9	0	209	5	0
Queue Length 95th (ft)	#403	290	0	26	191	130	20	26	0	384	17	0
Internal Link Dist (ft)		745			868			216			816	
Turn Bay Length (ft)	400		305	350			110		110	600		420
Base Capacity (vph)	1038	1516	725	536	1130	2344	464	1664	594	2571	2189	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.34	0.02	0.04	0.27	0.51	0.03	0.03	0.03	0.42	0.01	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative plus SMP 39
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	↑↑	↗	←←	↑↑	↗	←←	↑↑↑	↗	←←←	↑↑	↗
Traffic Volume (veh/h)	709	490	12	20	292	1141	13	41	15	999	28	466
Future Volume (veh/h)	709	490	12	20	292	1141	13	41	15	999	28	466
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		0.98	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1856	1870	1796	1796	1856	1589	1870
Adj Flow Rate, veh/h	754	521	13	21	304	1189	14	45	16	1086	30	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	3	2	7	7	3	21	2
Cap, veh/h	871	1635	726	76	1098	1565	45	310	94	1298	938	
Arrive On Green	0.17	0.46	0.46	0.02	0.31	0.31	0.01	0.06	0.06	0.26	0.31	0.00
Sat Flow, veh/h	5023	3554	1578	3456	3554	2732	3456	4904	1493	4983	3019	1585
Grp Volume(v), veh/h	754	521	13	21	304	1189	14	45	16	1086	30	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1578	1728	1777	1366	1728	1635	1493	1661	1509	1585
Q Serve(g_s), s	14.5	9.2	0.4	0.6	6.4	30.7	0.4	0.9	1.0	20.5	0.7	0.0
Cycle Q Clear(g_c), s	14.5	9.2	0.4	0.6	6.4	30.7	0.4	0.9	1.0	20.5	0.7	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	871	1635	726	76	1098	1565	45	310	94	1298	938	
V/C Ratio(X)	0.87	0.32	0.02	0.27	0.28	0.76	0.31	0.15	0.17	0.84	0.03	
Avail Cap(c_a), veh/h	1011	1635	726	522	1098	1565	452	1629	496	2508	2148	
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	0.00
Uniform Delay (d), s/veh	39.9	17.0	14.6	47.8	25.9	16.3	48.6	44.0	44.1	34.8	23.9	0.0
Incr Delay (d2), s/veh	6.4	0.1	0.0	0.7	0.1	2.2	1.5	0.2	0.6	1.1	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	6.3	3.6	0.2	0.3	2.6	9.5	0.2	0.3	0.4	8.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	17.1	14.6	48.5	26.1	18.5	50.1	44.2	44.7	35.9	23.9	0.0
LnGrp LOS	D	B	B	D	C	B	D	D	D	D	C	
Approach Vol, veh/h		1288			1514			75			1116	A
Approach Delay, s/veh		34.2			20.5			45.4			35.6	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	21.2	36.0	29.9	12.3	6.2	51.0	5.3	36.9				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	16.5	32.7	22.5	3.0	2.6	11.2	2.4	2.7				
Green Ext Time (p_c), s	0.7	0.0	3.4	0.2	0.0	3.4	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	29.6
HCM 6th LOS	C

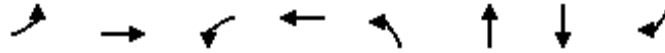
Notes

User approved ignoring U-Turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	504	1068	42	739	136	131	107	693
v/c Ratio	0.66	0.55	0.20	0.59	0.43	0.41	0.36	0.67
Control Delay	36.8	23.1	46.1	32.7	38.0	32.4	41.4	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	23.1	46.1	32.7	38.0	32.4	41.4	7.0
Queue Length 50th (ft)	102	146	17	81	57	46	42	0
Queue Length 95th (ft)	274	320	76	196	165	143	148	59
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1325	3235	455	3145	474	471	466	1232
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.33	0.09	0.23	0.29	0.28	0.23	0.56
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↓		↖	↑↑↑		↖	↕			↕	↖↗
Traffic Volume (vph)	484	997	28	39	610	70	189	22	48	60	45	679
Future Volume (vph)	484	997	28	39	610	70	189	22	48	60	45	679
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5014		1770	6085		1681	1621			1811	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5014		1770	6085		1681	1621			1811	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	504	1039	29	42	663	76	195	23	49	61	46	693
RTOR Reduction (vph)	0	2	0	0	18	0	0	16	0	0	0	579
Lane Group Flow (vph)	504	1066	0	42	721	0	136	115	0	0	107	114
Confl. Peds. (#/hr)							1		12			
Confl. Bikes (#/hr)							3		1			1
Heavy Vehicles (%)	2%	3%	4%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	18.8	32.9		5.2	19.3		15.8	15.8			14.0	14.0
Effective Green, g (s)	18.8	32.9		5.2	19.3		15.8	15.8			14.0	14.0
Actuated g/C Ratio	0.22	0.39		0.06	0.23		0.19	0.19			0.16	0.16
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	757	1936		108	1378		311	300			297	457
v/s Ratio Prot	c0.15	c0.21		0.02	0.12		c0.08	0.07			c0.06	0.04
v/s Ratio Perm												
v/c Ratio	0.67	0.55		0.39	0.52		0.44	0.38			0.36	0.25
Uniform Delay, d1	30.3	20.4		38.5	28.9		30.8	30.4			31.6	31.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.0	0.2		0.8	0.2		0.7	0.6			0.3	0.1
Delay (s)	32.3	20.6		39.3	29.1		31.5	31.0			31.9	31.1
Level of Service	C	C		D	C		C	C			C	C
Approach Delay (s)		24.3			29.6			31.3			31.2	
Approach LOS		C			C			C			C	

Intersection Summary

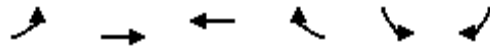
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	85.2	Sum of lost time (s)	17.3
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

Cumulative plus SMP 39

3: W Jack London Blvd & Livermore Outlets Dr

Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	145	1043	593	54	57	177
v/c Ratio	0.19	0.52	0.52	0.10	0.14	0.23
Control Delay	19.3	6.7	14.6	3.9	20.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	6.7	14.6	3.9	20.1	5.5
Queue Length 50th (ft)	15	72	72	0	12	0
Queue Length 95th (ft)	50	99	104	15	50	26
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	1941	3539	3121	1444	800	1357
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.29	0.19	0.04	0.07	0.13
Intersection Summary						

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↗	↖	↖↗
Traffic Volume (veh/h)	139	1001	575	52	54	166
Future Volume (veh/h)	139	1001	575	52	54	166
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1796	1870	1870	1870
Adj Flow Rate, veh/h	145	1043	593	54	57	177
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	7	2	2	2
Cap, veh/h	669	1983	921	415	395	618
Arrive On Green	0.19	0.56	0.27	0.27	0.22	0.22
Sat Flow, veh/h	3456	3647	3503	1538	1781	2790
Grp Volume(v), veh/h	145	1043	593	54	57	177
Grp Sat Flow(s),veh/h/ln	1728	1777	1706	1538	1781	1395
Q Serve(g_s), s	1.5	7.8	6.5	1.1	1.1	2.2
Cycle Q Clear(g_c), s	1.5	7.8	6.5	1.1	1.1	2.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	669	1983	921	415	395	618
V/C Ratio(X)	0.22	0.53	0.64	0.13	0.14	0.29
Avail Cap(c_a), veh/h	2046	3366	3637	1639	844	1321
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.3	5.8	13.6	11.7	13.2	13.7
Incr Delay (d2), s/veh	0.1	0.1	0.3	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.2	1.8	0.3	0.4	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.4	5.9	13.9	11.7	13.3	13.8
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		1188	647		234	
Approach Delay, s/veh		7.0	13.7		13.6	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.2	16.7			28.9	13.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.5	8.5			9.8	4.2
Green Ext Time (p_c), s	0.3	2.5			4.9	0.4

Intersection Summary

HCM 6th Ctrl Delay	9.8
HCM 6th LOS	A

Notes

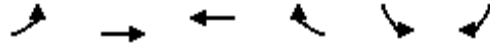
User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues

4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 39

Timing Plan: PM Peak



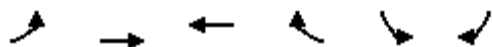
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	20	1069	635	18	25	41
v/c Ratio	0.03	0.44	0.29	0.02	0.03	0.06
Control Delay	18.9	7.6	9.5	8.2	12.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	7.6	9.5	8.2	12.7	5.7
Queue Length 50th (ft)	3	74	37	1	3	0
Queue Length 95th (ft)	27	221	174	15	23	19
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1445	3539	3113	1419	1205	1101
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.30	0.20	0.01	0.02	0.04

Intersection Summary

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↶
Traffic Volume (veh/h)	19	1037	591	17	23	38
Future Volume (veh/h)	19	1037	591	17	23	38
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1796	1870	1841	1856
Adj Flow Rate, veh/h	20	1069	635	18	25	41
Peak Hour Factor	0.97	0.97	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	2	2	7	2	4	3
Cap, veh/h	91	1910	1189	537	249	224
Arrive On Green	0.05	0.54	0.35	0.35	0.14	0.14
Sat Flow, veh/h	1781	3647	3503	1542	1753	1572
Grp Volume(v), veh/h	20	1069	635	18	25	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1706	1542	1753	1572
Q Serve(g_s), s	0.3	5.8	4.3	0.2	0.4	0.7
Cycle Q Clear(g_c), s	0.3	5.8	4.3	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	91	1910	1189	537	249	224
V/C Ratio(X)	0.22	0.56	0.53	0.03	0.10	0.18
Avail Cap(c_a), veh/h	1840	5507	5289	2389	1207	1083
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.2	4.4	7.6	6.2	10.8	11.0
Incr Delay (d2), s/veh	0.9	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	0.7	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.1	4.5	7.7	6.2	10.9	11.1
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		1089	653		66	
Approach Delay, s/veh		4.7	7.7		11.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.5	15.4			20.9	8.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.3	6.3			7.8	2.7
Green Ext Time (p_c), s	0.0	2.7			5.1	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
 5: SMP 39 West Dwy/Ambassador Dwy & W Jack London Blvd

Cumulative plus SMP 39
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	69.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Traffic Vol, veh/h	0	1024	45	57	519	0	97	0	134	0	0	0
Future Vol, veh/h	0	1024	45	57	519	0	97	0	134	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	1	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	180	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	94	94	94	92	92	92	92	92	92
Heavy Vehicles, %	2	2	18	16	5	2	18	2	16	2	2	2
Mvmt Flow	0	1113	49	61	552	0	105	0	146	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	553	0	0	1162	0	0	1536	1813	581	1232	1837	277
Stage 1	-	-	-	-	-	-	1138	1138	-	675	675	-
Stage 2	-	-	-	-	-	-	398	675	-	557	1162	-
Critical Hdwy	4.14	-	-	4.42	-	-	7.86	6.54	7.22	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.86	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.86	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.36	-	-	3.68	4.02	3.46	3.52	4.02	3.32
Pot Cap-1 Maneuver	1013	-	-	523	-	-	~ 68	78	423	133	75	720
Stage 1	-	-	-	-	-	-	189	275	-	410	451	-
Stage 2	-	-	-	-	-	-	558	451	-	482	267	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1012	-	-	523	-	-	~ 62	69	423	79	66	719
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 62	69	-	79	66	-
Stage 1	-	-	-	-	-	-	189	275	-	410	398	-
Stage 2	-	-	-	-	-	-	493	398	-	316	267	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.3	\$ 554.6	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	123	1012	-	-	523	-	-	-
HCM Lane V/C Ratio	2.041	-	-	-	0.116	-	-	-
HCM Control Delay (s)	\$ 554.6	0	-	-	12.8	-	-	0
HCM Lane LOS	F	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	20.6	0	-	-	0.4	-	-	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
6: SMP 39 East Dwy/Airport Dwy & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	92.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕		↵	↕			↕			↕	
Traffic Vol, veh/h	3	1101	44	63	484	0	101	0	133	0	0	1
Future Vol, veh/h	3	1101	44	63	484	0	101	0	133	0	0	1
Conflicting Peds, #/hr	0	0	0	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	300	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	3	18	16	3	2	18	2	15	2	2	2
Mvmt Flow	3	1197	48	68	526	0	110	0	145	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	526	0	0	1245	0	0	1626	1889	623	1267	1913	263
Stage 1	-	-	-	-	-	-	1227	1227	-	662	662	-
Stage 2	-	-	-	-	-	-	399	662	-	605	1251	-
Critical Hdwy	4.14	-	-	4.42	-	-	7.86	6.54	7.2	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.86	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.86	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.36	-	-	3.68	4.02	3.45	3.52	4.02	3.32
Pot Cap-1 Maneuver	1037	-	-	484	-	-	~ 58	70	399	126	67	735
Stage 1	-	-	-	-	-	-	166	249	-	417	457	-
Stage 2	-	-	-	-	-	-	557	457	-	451	242	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1037	-	-	484	-	-	~ 52	60	399	72	57	735
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 52	60	-	72	57	-
Stage 1	-	-	-	-	-	-	166	248	-	416	393	-
Stage 2	-	-	-	-	-	-	478	393	-	287	241	-

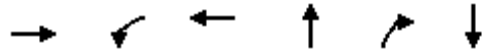
Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	\$ 755.5	9.9
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	103	1037	-	-	484	-	-	735
HCM Lane V/C Ratio	2.469	0.003	-	-	0.141	-	-	0.001
HCM Control Delay (s)	\$ 755.5	8.5	-	-	13.7	-	-	9.9
HCM Lane LOS	F	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	23.1	0	-	-	0.5	-	-	0

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues

7: Discovery Dr & W Jack London Blvd



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1345	13	549	25	18	14
v/c Ratio	0.48	0.04	0.19	0.07	0.06	0.04
Control Delay	8.3	22.3	3.3	21.2	0.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	22.3	3.3	21.2	0.3	0.2
Queue Length 50th (ft)	0	2	0	4	0	0
Queue Length 95th (ft)	#418	20	77	31	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	2801	1110	3376	848	602	574
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.01	0.16	0.03	0.03	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	1214	23	12	505	0	23	0	17	10	0	3
Future Volume (veh/h)	0	1214	23	12	505	0	23	0	17	10	0	3
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		1.00	1.00		1.00	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		No		No
Adj Sat Flow, veh/h/ln	0	1841	1841	1648	1826	0	1870	1870	1292	1870	1870	1870
Adj Flow Rate, veh/h	0	1320	25	13	549	0	25	0	18	11	0	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	4	4	17	5	0	2	2	41	2	2	2
Cap, veh/h	0	1705	32	42	2085	0	148	0	91	29	0	8
Arrive On Green	0.00	0.49	0.49	0.03	0.60	0.00	0.08	0.00	0.08	0.02	0.00	0.02
Sat Flow, veh/h	0	3601	66	1570	3561	0	1781	0	1095	1363	0	372
Grp Volume(v), veh/h	0	657	688	13	549	0	25	0	18	14	0	0
Grp Sat Flow(s),veh/h/ln	0	1749	1827	1570	1735	0	1781	0	1095	1735	0	0
Q Serve(g_s), s	0.0	14.0	14.0	0.4	3.4	0.0	0.6	0.0	0.7	0.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	14.0	14.0	0.4	3.4	0.0	0.6	0.0	0.7	0.4	0.0	0.0
Prop In Lane	0.00		0.04	1.00		0.00	1.00		1.00	0.79		0.21
Lane Grp Cap(c), veh/h	0	850	888	42	2085	0	148	0	91	37	0	0
V/C Ratio(X)	0.00	0.77	0.77	0.31	0.26	0.00	0.17	0.00	0.20	0.38	0.00	0.00
Avail Cap(c_a), veh/h	0	1161	1213	1042	2304	0	789	0	485	461	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.6	9.6	21.6	4.3	0.0	19.3	0.0	19.3	21.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	1.9	1.9	1.5	0.0	0.0	0.2	0.0	0.4	2.3	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.5	3.7	0.1	0.5	0.0	0.2	0.0	0.2	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	11.5	11.4	23.1	4.3	0.0	19.5	0.0	19.7	24.1	0.0	0.0
LnGrp LOS	A	B	B	C	A	A	B	A	B	C	A	A
Approach Vol, veh/h		1345			562			43				14
Approach Delay, s/veh		11.5			4.8			19.6				24.1
Approach LOS		B			A			B				C
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.2	27.2		5.0		32.4		7.8				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	16.0		2.4		5.4		2.7				
Green Ext Time (p_c), s	0.0	5.9		0.0		2.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	9.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	4	1366	28	557	8	87
v/c Ratio	0.02	0.58	0.18	0.22	0.03	0.31
Control Delay	25.5	9.0	27.2	4.4	24.6	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	9.0	27.2	4.4	24.6	4.7
Queue Length 50th (ft)	1	93	8	27	2	0
Queue Length 95th (ft)	10	272	32	79	14	14
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	399	2359	390	2777	832	588
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.58	0.07	0.20	0.01	0.15
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕	↗		↕	↗
Traffic Volume (veh/h)	4	1244	13	26	512	0	7	0	80	0	0	0
Future Volume (veh/h)	4	1244	13	26	512	0	7	0	80	0	0	0
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		1.00	1.00		1.00	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	1870	1841	1841	803	1826	1826	1870	1870	1189	1870	1870	1870
Adj Flow Rate, veh/h	4	1352	14	28	557	0	8	0	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	4	4	74	5	5	2	2	48	2	2	2
Cap, veh/h	14	1817	19	40	1936	0	225	0	127	0	4	0
Arrive On Green	0.01	0.51	0.51	0.05	0.56	0.00	0.13	0.00	0.13	0.00	0.00	0.00
Sat Flow, veh/h	1781	3545	37	765	3561	0	1781	0	1007	0	1870	0
Grp Volume(v), veh/h	4	667	699	28	557	0	8	0	87	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1749	1833	765	1735	0	1781	0	1007	0	1870	0
Q Serve(g_s), s	0.1	12.9	13.0	1.6	3.6	0.0	0.2	0.0	3.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	12.9	13.0	1.6	3.6	0.0	0.2	0.0	3.6	0.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	14	896	940	40	1936	0	225	0	127	0	4	0
V/C Ratio(X)	0.30	0.74	0.74	0.69	0.29	0.00	0.04	0.00	0.69	0.00	0.00	0.00
Avail Cap(c_a), veh/h	496	1419	1488	355	2816	0	1033	0	584	0	520	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	21.3	8.3	8.3	20.1	5.0	0.0	16.5	0.0	18.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.4	0.9	0.9	7.6	0.1	0.0	0.0	0.0	2.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.7	2.8	0.3	0.6	0.0	0.1	0.0	0.8	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	9.2	9.2	27.7	5.1	0.0	16.6	0.0	20.5	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	C	A	A	A
Approach Vol, veh/h		1370			585			95				0
Approach Delay, s/veh		9.2			6.2			20.1				0.0
Approach LOS		A			A			C				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	27.4		0.0	4.3	29.4		9.4				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.6	15.0		0.0	2.1	5.6		5.6				
Green Ext Time (p_c), s	0.0	7.1		0.0	0.0	2.9		0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	251	750	376	179	302	439	139	1810	206	412	2053	140
v/c Ratio	0.77	1.10	0.85	0.44	0.82	0.72	0.41	0.86	0.27	1.08	0.96	0.21
Control Delay	76.7	116.2	43.8	62.7	70.5	39.3	64.7	41.5	9.7	126.4	51.3	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.7	116.2	43.8	62.7	70.5	39.3	64.7	41.5	9.7	126.4	51.3	5.9
Queue Length 50th (ft)	108	-377	158	74	248	270	58	519	32	-198	632	5
Queue Length 95th (ft)	#232	484	318	140	398	458	114	709	97	#409	#899	51
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	325	1436	715	506	816	607	478	2577	888	380	2406	727
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.52	0.53	0.35	0.37	0.72	0.29	0.70	0.23	1.08	0.85	0.19

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary

9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	231	690	346	165	278	404	133	1738	198	379	1889	129
Future Volume (veh/h)	231	690	346	165	278	404	133	1738	198	379	1889	129
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		1.00	1.00		1.00	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	1618	1870	1781	1870	1856	1870	1781	1841	1870	1870	1826	1618
Adj Flow Rate, veh/h	251	750	376	179	302	439	139	1810	206	412	2053	140
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Percent Heavy Veh, %	19	2	8	2	3	2	8	4	2	2	5	19
Cap, veh/h	317	895	380	390	480	578	324	1915	604	366	1937	533
Arrive On Green	0.11	0.25	0.25	0.11	0.26	0.26	0.10	0.38	0.38	0.11	0.39	0.39
Sat Flow, veh/h	2990	3554	1508	3456	1856	1585	3291	5025	1585	3456	4985	1372
Grp Volume(v), veh/h	251	750	376	179	302	439	139	1810	206	412	2053	140
Grp Sat Flow(s),veh/h/ln	1495	1777	1508	1728	1856	1585	1646	1675	1585	1728	1662	1372
Q Serve(g_s), s	11.6	28.3	35.2	6.9	20.4	34.5	5.6	49.3	13.1	15.0	55.0	9.8
Cycle Q Clear(g_c), s	11.6	28.3	35.2	6.9	20.4	34.5	5.6	49.3	13.1	15.0	55.0	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	317	895	380	390	480	578	324	1915	604	366	1937	533
V/C Ratio(X)	0.79	0.84	0.99	0.46	0.63	0.76	0.43	0.95	0.34	1.13	1.06	0.26
Avail Cap(c_a), veh/h	317	895	380	488	786	840	465	2485	784	366	1937	533
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	61.8	50.2	52.8	58.7	46.5	39.5	60.1	42.4	31.2	63.3	43.3	29.5
Incr Delay (d2), s/veh	11.9	6.7	43.4	0.3	0.5	1.2	0.3	6.4	0.1	85.5	38.6	0.1
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	4.9	13.1	17.5	3.0	9.3	13.2	2.3	20.5	4.9	10.8	28.5	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.6	56.9	96.2	59.1	47.0	40.7	60.4	48.8	31.3	148.8	81.8	29.6
LnGrp LOS	E	E	F	E	D	D	E	D	C	F	F	C
Approach Vol, veh/h		1377			920			2155			2605	
Approach Delay, s/veh		70.7			46.3			47.9			89.6	
Approach LOS		E			D			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	59.7	20.7	41.4	18.6	60.8	19.7	42.4				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	17.0	51.3	8.9	37.2	7.6	57.0	13.6	36.5				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	67.5
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	32	49	20	2194	2540	42
v/c Ratio	0.08	0.14	0.07	0.54	0.67	0.05
Control Delay	22.6	9.3	22.7	4.3	9.5	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	9.3	22.7	4.3	9.5	4.1
Queue Length 50th (ft)	5	0	3	119	158	2
Queue Length 95th (ft)	16	14	12	153	#472	17
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1426	1163	1062	4988	3782	864
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.04	0.02	0.44	0.67	0.05

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↔↔	↔↔	↑↑↑	↑↑↑	↔
Traffic Volume (veh/h)	29	45	19	2040	2337	39
Future Volume (veh/h)	29	45	19	2040	2337	39
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1693	1663	1115	1841	1826	1248
Adj Flow Rate, veh/h	32	49	20	2194	2540	42
Peak Hour Factor	0.92	0.92	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	14	16	53	4	5	44
Cap, veh/h	293	232	70	3484	2731	579
Arrive On Green	0.09	0.09	0.03	0.69	0.55	0.55
Sat Flow, veh/h	3127	2480	2059	5191	5149	1058
Grp Volume(v), veh/h	32	49	20	2194	2540	42
Grp Sat Flow(s),veh/h/ln	1564	1240	1030	1675	1662	1058
Q Serve(g_s), s	0.5	0.9	0.5	12.2	24.0	1.0
Cycle Q Clear(g_c), s	0.5	0.9	0.5	12.2	24.0	1.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	293	232	70	3484	2731	579
V/C Ratio(X)	0.11	0.21	0.29	0.63	0.93	0.07
Avail Cap(c_a), veh/h	1529	1213	1007	3484	2925	620
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.2	21.4	24.1	4.3	10.7	5.4
Incr Delay (d2), s/veh	0.1	0.2	0.8	0.3	5.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.1	0.8	6.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.3	21.6	24.9	4.5	16.3	5.5
LnGrp LOS	C	C	C	A	B	A
Approach Vol, veh/h	81			2214	2582	
Approach Delay, s/veh	21.5			4.7	16.1	
Approach LOS	C			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		41.6		9.5	7.4	34.2
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		14.2		2.9	2.5	26.0
Green Ext Time (p_c), s		3.0		0.0	0.0	2.0

Intersection Summary

HCM 6th Ctrl Delay	11.0
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak






















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	122	786	1460	124	590	2012
v/c Ratio	0.13	1.08	0.78	0.06	0.67	0.97
Control Delay	25.6	73.2	28.4	2.8	38.5	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	73.2	28.4	2.8	38.5	31.8
Queue Length 50th (ft)	26	~327	261	6	112	521
Queue Length 95th (ft)	51	#578	342	16	149	#759
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	962	731	1920	1987	1119	2272
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	1.08	0.76	0.06	0.53	0.89

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39
 Timing Plan: PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  	 	  	 
Traffic Volume (veh/h)	112	723	1343	114	543	1851
Future Volume (veh/h)	112	723	1343	114	543	1851
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1811	1841	1870	1811
Adj Flow Rate, veh/h	122	786	1460	124	590	2012
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	6	4	2	6
Cap, veh/h	1019	467	1880	1854	773	2021
Arrive On Green	0.29	0.29	0.38	0.38	0.15	0.59
Sat Flow, veh/h	3456	1585	5107	2745	5023	3532
Grp Volume(v), veh/h	122	786	1460	124	590	2012
Grp Sat Flow(s),veh/h/ln	1728	1585	1648	1373	1674	1721
Q Serve(g_s), s	2.2	25.0	22.0	1.3	9.5	49.3
Cycle Q Clear(g_c), s	2.2	25.0	22.0	1.3	9.5	49.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1019	467	1880	1854	773	2021
V/C Ratio(X)	0.12	1.68	0.78	0.07	0.76	1.00
Avail Cap(c_a), veh/h	1019	467	2041	1943	1185	2021
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.9	29.9	23.1	4.7	34.4	17.4
Incr Delay (d2), s/veh	0.1	316.1	2.0	0.0	1.6	19.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	50.0	7.8	0.3	3.7	19.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.9	346.0	25.1	4.7	36.0	36.4
LnGrp LOS	C	F	C	A	D	D
Approach Vol, veh/h	908		1584			2602
Approach Delay, s/veh	302.4		23.5			36.3
Approach LOS	F		C			D
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	17.5	37.7			55.3	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	11.5	24.0			51.3	27.0
Green Ext Time (p_c), s	1.5	8.2			0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			79.7			
HCM 6th LOS			E			

Queues
12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	16	153	368	46	84	357	220	2330	41	337	2178
v/c Ratio	0.06	0.48	0.56	0.17	0.17	0.45	0.88	1.14	0.06	0.80	1.12
Control Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	100.6	0.2	60.5	93.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	100.6	0.2	60.5	93.8
Queue Length 50th (ft)	9	97	89	27	39	31	146	~697	0	113	~640
Queue Length 95th (ft)	35	157	170	76	93	118	#388	#1117	0	#257	#1045
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	274	449	656	269	564	796	251	2039	689	440	1938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.34	0.56	0.17	0.15	0.45	0.88	1.14	0.06	0.77	1.12

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	141	339	42	77	328	202	2144	38	310	1992	12
Future Volume (veh/h)	15	141	339	42	77	328	202	2144	38	310	1992	12
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		1.00	1.00		1.00	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	1796	1737	1870	1870	1870	1870	1870	1826	1781	1826	1811	1811
Adj Flow Rate, veh/h	16	153	368	46	84	357	220	2330	41	337	2165	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	11	2	2	2	2	2	5	8	5	6	6
Cap, veh/h	96	367	538	184	483	594	229	1846	559	393	1817	11
Arrive On Green	0.06	0.21	0.21	0.10	0.26	0.26	0.13	0.37	0.37	0.12	0.36	0.36
Sat Flow, veh/h	1711	1737	1583	1781	1870	1585	1781	4985	1510	3374	5071	30
Grp Volume(v), veh/h	16	153	368	46	84	357	220	2330	41	337	1407	771
Grp Sat Flow(s),veh/h/ln	1711	1737	1583	1781	1870	1585	1781	1662	1510	1687	1648	1806
Q Serve(g_s), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Cycle Q Clear(g_c), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	96	367	538	184	483	594	229	1846	559	393	1181	647
V/C Ratio(X)	0.17	0.42	0.68	0.25	0.17	0.60	0.96	1.26	0.07	0.86	1.19	1.19
Avail Cap(c_a), veh/h	251	367	538	245	483	594	229	1846	559	403	1181	647
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	48.9	37.1	30.9	44.9	31.3	27.5	47.2	34.3	22.2	47.2	34.9	34.9
Incr Delay (d2), s/veh	0.3	0.3	3.0	0.3	0.1	1.2	47.9	122.4	0.0	15.5	94.8	101.3
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	0.4	3.4	8.4	1.1	1.7	7.4	8.8	36.1	0.7	5.2	30.1	34.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.2	37.4	33.9	45.2	31.4	28.7	95.1	156.7	22.2	62.8	129.7	136.2
LnGrp LOS	D	D	C	D	C	C	F	F	C	E	F	F
Approach Vol, veh/h		537			487			2591			2515	
Approach Delay, s/veh		35.3			30.7			149.4			122.7	
Approach LOS		D			C			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	46.1	16.3	28.8	19.0	44.8	11.1	33.9				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	12.7	42.3	4.6	23.8	15.4	41.0	3.0	21.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	119.0
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	4.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	25	12	23	19	9	35
Future Vol, veh/h	25	12	23	19	9	35
Conflicting Peds, #/hr	0	1	1	0	4	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	8	57	37	33	49
Mvmt Flow	27	13	25	21	10	38

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	41	0	110
Stage 1	-	-	-	-	35
Stage 2	-	-	-	-	75
Critical Hdwy	-	-	4.67	-	6.73
Critical Hdwy Stg 1	-	-	-	-	5.73
Critical Hdwy Stg 2	-	-	-	-	5.73
Follow-up Hdwy	-	-	2.713	-	3.797
Pot Cap-1 Maneuver	-	-	1278	-	818
Stage 1	-	-	-	-	913
Stage 2	-	-	-	-	875
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1277	-	798
Mov Cap-2 Maneuver	-	-	-	-	798
Stage 1	-	-	-	-	912
Stage 2	-	-	-	-	854

Approach	EB	WB	NB
HCM Control Delay, s	0	4.3	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	890	-	-	1277	-
HCM Lane V/C Ratio	0.054	-	-	0.02	-
HCM Control Delay (s)	9.3	-	-	7.9	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative plus SMP 39
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	57	1	10	32	25	4	7	34	16	3	4
Future Vol, veh/h	4	57	1	10	32	25	4	7	34	16	3	4
Conflicting Peds, #/hr	1	0	0	0	0	1	19	0	9	9	0	19
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	30	2	2	53	64	75	2	12	2	2	2
Mvmt Flow	4	58	1	11	35	27	4	8	37	17	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	63	0	0	59	0	0	160	152	68	170	139	69
Stage 1	-	-	-	-	-	-	67	67	-	72	72	-
Stage 2	-	-	-	-	-	-	93	85	-	98	67	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.85	6.52	6.32	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.85	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.85	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	4.175	4.018	3.408	3.518	4.018	3.318
Pot Cap-1 Maneuver	1540	-	-	1545	-	-	666	740	968	794	752	994
Stage 1	-	-	-	-	-	-	789	839	-	938	835	-
Stage 2	-	-	-	-	-	-	762	824	-	908	839	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1539	-	-	1545	-	-	644	732	960	745	744	975
Mov Cap-2 Maneuver	-	-	-	-	-	-	644	732	-	745	744	-
Stage 1	-	-	-	-	-	-	787	836	-	934	828	-
Stage 2	-	-	-	-	-	-	737	817	-	855	836	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			1.1			9.3			9.8		
HCM LOS							A			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	879	1539	-	-	1545	-	-	777
HCM Lane V/C Ratio	0.056	0.003	-	-	0.007	-	-	0.032
HCM Control Delay (s)	9.3	7.3	0	-	7.3	0	-	9.8
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Queues

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	177	178	873	1214	1485	842
v/c Ratio	0.42	0.42	0.75	1.37	0.67	0.64
Control Delay	27.2	27.2	22.2	195.4	10.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	27.2	22.2	195.4	10.6	3.0
Queue Length 50th (ft)	69	69	178	~746	211	0
Queue Length 95th (ft)	144	144	248	#1127	273	36
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	457	459	1411	887	2586	1383
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.39	0.62	1.37	0.57	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative plus SMP 39
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↖	↗		↑			↕	↘
Traffic Volume (vph)	0	0	0	320	6	803	0	1117	0	0	1366	775
Future Volume (vph)	0	0	0	320	6	803	0	1117	0	0	1366	775
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1681	1689	2787		1863			3539	1583
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1681	1689	2787		1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	348	7	873	0	1214	0	0	1485	842
RTOR Reduction (vph)	0	0	0	0	0	24	0	0	0	0	0	310
Lane Group Flow (vph)	0	0	0	177	178	849	0	1214	0	0	1485	532
Turn Type				Perm	NA	custom		NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8		8 1						6
Actuated Green, G (s)				18.7	18.7	30.1		35.2			46.6	46.6
Effective Green, g (s)				18.7	18.7	30.1		35.2			46.6	46.6
Actuated g/C Ratio				0.25	0.25	0.41		0.48			0.63	0.63
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2
Lane Grp Cap (vph)				425	427	1136		888			2234	999
v/s Ratio Prot								c0.65			0.42	
v/s Ratio Perm				0.11	0.11	c0.30						0.34
v/c Ratio				0.42	0.42	0.75		1.37			0.66	0.53
Uniform Delay, d1				23.0	23.0	18.6		19.3			8.6	7.5
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2				0.2	0.2	2.4		172.4			0.6	0.3
Delay (s)				23.2	23.2	21.0		191.7			9.2	7.8
Level of Service				C	C	C		F			A	A
Approach Delay (s)		0.0			21.7			191.7			8.7	
Approach LOS		A			C			F			A	

Intersection Summary		
HCM 2000 Control Delay	58.6	HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio	1.15	
Actuated Cycle Length (s)	73.8	Sum of lost time (s) 12.2
Intersection Capacity Utilization	94.2%	ICU Level of Service F
Analysis Period (min)	15	

c Critical Lane Group

Queues

Cumulative plus SMP 39

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Timing Plan: PM Peak

























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	576	586	1395	584	1043
v/c Ratio	0.66	0.73	0.71	0.33	0.52
Control Delay	21.2	19.3	10.2	1.2	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	19.3	10.2	1.2	7.8
Queue Length 50th (ft)	72	60	120	0	76
Queue Length 95th (ft)	151	145	253	19	163
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2005	1642	2880	2338	2908
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.36	0.48	0.25	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 39
 Timing Plan: PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 		 					 	 		 		
Traffic Volume (vph)	530	0	539	0	0	0	0	1339	561	0	960	0	
Future Volume (vph)	530	0	539	0	0	0	0	1339	561	0	960	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0		
Lane Util. Factor	0.97		0.88					0.95	0.88		0.95		
Frpb, ped/bikes	1.00		1.00					1.00	0.98		1.00		
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00		
Frt	1.00		0.85					1.00	0.85		1.00		
Flt Protected	0.95		1.00					1.00	1.00		1.00		
Satd. Flow (prot)	3433		2707					3505	2720		3539		
Flt Permitted	0.95		1.00					1.00	1.00		1.00		
Satd. Flow (perm)	3433		2707					3505	2720		3539		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92	
Adj. Flow (vph)	576	0	586	0	0	0	0	1395	584	0	1043	0	
RTOR Reduction (vph)	0	0	109	0	0	0	0	0	249	0	0	0	
Lane Group Flow (vph)	576	0	477	0	0	0	0	1395	335	0	1043	0	
Confl. Peds. (#/hr)									4				
Confl. Bikes (#/hr)									1				
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%	2%	3%	2%	2%	2%	2%	
Turn Type	Perm		Perm					NA	Perm		NA		
Protected Phases								2			6		
Permitted Phases	4		4						2				
Actuated Green, G (s)	12.4		12.4					27.4	27.4		27.4		
Effective Green, g (s)	12.4		12.4					27.4	27.4		27.4		
Actuated g/C Ratio	0.26		0.26					0.57	0.57		0.57		
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0		
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2		
Lane Grp Cap (vph)	890		702					2009	1559		2028		
v/s Ratio Prot								c0.40			0.29		
v/s Ratio Perm	0.17		c0.18						0.12				
v/c Ratio	0.65		0.68					0.69	0.21		0.51		
Uniform Delay, d1	15.8		15.9					7.2	5.0		6.2		
Progression Factor	1.00		1.00					1.00	1.00		1.00		
Incremental Delay, d2	1.2		2.1					0.9	0.0		0.1		
Delay (s)	17.0		18.0					8.1	5.0		6.3		
Level of Service	B		B					A	A		A		
Approach Delay (s)		17.5			0.0			7.2			6.3		
Approach LOS		B			A			A			A		
Intersection Summary													
HCM 2000 Control Delay			9.8									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.69										
Actuated Cycle Length (s)			47.8									Sum of lost time (s)	8.0
Intersection Capacity Utilization			68.6%									ICU Level of Service	C
Analysis Period (min)			15										
c	Critical Lane Group												

Queues

Cumulative plus SMP 40

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: AM Peak








































Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	208	55	7	302	441	4	89	3	313	142	458
v/c Ratio	0.32	0.04	0.03	0.37	0.45	0.02	0.19	0.01	0.37	0.21	0.54
Control Delay	30.6	15.7	37.0	23.2	4.5	37.8	24.6	0.0	28.3	15.7	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	15.7	37.0	23.2	4.5	37.8	24.6	0.0	28.3	15.7	4.5
Queue Length 50th (ft)	21	5	1	44	0	0	9	0	31	15	0
Queue Length 95th (ft)	73	27	9	123	40	7	29	0	101	55	61
Internal Link Dist (ft)		745		868			217			816	
Turn Bay Length (ft)	400		350			110		110	600		420
Base Capacity (vph)	1866	2320	785	2032	1751	640	1659	541	4186	1851	1522
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.02	0.01	0.15	0.25	0.01	0.05	0.01	0.07	0.08	0.30

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative plus SMP 40
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	  	 		 	 	 	 	  		  	 	 
Traffic Volume (veh/h)	191	51	0	6	278	406	4	82	3	288	131	421
Future Volume (veh/h)	191	51	0	6	278	406	4	82	3	288	131	421
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		1.00	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	1870	1856	1870	1530	1870	1856	1411	522	418	1856	685	1885
Adj Flow Rate, veh/h	208	55	0	7	302	441	4	89	3	313	142	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	3	2	25	2	3	33	93	100	3	82	1
Cap, veh/h	484	1213	546	26	913	702	11	155	39	705	320	
Arrive On Green	0.10	0.34	0.00	0.01	0.26	0.26	0.00	0.11	0.11	0.14	0.25	0.00
Sat Flow, veh/h	5023	3526	1585	2826	3554	2732	2607	1424	353	4983	1301	1598
Grp Volume(v), veh/h	208	55	0	7	302	441	4	89	3	313	142	0
Grp Sat Flow(s),veh/h/ln	1674	1763	1585	1413	1777	1366	1303	475	353	1661	651	1598
Q Serve(g_s), s	1.9	0.5	0.0	0.1	3.4	7.0	0.1	2.9	0.4	2.8	4.5	0.0
Cycle Q Clear(g_c), s	1.9	0.5	0.0	0.1	3.4	7.0	0.1	2.9	0.4	2.8	4.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	484	1213	546	26	913	702	11	155	39	705	320	
V/C Ratio(X)	0.43	0.05	0.00	0.27	0.33	0.63	0.35	0.57	0.08	0.44	0.44	
Avail Cap(c_a), veh/h	2061	2582	1161	870	2238	1721	695	964	239	5112	1887	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	20.8	10.6	0.0	24.0	14.7	16.0	24.2	20.6	19.5	19.2	15.5	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	2.0	0.2	0.9	6.9	2.5	0.6	0.3	0.7	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.2	0.0	0.0	1.1	1.8	0.0	0.3	0.0	0.9	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	10.7	0.0	26.0	14.9	17.0	31.1	23.1	20.1	19.5	16.3	0.0
LnGrp LOS	C	B	A	C	B	B	C	C	C	B	B	
Approach Vol, veh/h		263			750			96			455	A
Approach Delay, s/veh		18.8			16.2			23.3			18.5	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	17.8	10.9	11.3	4.5	22.1	4.2	18.0				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	3.9	9.0	4.8	4.9	2.1	2.5	2.1	6.5				
Green Ext Time (p_c), s	0.3	3.6	0.9	0.4	0.0	0.3	0.0	0.8				

Intersection Summary

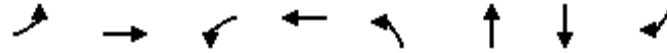
HCM 6th Ctrl Delay	17.8
HCM 6th LOS	B

Notes

- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
- User approved changes to right turn type.
- Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	73	248	17	782	8	8	14	14
v/c Ratio	0.05	0.07	0.03	0.22	0.01	0.01	0.02	0.01
Control Delay	26.1	11.4	32.9	15.9	21.4	17.4	31.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	11.4	32.9	15.9	21.4	17.4	31.5	0.0
Queue Length 50th (ft)	3	0	2	27	1	1	2	0
Queue Length 95th (ft)	47	66	34	158	15	13	29	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2471	4211	1031	5084	983	1000	940	1781
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.06	0.02	0.15	0.01	0.01	0.01	0.01
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↖↗↘		↖	↖↗↘		↖	↖↗			↖↗	↖↗↘
Traffic Volume (vph)	71	240	1	16	704	16	10	1	4	9	4	13
Future Volume (vph)	71	240	1	16	704	16	10	1	4	9	4	13
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	4985		1656	6385		1504	1529			1509	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	4985		1656	6385		1504	1529			1509	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	247	1	17	765	17	11	1	4	10	4	14
RTOR Reduction (vph)	0	0	0	0	2	0	0	4	0	0	0	13
Lane Group Flow (vph)	73	248	0	17	780	0	8	4	0	0	14	1
Confl. Peds. (#/hr)			3			3			3			
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	4%	4%	2%	9%	2%	2%	14%	2%	2%	17%	33%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	6.3	25.9		0.8	20.4		4.8	4.8			2.6	2.6
Effective Green, g (s)	6.3	25.9		0.8	20.4		4.8	4.8			2.6	2.6
Actuated g/C Ratio	0.12	0.50		0.02	0.40		0.09	0.09			0.05	0.05
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	412	2511		25	2534		140	142			76	140
v/s Ratio Prot	c0.02	0.05		c0.01	c0.12		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.18	0.10		0.68	0.31		0.06	0.03			0.18	0.01
Uniform Delay, d1	20.2	6.7		25.2	10.6		21.2	21.2			23.4	23.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	0.0		46.7	0.0		0.1	0.1			0.4	0.0
Delay (s)	20.4	6.7		71.9	10.7		21.4	21.2			23.8	23.2
Level of Service	C	A		E	B		C	C			C	C
Approach Delay (s)		9.8			12.0			21.3			23.5	
Approach LOS		A			B			C			C	

Intersection Summary

HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	51.4	Sum of lost time (s)	17.3
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 40

Timing Plan: AM Peak



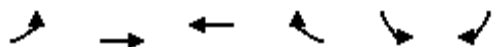
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	73	205	765	48	11	45
v/c Ratio	0.06	0.08	0.36	0.05	0.02	0.04
Control Delay	16.0	3.4	11.1	4.5	17.2	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	3.4	11.1	4.5	17.2	7.2
Queue Length 50th (ft)	8	10	97	0	3	0
Queue Length 95th (ft)	23	19	144	16	13	11
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2391	3438	3304	1461	1128	1792
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.06	0.23	0.03	0.01	0.03

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↗	↖↗
Traffic Volume (veh/h)	67	189	704	44	10	41
Future Volume (veh/h)	67	189	704	44	10	41
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1826	1870	1870	1870	1870
Adj Flow Rate, veh/h	73	205	765	48	11	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	5	2	2	2	2
Cap, veh/h	507	2097	1208	526	215	337
Arrive On Green	0.15	0.60	0.34	0.34	0.12	0.12
Sat Flow, veh/h	3456	3561	3647	1548	1781	2790
Grp Volume(v), veh/h	73	205	765	48	11	45
Grp Sat Flow(s),veh/h/ln	1728	1735	1777	1548	1781	1395
Q Serve(g_s), s	0.6	0.8	6.1	0.7	0.2	0.5
Cycle Q Clear(g_c), s	0.6	0.8	6.1	0.7	0.2	0.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	507	2097	1208	526	215	337
V/C Ratio(X)	0.14	0.10	0.63	0.09	0.05	0.13
Avail Cap(c_a), veh/h	2550	4096	4720	2056	1052	1647
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	12.6	2.8	9.4	7.6	13.2	13.3
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	1.3	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	12.7	2.8	9.6	7.6	13.2	13.4
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		278	813		56	
Approach Delay, s/veh		5.4	9.5		13.3	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.0	16.8			25.8	8.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.6	8.1			2.8	2.5
Green Ext Time (p_c), s	0.1	3.4			0.8	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Queues
4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	4	213	774	22	32	38
v/c Ratio	0.00	0.08	0.29	0.02	0.04	0.05
Control Delay	14.0	3.1	6.0	5.8	12.7	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	3.1	6.0	5.8	12.7	7.2
Queue Length 50th (ft)	0	0	0	0	0	0
Queue Length 95th (ft)	8	19	143	12	29	20
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1582	3471	3387	1478	1409	1268
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.06	0.23	0.01	0.02	0.03
Intersection Summary						

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	196	712	20	29	35
Future Volume (veh/h)	4	196	712	20	29	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1841	1870	1870	1870	1870
Adj Flow Rate, veh/h	4	213	774	22	32	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	4	2	2	2	2
Cap, veh/h	19	1822	1309	570	267	237
Arrive On Green	0.01	0.52	0.37	0.37	0.15	0.15
Sat Flow, veh/h	1781	3589	3647	1546	1781	1585
Grp Volume(v), veh/h	4	213	774	22	32	38
Grp Sat Flow(s),veh/h/ln	1781	1749	1777	1546	1781	1585
Q Serve(g_s), s	0.1	0.9	5.0	0.3	0.4	0.6
Cycle Q Clear(g_c), s	0.1	0.9	5.0	0.3	0.4	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	19	1822	1309	570	267	237
V/C Ratio(X)	0.21	0.12	0.59	0.04	0.12	0.16
Avail Cap(c_a), veh/h	1893	5575	5665	2465	1262	1123
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.8	3.4	7.2	5.7	10.4	10.5
Incr Delay (d2), s/veh	3.8	0.0	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.7	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.6	3.5	7.4	5.7	10.5	10.6
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		217	796		70	
Approach Delay, s/veh		3.7	7.3		10.5	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	15.7			20.0	8.2
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	7.0			2.9	2.6
Green Ext Time (p_c), s	0.0	3.4			0.8	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	212	734	0	0	1
Future Vol, veh/h	3	212	734	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	50	4	2	2	2	100
Mvmt Flow	3	230	798	0	0	1

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	798	0	-	0	919 399
Stage 1	-	-	-	-	798 -
Stage 2	-	-	-	-	121 -
Critical Hdwy	5.1	-	-	-	6.84 8.9
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.7	-	-	-	3.52 4.3
Pot Cap-1 Maneuver	572	-	-	-	270 392
Stage 1	-	-	-	-	404 -
Stage 2	-	-	-	-	891 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	572	-	-	-	269 392
Mov Cap-2 Maneuver	-	-	-	-	269 -
Stage 1	-	-	-	-	402 -
Stage 2	-	-	-	-	891 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	572	-	-	-	392
HCM Lane V/C Ratio	0.006	-	-	-	0.003
HCM Control Delay (s)	11.3	-	-	-	14.2
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑	↑↑		↵	
Traffic Vol, veh/h	3	211	744	1	4	0
Future Vol, veh/h	3	211	744	1	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	4	2	100	33	2
Mvmt Flow	3	229	809	1	4	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	810	0	-	0	931 405
Stage 1	-	-	-	-	810 -
Stage 2	-	-	-	-	121 -
Critical Hdwy	4.14	-	-	-	7.46 6.94
Critical Hdwy Stg 1	-	-	-	-	6.46 -
Critical Hdwy Stg 2	-	-	-	-	6.46 -
Follow-up Hdwy	2.22	-	-	-	3.83 3.32
Pot Cap-1 Maneuver	812	-	-	-	215 595
Stage 1	-	-	-	-	328 -
Stage 2	-	-	-	-	806 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	812	-	-	-	214 595
Mov Cap-2 Maneuver	-	-	-	-	214 -
Stage 1	-	-	-	-	327 -
Stage 2	-	-	-	-	806 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	22.2
HCM LOS			C

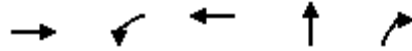
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	812	-	-	-	214
HCM Lane V/C Ratio	0.004	-	-	-	0.02
HCM Control Delay (s)	9.5	-	-	-	22.2
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Queues

7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 40

Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	232	25	784	25	14
v/c Ratio	0.09	0.04	0.27	0.04	0.03
Control Delay	4.7	14.1	3.1	13.3	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	14.1	3.1	13.3	0.1
Queue Length 50th (ft)	0	1	0	0	0
Queue Length 95th (ft)	37	25	66	24	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	3021	1340	3539	1211	847
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.22	0.02	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 40
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	188	26	23	721	0	23	0	13	0	0	0
Future Volume (veh/h)	0	188	26	23	721	0	23	0	13	0	0	0
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		1.00	1.00		1.00	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	0	1826	1826	1589	1870	0	1870	1870	1070	1870	1870	1870
Adj Flow Rate, veh/h	0	204	28	25	784	0	25	0	14	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	5	5	21	2	0	2	2	56	2	2	2
Cap, veh/h	0	999	135	77	1913	0	152	0	78	0	8	0
Arrive On Green	0.00	0.33	0.33	0.05	0.54	0.00	0.09	0.00	0.09	0.00	0.00	0.00
Sat Flow, veh/h	0	3161	416	1513	3647	0	1781	0	907	0	1870	0
Grp Volume(v), veh/h	0	114	118	25	784	0	25	0	14	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1735	1750	1513	1777	0	1781	0	907	0	1870	0
Q Serve(g_s), s	0.0	1.2	1.2	0.4	3.2	0.0	0.3	0.0	0.4	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.2	1.2	0.4	3.2	0.0	0.3	0.0	0.4	0.0	0.0	0.0
Prop In Lane	0.00		0.24	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	565	570	77	1913	0	152	0	78	0	8	0
V/C Ratio(X)	0.00	0.20	0.21	0.32	0.41	0.00	0.16	0.00	0.18	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2105	2124	1836	4312	0	1441	0	734	0	908	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	6.0	6.0	11.3	3.4	0.0	10.5	0.0	10.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	0.9	0.1	0.0	0.2	0.0	0.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.1	6.2	12.2	3.5	0.0	10.7	0.0	10.9	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		232			809			39				0
Approach Delay, s/veh		6.2			3.8			10.8				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.3	13.3		0.0		18.6		6.1				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	3.2		0.0		5.2		2.4				
Green Ext Time (p_c), s	0.0	0.9		0.0		4.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.5
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	226	73	784	13	60
v/c Ratio	0.01	0.12	0.16	0.31	0.04	0.14
Control Delay	18.3	9.3	16.5	5.4	17.6	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.3	9.3	16.5	5.4	17.6	0.7
Queue Length 50th (ft)	1	20	13	41	2	0
Queue Length 95th (ft)	7	39	55	118	17	1
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	884	2969	888	3359	835	791
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.08	0.08	0.23	0.02	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↕		↖	↕			↕	↗		↕	
Traffic Volume (veh/h)	3	198	10	67	721	0	12	0	55	0	0	0
Future Volume (veh/h)	3	198	10	67	721	0	12	0	55	0	0	0
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		1.00	1.00		1.00	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	1870	1796	1796	1322	1870	1870	1870	1870	996	1870	1870	1870
Adj Flow Rate, veh/h	3	215	11	73	784	0	13	0	60	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	7	7	39	2	2	2	2	61	2	2	2
Cap, veh/h	10	939	48	155	1429	0	220	0	104	0	7	0
Arrive On Green	0.01	0.28	0.28	0.12	0.40	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3300	168	1259	3647	0	1781	0	844	0	1870	0
Grp Volume(v), veh/h	3	111	115	73	784	0	13	0	60	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1706	1761	1259	1777	0	1781	0	844	0	1870	0
Q Serve(g_s), s	0.0	1.4	1.4	1.5	4.8	0.0	0.2	0.0	1.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.4	1.4	1.5	4.8	0.0	0.2	0.0	1.9	0.0	0.0	0.0
Prop In Lane	1.00		0.10	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	485	501	155	1429	0	220	0	104	0	7	0
V/C Ratio(X)	0.29	0.23	0.23	0.47	0.55	0.00	0.06	0.00	0.58	0.00	0.00	0.00
Avail Cap(c_a), veh/h	753	2105	2173	888	4384	0	1570	0	744	0	791	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	14.0	7.8	7.8	11.6	6.5	0.0	11.0	0.0	11.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.2	0.2	0.8	0.2	0.0	0.0	0.0	1.9	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.3	0.3	0.6	0.0	0.1	0.0	0.3	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.7	7.9	7.9	12.4	6.8	0.0	11.0	0.0	13.6	0.0	0.0	0.0
LnGrp LOS	B	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		229			857			73				0
Approach Delay, s/veh		8.1			7.2			13.1				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.5	13.4		0.0	4.2	16.7		7.5				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.5	3.4		0.0	2.0	6.8		3.9				
Green Ext Time (p_c), s	0.1	0.9		0.0	0.0	4.3		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	79	128	76	229	430	502	255	1863	211	287	1922	165
v/c Ratio	0.35	0.16	0.18	0.65	0.93	0.85	0.77	0.91	0.28	0.90	0.94	0.24
Control Delay	75.7	48.2	0.9	80.1	87.6	51.7	87.3	50.5	11.4	101.5	53.9	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.7	48.2	0.9	80.1	87.6	51.7	87.3	50.5	11.4	101.5	53.9	9.6
Queue Length 50th (ft)	40	56	0	121	447	406	138	663	41	156	691	21
Queue Length 95th (ft)	76	87	0	182	587	552	200	#893	113	#275	#994	84
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	224	1188	551	427	696	593	423	2054	761	320	2049	689
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.11	0.14	0.54	0.62	0.85	0.60	0.91	0.28	0.90	0.94	0.24

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	73	118	70	211	396	462	235	1714	194	264	1768	152
Future Volume (veh/h)	73	118	70	211	396	462	235	1714	194	264	1768	152
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		0.99	1.00		1.00	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	1218	1841	1648	1870	1870	1870	1856	1752	1870	1870	1767	1707
Adj Flow Rate, veh/h	79	128	76	229	430	502	255	1863	211	287	1922	165
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	46	4	17	2	2	2	3	10	2	2	9	13
Cap, veh/h	194	1027	404	325	564	612	293	1917	635	305	1947	584
Arrive On Green	0.09	0.29	0.29	0.09	0.30	0.30	0.09	0.40	0.40	0.09	0.40	0.40
Sat Flow, veh/h	2251	3497	1377	3456	1870	1565	3428	4782	1584	3456	4823	1447
Grp Volume(v), veh/h	79	128	76	229	430	502	255	1863	211	287	1922	165
Grp Sat Flow(s),veh/h/ln	1125	1749	1377	1728	1870	1565	1714	1594	1584	1728	1608	1447
Q Serve(g_s), s	5.7	4.6	7.0	10.9	35.5	49.1	12.5	65.1	15.7	14.1	67.2	13.1
Cycle Q Clear(g_c), s	5.7	4.6	7.0	10.9	35.5	49.1	12.5	65.1	15.7	14.1	67.2	13.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	194	1027	404	325	564	612	293	1917	635	305	1947	584
V/C Ratio(X)	0.41	0.12	0.19	0.70	0.76	0.82	0.87	0.97	0.33	0.94	0.99	0.28
Avail Cap(c_a), veh/h	198	1027	404	406	659	691	403	1967	651	305	1947	584
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	73.7	44.1	44.9	74.8	53.9	46.7	76.9	50.0	35.2	77.2	50.3	34.2
Incr Delay (d2), s/veh	0.5	0.0	0.1	2.6	3.6	6.2	11.3	13.9	0.1	36.1	17.4	0.1
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	1.6	2.0	2.4	4.9	17.0	19.7	5.9	27.4	6.0	7.7	29.4	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.2	44.1	45.0	77.4	57.5	52.9	88.2	63.9	35.3	113.2	67.7	34.3
LnGrp LOS	E	D	D	E	E	D	F	E	D	F	E	C
Approach Vol, veh/h		283			1161			2329			2374	
Approach Delay, s/veh		52.7			59.4			64.0			70.9	
Approach LOS		D			E			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	74.0	20.7	55.8	19.2	74.5	19.3	57.1				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	16.1	67.1	12.9	9.0	14.5	69.2	7.7	51.1				
Green Ext Time (p_c), s	0.0	1.2	0.0	0.1	0.0	0.0	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	65.3
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	55	45	43	2264	2121	110
v/c Ratio	0.17	0.16	0.11	0.62	0.66	0.13
Control Delay	24.9	10.5	24.1	5.5	10.8	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.9	10.5	24.1	5.5	10.8	4.2
Queue Length 50th (ft)	7	0	6	130	115	4
Queue Length 95th (ft)	24	14	20	168	#324	29
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1156	868	1385	4769	3225	863
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.03	0.47	0.66	0.13

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative plus SMP 40
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	51	41	40	2083	1951	101
Future Volume (veh/h)	51	41	40	2083	1951	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1411	1189	1737	1781	1781	1470
Adj Flow Rate, veh/h	55	45	43	2264	2121	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	33	48	11	8	8	29
Cap, veh/h	278	189	204	3252	2373	608
Arrive On Green	0.11	0.11	0.06	0.67	0.49	0.49
Sat Flow, veh/h	2607	1773	3209	5024	5024	1246
Grp Volume(v), veh/h	55	45	43	2264	2121	110
Grp Sat Flow(s),veh/h/ln	1303	886	1605	1621	1621	1246
Q Serve(g_s), s	0.9	1.1	0.6	14.0	19.2	2.4
Cycle Q Clear(g_c), s	0.9	1.1	0.6	14.0	19.2	2.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	278	189	204	3252	2373	608
V/C Ratio(X)	0.20	0.24	0.21	0.70	0.89	0.18
Avail Cap(c_a), veh/h	1342	913	1653	3252	3005	770
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	19.8	19.9	21.6	5.0	11.3	7.0
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.6	2.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.2	1.1	4.5	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	19.9	20.1	21.8	5.5	14.1	7.0
LnGrp LOS	B	C	C	A	B	A
Approach Vol, veh/h	100			2307	2231	
Approach Delay, s/veh	20.0			5.8	13.7	
Approach LOS	C			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		38.7		9.9	8.8	29.9
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		16.0		3.1	2.6	21.2
Green Ext Time (p_c), s		3.1		0.0	0.0	2.5

Intersection Summary

HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	112	516	1770	212	659	1510
v/c Ratio	0.19	0.86	0.84	0.11	0.70	0.66
Control Delay	28.3	23.1	26.9	4.0	35.3	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.3	23.1	26.9	4.0	35.3	9.9
Queue Length 50th (ft)	24	53	280	15	109	189
Queue Length 95th (ft)	47	187	#501	30	169	377
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	1037	751	2112	2212	1195	2476
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.69	0.84	0.10	0.55	0.61

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 40
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↕↕↕	↔↔	↔↔↔	↕↕
Traffic Volume (veh/h)	103	475	1628	195	606	1389
Future Volume (veh/h)	103	475	1628	195	606	1389
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1811	1811	1781	1811	1796	1767
Adj Flow Rate, veh/h	112	516	1770	212	659	1510
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	6	8	6	7	9
Cap, veh/h	934	428	1894	1806	818	2045
Arrive On Green	0.28	0.28	0.39	0.39	0.17	0.61
Sat Flow, veh/h	3346	1535	5024	2701	4824	3445
Grp Volume(v), veh/h	112	516	1770	212	659	1510
Grp Sat Flow(s),veh/h/ln	1673	1535	1621	1351	1608	1678
Q Serve(g_s), s	2.2	25.0	31.3	2.5	11.8	28.6
Cycle Q Clear(g_c), s	2.2	25.0	31.3	2.5	11.8	28.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	934	428	1894	1806	818	2045
V/C Ratio(X)	0.12	1.20	0.93	0.12	0.81	0.74
Avail Cap(c_a), veh/h	934	428	1900	1809	1077	2045
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	24.1	32.3	26.2	5.3	35.8	12.4
Incr Delay (d2), s/veh	0.1	112.3	9.3	0.0	3.4	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	22.2	12.2	0.6	4.5	8.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.1	144.6	35.6	5.4	39.2	14.0
LnGrp LOS	C	F	D	A	D	B
Approach Vol, veh/h	628		1982			2169
Approach Delay, s/veh	123.1		32.3			21.7
Approach LOS	F		C			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	19.7	40.4			60.1	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	13.8	33.3			30.6	27.0
Green Ext Time (p_c), s	1.4	1.6			3.7	0.0

Intersection Summary

HCM 6th Ctrl Delay	39.4
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Cumulative plus SMP 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	7	101	201	87	118	187	253	2032	35	315	2229
v/c Ratio	0.03	0.37	0.34	0.35	0.22	0.25	1.07	1.08	0.05	0.80	1.23
Control Delay	45.0	42.4	10.4	49.7	29.2	3.5	124.0	79.8	0.1	63.3	141.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	42.4	10.4	49.7	29.2	3.5	124.0	79.8	0.1	63.3	141.4
Queue Length 50th (ft)	4	63	32	53	55	0	~188	~568	0	105	~680
Queue Length 95th (ft)	21	110	80	126	124	43	#459	#949	0	#235	#1092
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	276	391	600	246	578	757	236	1875	704	418	1805
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.26	0.34	0.35	0.20	0.25	1.07	1.08	0.05	0.75	1.23

























Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Cumulative plus SMP 40
 Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	93	185	80	109	172	233	1869	32	290	2026	25
Future Volume (veh/h)	6	93	185	80	109	172	233	1869	32	290	2026	25
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		1.00	1.00		1.00	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	1870	1559	1870	1796	1841	1663	1841	1752	1870	1811	1767	1767
Adj Flow Rate, veh/h	7	101	201	87	118	187	253	2032	35	315	2202	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	23	2	7	4	16	4	10	2	6	9	9
Cap, veh/h	50	213	434	230	447	500	240	1942	643	375	1871	23
Arrive On Green	0.03	0.14	0.14	0.13	0.24	0.24	0.14	0.41	0.41	0.11	0.38	0.38
Sat Flow, veh/h	1781	1559	1585	1711	1841	1409	1753	4782	1585	3346	4911	60
Grp Volume(v), veh/h	7	101	201	87	118	187	253	2032	35	315	1441	788
Grp Sat Flow(s),veh/h/ln	1781	1559	1585	1711	1841	1409	1753	1594	1585	1673	1608	1756
Q Serve(g_s), s	0.4	6.1	10.8	4.7	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Cycle Q Clear(g_c), s	0.4	6.1	10.8	4.7	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	50	213	434	230	447	500	240	1942	643	375	1225	669
V/C Ratio(X)	0.14	0.47	0.46	0.38	0.26	0.37	1.05	1.05	0.05	0.84	1.18	1.18
Avail Cap(c_a), veh/h	279	350	573	251	447	500	240	1942	643	425	1225	669
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	48.5	40.8	30.9	40.4	31.3	24.6	44.2	30.4	18.5	44.5	31.7	31.7
Incr Delay (d2), s/veh	0.5	0.6	0.3	0.4	0.1	0.2	73.3	33.9	0.0	11.5	88.0	95.1
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	0.2	2.3	4.0	2.0	2.3	3.3	10.7	20.6	0.5	4.4	28.9	32.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	41.4	31.2	40.8	31.5	24.7	117.5	64.3	18.5	56.0	119.7	126.7
LnGrp LOS	D	D	C	D	C	C	F	F	B	E	F	F
Approach Vol, veh/h		309			392			2320			2544	
Approach Delay, s/veh		34.9			30.3			69.4			114.0	
Approach LOS		C			C			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	47.3	18.7	19.8	19.0	44.8	7.9	30.6				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	11.4	43.5	6.7	12.8	16.0	41.0	2.4	12.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	85.1
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5.8					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	29	8	56	17	7	44
Future Vol, veh/h	29	8	56	17	7	44
Conflicting Peds, #/hr	0	4	4	0	6	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	5	40	44	25	20	77
Mvmt Flow	32	9	61	18	8	48

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	45	0	187
Stage 1	-	-	-	-	41
Stage 2	-	-	-	-	146
Critical Hdwy	-	-	4.54	-	6.6
Critical Hdwy Stg 1	-	-	-	-	5.6
Critical Hdwy Stg 2	-	-	-	-	5.6
Follow-up Hdwy	-	-	2.596	-	3.68
Pot Cap-1 Maneuver	-	-	1332	-	763
Stage 1	-	-	-	-	937
Stage 2	-	-	-	-	839
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1327	-	720
Mov Cap-2 Maneuver	-	-	-	-	720
Stage 1	-	-	-	-	933
Stage 2	-	-	-	-	796

Approach	EB	WB	NB
HCM Control Delay, s	0	6	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	823	-	-	1327	-
HCM Lane V/C Ratio	0.067	-	-	0.046	-
HCM Control Delay (s)	9.7	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative plus SMP 40
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	59	12	56	61	17	10	0	30	6	0	4
Future Vol, veh/h	6	59	12	56	61	17	10	0	30	6	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	15	15	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	25	53	13	22	45	33	33	2	35	2	2	2
Mvmt Flow	7	64	13	61	66	18	11	0	33	7	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	84	0	0	77	0	0	284	291	86	313	288	75
Stage 1	-	-	-	-	-	-	85	85	-	197	197	-
Stage 2	-	-	-	-	-	-	199	206	-	116	91	-
Critical Hdwy	4.35	-	-	4.32	-	-	7.43	6.52	6.55	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.425	-	-	2.398	-	-	3.797	4.018	3.615	3.518	4.018	3.318
Pot Cap-1 Maneuver	1380	-	-	1404	-	-	611	619	889	640	622	986
Stage 1	-	-	-	-	-	-	852	824	-	805	738	-
Stage 2	-	-	-	-	-	-	737	731	-	889	820	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1380	-	-	1404	-	-	585	587	876	584	590	986
Mov Cap-2 Maneuver	-	-	-	-	-	-	585	587	-	584	590	-
Stage 1	-	-	-	-	-	-	848	820	-	801	704	-
Stage 2	-	-	-	-	-	-	700	697	-	839	816	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.6	3.2	9.9	10.2
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	779	1380	-	-	1404	-	-	698
HCM Lane V/C Ratio	0.056	0.005	-	-	0.043	-	-	0.016
HCM Control Delay (s)	9.9	7.6	0	-	7.7	0	-	10.2
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0

Queues

Cumulative plus SMP 40

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Timing Plan: AM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	133	134	737	960	800	822
v/c Ratio	0.35	0.35	0.70	1.01	0.36	0.63
Control Delay	24.5	24.4	20.0	52.7	6.8	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	24.4	20.0	52.7	6.8	3.1
Queue Length 50th (ft)	48	49	128	~417	77	0
Queue Length 95th (ft)	100	100	189	#735	116	38
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	467	475	1416	950	2744	1402
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.28	0.52	1.01	0.29	0.59

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative plus SMP 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↖	↖	↖↖		↑			↑↑	↖
Traffic Volume (vph)	0	0	0	220	28	685	0	883	0	0	736	756
Future Volume (vph)	0	0	0	220	28	685	0	883	0	0	736	756
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00
Frbp, ped/bikes				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
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1603	1631	2707		1863			3505	1564
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1603	1631	2707		1863			3505	1564
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	237	30	737	0	960	0	0	800	822
RTOR Reduction (vph)	0	0	0	0	0	59	0	0	0	0	0	297
Lane Group Flow (vph)	0	0	0	133	134	678	0	960	0	0	800	525
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	2%	2%	2%	7%	5%	5%	2%	2%	2%	2%	3%	2%
Turn Type				Perm	NA	custom		NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8		8 1						6
Actuated Green, G (s)				16.4	16.4	25.2		35.2			44.0	44.0
Effective Green, g (s)				16.4	16.4	25.2		35.2			44.0	44.0
Actuated g/C Ratio				0.24	0.24	0.37		0.51			0.64	0.64
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2
Lane Grp Cap (vph)				381	388	990		951			2238	998
v/s Ratio Prot								c0.52			0.23	
v/s Ratio Perm				0.08	0.08	c0.25						0.34
v/c Ratio				0.35	0.35	0.68		1.01			0.36	0.53
Uniform Delay, d1				21.8	21.8	18.5		16.9			5.8	6.8
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2				0.2	0.2	1.6		31.5			0.0	0.2
Delay (s)				22.0	22.0	20.1		48.4			5.9	7.0
Level of Service				C	C	C		D			A	A
Approach Delay (s)		0.0			20.6			48.4			6.4	
Approach LOS		A			C			D			A	
Intersection Summary												
HCM 2000 Control Delay			21.6		HCM 2000 Level of Service						C	
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			68.9		Sum of lost time (s)					12.2		
Intersection Capacity Utilization			77.8%		ICU Level of Service					D		
Analysis Period (min)			15									

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 40

Timing Plan: AM Peak




















Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	670	395	571	143	520
v/c Ratio	0.65	0.42	0.46	0.12	0.38
Control Delay	11.3	2.6	7.8	2.0	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	2.6	7.8	2.0	7.0
Queue Length 50th (ft)	36	0	25	0	22
Queue Length 95th (ft)	72	15	58	9	51
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3262	2130	3139	2682	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.19	0.18	0.05	0.15

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 40
 Timing Plan: AM Peak

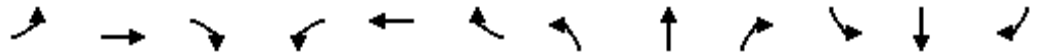
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	616	0	363	0	0	0	0	548	137	0	478	0
Future Volume (vph)	616	0	363	0	0	0	0	548	137	0	478	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.95	0.88		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3139	2682		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3139	2682		3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	670	0	395	0	0	0	0	571	143	0	520	0
RTOR Reduction (vph)	0	0	275	0	0	0	0	0	86	0	0	0
Lane Group Flow (vph)	670	0	120	0	0	0	0	571	57	0	520	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	6%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	8.1		8.1					10.6	10.6		10.6	
Effective Green, g (s)	8.1		8.1					10.6	10.6		10.6	
Actuated g/C Ratio	0.30		0.30					0.40	0.40		0.40	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	1041		673					1246	1064		1391	
v/s Ratio Prot								c0.18			0.15	
v/s Ratio Perm	c0.20		0.05						0.02			
v/c Ratio	0.64		0.18					0.46	0.05		0.37	
Uniform Delay, d1	8.1		6.8					5.9	5.0		5.7	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	1.0		0.0					0.1	0.0		0.1	
Delay (s)	9.1		6.9					6.0	5.0		5.8	
Level of Service	A		A					A	A		A	
Approach Delay (s)		8.3			0.0			5.8			5.8	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.9					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			26.7					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			77.6%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative plus SMP 40

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	754	510	13	21	278	1010	14	45	16	1002	30	507
v/c Ratio	0.67	0.34	0.02	0.10	0.42	0.56	0.07	0.09	0.06	0.68	0.02	0.32
Control Delay	39.7	24.5	0.1	51.9	39.1	4.2	52.8	40.3	0.4	32.4	15.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	24.5	0.1	51.9	39.1	4.2	52.8	40.3	0.4	32.4	15.9	0.5
Queue Length 50th (ft)	136	89	0	5	71	27	4	8	0	173	5	0
Queue Length 95th (ft)	#340	267	0	24	168	104	18	23	0	319	15	0
Internal Link Dist (ft)		745			868			221			816	
Turn Bay Length (ft)	400		305	350			110		110	600		420
Base Capacity (vph)	1153	1496	726	595	825	2361	515	1457	550	2883	2174	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.34	0.02	0.04	0.34	0.43	0.03	0.03	0.03	0.35	0.01	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative plus SMP 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↗	↔↔	↑↑	↗↗	↔↔	↑↑↑	↗	↔↔↔	↑↑	↗
Traffic Volume (veh/h)	709	479	12	20	267	970	13	41	15	922	28	466
Future Volume (veh/h)	709	479	12	20	267	970	13	41	15	922	28	466
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		0.99	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1796	1796	1870	1589	1870
Adj Flow Rate, veh/h	754	510	13	21	278	1010	14	45	16	1002	30	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	7	7	2	21	2
Cap, veh/h	920	1467	651	81	899	1398	46	335	102	1262	924	
Arrive On Green	0.18	0.41	0.41	0.02	0.25	0.25	0.01	0.07	0.07	0.25	0.31	0.00
Sat Flow, veh/h	5023	3554	1577	3456	3554	2754	3456	4904	1496	5023	3019	1585
Grp Volume(v), veh/h	754	510	13	21	278	1010	14	45	16	1002	30	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1577	1728	1777	1377	1728	1635	1496	1674	1509	1585
Q Serve(g_s), s	11.4	7.8	0.4	0.5	5.0	20.0	0.3	0.7	0.8	14.7	0.6	0.0
Cycle Q Clear(g_c), s	11.4	7.8	0.4	0.5	5.0	20.0	0.3	0.7	0.8	14.7	0.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	920	1467	651	81	899	1398	46	335	102	1262	924	
V/C Ratio(X)	0.82	0.35	0.02	0.26	0.31	0.72	0.30	0.13	0.16	0.79	0.03	
Avail Cap(c_a), veh/h	1271	1467	651	656	899	1398	569	1552	473	3179	924	
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	0.00
Uniform Delay (d), s/veh	31.0	15.9	13.7	37.9	23.9	15.3	38.6	34.6	34.7	27.7	19.2	0.0
Incr Delay (d2), s/veh	2.2	0.1	0.0	0.6	0.2	1.9	1.3	0.1	0.5	0.9	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	4.5	2.9	0.1	0.2	2.0	6.4	0.1	0.3	0.3	5.6	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.2	16.0	13.7	38.5	24.1	17.2	40.0	34.7	35.2	28.6	19.2	0.0
LnGrp LOS	C	B	B	D	C	B	D	C	D	C	B	
Approach Vol, veh/h		1277			1309			75			1032	A
Approach Delay, s/veh		26.1			19.0			35.8			28.3	
Approach LOS		C			B			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.5	25.3	23.8	11.4	5.8	37.9	5.1	30.2				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	13.4	22.0	16.7	2.8	2.5	9.8	2.3	2.6				
Green Ext Time (p_c), s	1.1	0.0	3.1	0.2	0.0	2.8	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	24.4
HCM 6th LOS	C

Notes

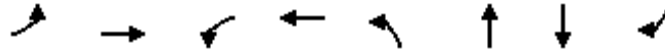
User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	504	976	42	526	136	131	107	693
v/c Ratio	0.66	0.52	0.19	0.44	0.43	0.41	0.35	0.66
Control Delay	35.6	23.0	44.4	29.9	36.4	31.0	39.7	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.6	23.0	44.4	29.9	36.4	31.0	39.7	6.8
Queue Length 50th (ft)	97	129	16	52	54	44	40	0
Queue Length 95th (ft)	274	287	76	135	165	143	148	59
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1373	3383	471	3350	490	485	482	1251
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.29	0.09	0.16	0.28	0.27	0.22	0.55
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑↔		↔	↑↑↑		↔	↔			↔	↔↔
Traffic Volume (vph)	484	909	28	39	414	70	189	22	48	60	45	679
Future Volume (vph)	484	909	28	39	414	70	189	22	48	60	45	679
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5060		1770	6255		1681	1621			1811	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5060		1770	6255		1681	1621			1811	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	504	947	29	42	450	76	195	23	49	61	46	693
RTOR Reduction (vph)	0	3	0	0	28	0	0	16	0	0	0	576
Lane Group Flow (vph)	504	973	0	42	498	0	136	115	0	0	107	117
Confl. Peds. (#/hr)							1		12			
Confl. Bikes (#/hr)							3		1			1
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	18.3	30.4		5.3	17.4		15.6	15.6			13.9	13.9
Effective Green, g (s)	18.3	30.4		5.3	17.4		15.6	15.6			13.9	13.9
Actuated g/C Ratio	0.22	0.37		0.06	0.21		0.19	0.19			0.17	0.17
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	761	1864		113	1319		317	306			305	469
v/s Ratio Prot	c0.15	c0.19		0.02	0.08		c0.08	0.07			c0.06	0.04
v/s Ratio Perm												
v/c Ratio	0.66	0.52		0.37	0.38		0.43	0.38			0.35	0.25
Uniform Delay, d1	29.3	20.4		37.0	27.9		29.5	29.2			30.3	29.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.0	0.1		0.8	0.1		0.7	0.6			0.3	0.1
Delay (s)	31.2	20.5		37.8	28.0		30.2	29.8			30.6	29.9
Level of Service	C	C		D	C		C	C			C	C
Approach Delay (s)		24.2			28.7			30.0			30.0	
Approach LOS		C			C			C			C	

Intersection Summary

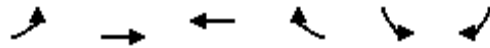
HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	82.5	Sum of lost time (s)	17.3
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 40

Timing Plan: PM Peak



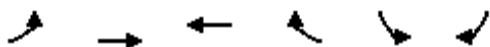
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	145	951	391	54	57	177
v/c Ratio	0.18	0.49	0.36	0.10	0.14	0.22
Control Delay	18.4	6.6	13.4	4.2	19.1	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	6.6	13.4	4.2	19.1	5.3
Queue Length 50th (ft)	14	63	43	0	11	0
Queue Length 95th (ft)	50	87	67	15	50	26
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2018	3539	3319	1463	832	1404
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.27	0.12	0.04	0.07	0.13

Intersection Summary

HCM 6th Signalized Intersection Summary

3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 40
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶↷	↶↷	↶↷	↷	↶	↶↷
Traffic Volume (veh/h)	139	913	379	52	54	166
Future Volume (veh/h)	139	913	379	52	54	166
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	145	951	391	54	57	177
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	681	1941	894	387	404	633
Arrive On Green	0.20	0.55	0.25	0.25	0.23	0.23
Sat Flow, veh/h	3456	3647	3647	1537	1781	2790
Grp Volume(v), veh/h	145	951	391	54	57	177
Grp Sat Flow(s),veh/h/ln	1728	1777	1777	1537	1781	1395
Q Serve(g_s), s	1.4	6.8	3.8	1.1	1.0	2.1
Cycle Q Clear(g_c), s	1.4	6.8	3.8	1.1	1.0	2.1
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	681	1941	894	387	404	633
V/C Ratio(X)	0.21	0.49	0.44	0.14	0.14	0.28
Avail Cap(c_a), veh/h	2107	3467	3900	1687	869	1361
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.8	5.8	12.9	11.9	12.7	13.1
Incr Delay (d2), s/veh	0.1	0.1	0.1	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.1	1.1	0.3	0.4	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.9	5.8	13.0	12.0	12.7	13.2
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		1096	445		234	
Approach Delay, s/veh		6.9	12.9		13.1	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.1	15.6			27.7	13.3
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.4	5.8			8.8	4.1
Green Ext Time (p_c), s	0.3	1.6			4.3	0.4

Intersection Summary

HCM 6th Ctrl Delay	9.2
HCM 6th LOS	A

Notes

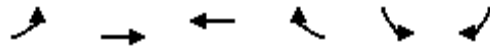
User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues

4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 40

Timing Plan: PM Peak



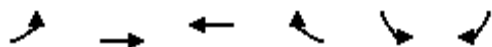
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	20	978	425	18	25	41
v/c Ratio	0.03	0.41	0.19	0.02	0.03	0.06
Control Delay	18.5	7.4	9.0	6.7	12.3	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	7.4	9.0	6.7	12.3	5.6
Queue Length 50th (ft)	2	65	23	0	3	0
Queue Length 95th (ft)	27	196	113	13	23	19
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1475	3539	3266	1420	1224	1118
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.28	0.13	0.01	0.02	0.04

Intersection Summary

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 40
Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↷
Traffic Volume (veh/h)	19	949	395	17	23	38
Future Volume (veh/h)	19	949	395	17	23	38
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1870	1870	1841	1856
Adj Flow Rate, veh/h	20	978	425	18	25	41
Peak Hour Factor	0.97	0.97	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	4	3
Cap, veh/h	91	1898	1221	530	250	224
Arrive On Green	0.05	0.53	0.34	0.34	0.14	0.14
Sat Flow, veh/h	1781	3647	3647	1542	1753	1572
Grp Volume(v), veh/h	20	978	425	18	25	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1777	1542	1753	1572
Q Serve(g_s), s	0.3	5.1	2.6	0.2	0.4	0.7
Cycle Q Clear(g_c), s	0.3	5.1	2.6	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	91	1898	1221	530	250	224
V/C Ratio(X)	0.22	0.52	0.35	0.03	0.10	0.18
Avail Cap(c_a), veh/h	1858	5561	5561	2412	1219	1094
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.1	4.3	7.0	6.3	10.7	10.9
Incr Delay (d2), s/veh	0.9	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.1	0.4	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.0	4.4	7.1	6.3	10.8	11.0
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		998	443		66	
Approach Delay, s/veh		4.6	7.1		10.9	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.5	15.2			20.7	8.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.3	4.6			7.1	2.7
Green Ext Time (p_c), s	0.0	1.7			4.5	0.1

Intersection Summary

HCM 6th Ctrl Delay	5.6
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

HCM 6th TWSC
 5: W Jack London Blvd & Ambassador Dwy

Cumulative plus SMP 40
 Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	981	420	0	0	0
Future Vol, veh/h	0	981	420	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	180	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	94	94	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1066	447	0	0	0

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	447	0	-	0	980 224
Stage 1	-	-	-	-	447 -
Stage 2	-	-	-	-	533 -
Critical Hdwy	4.14	-	-	-	6.84 6.94
Critical Hdwy Stg 1	-	-	-	-	5.84 -
Critical Hdwy Stg 2	-	-	-	-	5.84 -
Follow-up Hdwy	2.22	-	-	-	3.52 3.32
Pot Cap-1 Maneuver	1110	-	-	-	247 779
Stage 1	-	-	-	-	611 -
Stage 2	-	-	-	-	553 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1110	-	-	-	247 779
Mov Cap-2 Maneuver	-	-	-	-	247 -
Stage 1	-	-	-	-	611 -
Stage 2	-	-	-	-	553 -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1110	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	968	429	0	0	1
Future Vol, veh/h	3	968	429	0	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	1052	466	0	0	1

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	466	0	-	0	998
Stage 1	-	-	-	-	466
Stage 2	-	-	-	-	532
Critical Hdwy	4.14	-	-	-	6.84
Critical Hdwy Stg 1	-	-	-	-	5.84
Critical Hdwy Stg 2	-	-	-	-	5.84
Follow-up Hdwy	2.22	-	-	-	3.52
Pot Cap-1 Maneuver	1092	-	-	-	240
Stage 1	-	-	-	-	598
Stage 2	-	-	-	-	553
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1092	-	-	-	239
Mov Cap-2 Maneuver	-	-	-	-	239
Stage 1	-	-	-	-	596
Stage 2	-	-	-	-	553

Approach	EB	WB	SB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

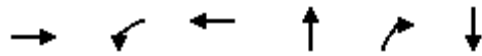
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1092	-	-	-	769
HCM Lane V/C Ratio	0.003	-	-	-	0.001
HCM Control Delay (s)	8.3	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Queues

7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 40

Timing Plan: PM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1056	13	418	27	18	14
v/c Ratio	0.37	0.04	0.14	0.06	0.05	0.04
Control Delay	6.6	21.3	3.3	20.1	0.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	21.3	3.3	20.1	0.3	0.2
Queue Length 50th (ft)	0	1	0	3	0	0
Queue Length 95th (ft)	255	20	57	32	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	2884	1217	3475	946	660	628
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.01	0.12	0.03	0.03	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	948	24	12	385	0	25	0	17	10	0	3
Future Volume (veh/h)	0	948	24	12	385	0	25	0	17	10	0	3
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		1.00	1.00		1.00	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	0	1870	1870	1648	1870	0	1870	1870	1292	1870	1870	1870
Adj Flow Rate, veh/h	0	1030	26	13	418	0	27	0	18	11	0	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	2	2	17	2	0	2	2	41	2	2	2
Cap, veh/h	0	1477	37	42	1944	0	159	0	98	30	0	8
Arrive On Green	0.00	0.42	0.42	0.03	0.55	0.00	0.09	0.00	0.09	0.02	0.00	0.02
Sat Flow, veh/h	0	3633	89	1570	3647	0	1781	0	1095	1363	0	372
Grp Volume(v), veh/h	0	517	539	13	418	0	27	0	18	14	0	0
Grp Sat Flow(s),veh/h/ln	0	1777	1852	1570	1777	0	1781	0	1095	1735	0	0
Q Serve(g_s), s	0.0	9.3	9.3	0.3	2.3	0.0	0.5	0.0	0.6	0.3	0.0	0.0
Cycle Q Clear(g_c), s	0.0	9.3	9.3	0.3	2.3	0.0	0.5	0.0	0.6	0.3	0.0	0.0
Prop In Lane	0.00		0.05	1.00		0.00	1.00		1.00	0.79		0.21
Lane Grp Cap(c), veh/h	0	741	773	42	1944	0	159	0	98	38	0	0
V/C Ratio(X)	0.00	0.70	0.70	0.31	0.21	0.00	0.17	0.00	0.18	0.37	0.00	0.00
Avail Cap(c_a), veh/h	0	1371	1429	1211	2743	0	916	0	563	536	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.3	9.3	18.6	4.5	0.0	16.4	0.0	16.4	18.8	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.9	1.5	0.0	0.0	0.2	0.0	0.3	2.3	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.2	2.3	0.1	0.3	0.0	0.2	0.0	0.1	0.1	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	10.2	10.2	20.1	4.6	0.0	16.6	0.0	16.7	21.0	0.0	0.0
LnGrp LOS	A	B	B	C	A	A	B	A	B	C	A	A
Approach Vol, veh/h		1056			431			45				14
Approach Delay, s/veh		10.2			5.0			16.6				21.0
Approach LOS		B			A			B				C
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.0	21.5		4.8		26.6		7.5				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.3	11.3		2.3		4.3		2.6				
Green Ext Time (p_c), s	0.0	4.9		0.0		2.0		0.1				

Intersection Summary

HCM 6th Ctrl Delay	9.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	4	1077	28	426	8	87
v/c Ratio	0.01	0.50	0.12	0.18	0.02	0.24
Control Delay	21.5	9.0	21.8	5.1	20.7	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	9.0	21.8	5.1	20.7	3.6
Queue Length 50th (ft)	1	64	6	20	2	0
Queue Length 95th (ft)	9	191	29	61	13	14
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	606	2851	570	3198	1128	747
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.38	0.05	0.13	0.01	0.12
Intersection Summary						

HCM 6th Signalized Intersection Summary

8: Voyager St & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕		↵	↕			↕	↕		↕	
Traffic Volume (veh/h)	4	978	13	26	392	0	7	0	80	0	0	0
Future Volume (veh/h)	4	978	13	26	392	0	7	0	80	0	0	0
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		1.00	1.00		1.00	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	1870	1870	1870	803	1870	1870	1870	1870	1189	1870	1870	1870
Adj Flow Rate, veh/h	4	1063	14	28	426	0	8	0	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	74	2	2	2	2	48	2	2	2
Cap, veh/h	14	1584	21	42	1733	0	242	0	137	0	5	0
Arrive On Green	0.01	0.44	0.44	0.05	0.49	0.00	0.14	0.00	0.14	0.00	0.00	0.00
Sat Flow, veh/h	1781	3590	47	765	3647	0	1781	0	1007	0	1870	0
Grp Volume(v), veh/h	4	526	551	28	426	0	8	0	87	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1777	1861	765	1777	0	1781	0	1007	0	1870	0
Q Serve(g_s), s	0.1	8.5	8.5	1.3	2.5	0.0	0.1	0.0	2.9	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	8.5	8.5	1.3	2.5	0.0	0.1	0.0	2.9	0.0	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	14	784	821	42	1733	0	243	0	137	0	5	0
V/C Ratio(X)	0.29	0.67	0.67	0.67	0.25	0.00	0.03	0.00	0.63	0.00	0.00	0.00
Avail Cap(c_a), veh/h	592	1723	1804	424	3446	0	1234	0	698	0	622	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	17.8	8.0	8.0	16.8	5.4	0.0	13.5	0.0	14.7	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.4	0.7	0.7	6.9	0.1	0.0	0.0	0.0	1.8	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.7	1.8	0.3	0.4	0.0	0.0	0.0	0.6	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	8.8	8.7	23.6	5.4	0.0	13.5	0.0	16.5	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	B	A	A	A
Approach Vol, veh/h		1081			454			95				0
Approach Delay, s/veh		8.8			6.6			16.3				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.0	21.2		0.0	4.3	22.9		8.9				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.3	10.5		0.0	2.1	4.5		4.9				
Green Ext Time (p_c), s	0.0	5.4		0.0	0.0	2.1		0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	138	666	284	183	264	439	99	1851	215	412	2068	89
v/c Ratio	0.40	1.05	0.66	0.44	0.77	0.74	0.28	0.86	0.28	1.07	0.96	0.13
Control Delay	62.4	101.6	24.0	61.7	66.9	40.6	61.5	40.8	9.8	120.6	48.8	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.4	101.6	24.0	61.7	66.9	40.6	61.5	40.8	9.8	120.6	48.8	1.3
Queue Length 50th (ft)	55	~325	67	73	212	270	39	511	33	~188	609	0
Queue Length 95th (ft)	113	422	179	142	345	458	86	733	104	#409	#911	9
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	348	1460	740	515	830	591	505	2619	901	386	2444	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.46	0.38	0.36	0.32	0.74	0.20	0.71	0.24	1.07	0.85	0.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	127	613	261	168	243	404	95	1777	206	379	1903	82
Future Volume (veh/h)	127	613	261	168	243	404	95	1777	206	379	1903	82
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		1.00	1.00		1.00	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	1707	1870	1826	1870	1856	1870	1841	1841	1870	1870	1826	1663
Adj Flow Rate, veh/h	138	666	284	183	264	439	99	1851	215	412	2068	89
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Percent Heavy Veh, %	13	2	5	2	3	2	4	4	2	2	5	16
Cap, veh/h	328	894	389	384	480	576	325	1945	613	360	1973	558
Arrive On Green	0.10	0.25	0.25	0.11	0.26	0.26	0.10	0.39	0.39	0.10	0.40	0.40
Sat Flow, veh/h	3155	3554	1546	3456	1856	1585	3401	5025	1585	3456	4985	1409
Grp Volume(v), veh/h	138	666	284	183	264	439	99	1851	215	412	2068	89
Grp Sat Flow(s),veh/h/ln	1577	1777	1546	1728	1856	1585	1700	1675	1585	1728	1662	1409
Q Serve(g_s), s	5.9	24.8	24.2	7.1	17.7	35.1	3.9	51.4	13.8	15.0	56.9	5.9
Cycle Q Clear(g_c), s	5.9	24.8	24.2	7.1	17.7	35.1	3.9	51.4	13.8	15.0	56.9	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	328	894	389	384	480	576	325	1945	613	360	1973	558
V/C Ratio(X)	0.42	0.74	0.73	0.48	0.55	0.76	0.30	0.95	0.35	1.14	1.05	0.16
Avail Cap(c_a), veh/h	329	894	389	480	774	826	473	2445	771	360	1973	558
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	60.4	49.6	49.4	60.0	46.1	40.3	60.6	42.8	31.3	64.4	43.5	28.0
Incr Delay (d2), s/veh	0.3	3.0	6.0	0.3	0.4	1.4	0.2	7.5	0.1	92.4	34.3	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	2.3	11.2	9.8	3.1	8.1	13.5	1.7	21.6	5.2	11.1	28.7	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.7	52.6	55.4	60.3	46.4	41.7	60.8	50.3	31.4	156.8	77.7	28.1
LnGrp LOS	E	D	E	E	D	D	E	D	C	F	F	C
Approach Vol, veh/h		1088			886			2165			2569	
Approach Delay, s/veh		54.4			47.0			48.9			88.7	
Approach LOS		D			D			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	61.5	20.7	42.0	18.4	62.7	19.6	43.0				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	17.0	53.4	9.1	26.8	5.9	58.9	7.9	37.1				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	64.8
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative plus SMP 40
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	83	68	27	2153	2448	61
v/c Ratio	0.21	0.18	0.08	0.59	0.72	0.07
Control Delay	22.5	8.5	21.6	5.4	10.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	8.5	21.6	5.4	10.5	3.9
Queue Length 50th (ft)	10	0	3	114	146	2
Queue Length 95th (ft)	32	17	14	146	#441	21
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1441	1205	1161	5036	3422	825
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.06	0.02	0.43	0.72	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative plus SMP 40
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶↶	↷↷	↶↶	↑↑↑	↑↑↑	↷
Traffic Volume (veh/h)	76	63	25	2002	2252	56
Future Volume (veh/h)	76	63	25	2002	2252	56
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1663	1663	1248	1856	1841	1366
Adj Flow Rate, veh/h	83	68	27	2153	2448	61
Peak Hour Factor	0.92	0.92	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	16	16	44	3	4	36
Cap, veh/h	362	292	100	3426	2641	609
Arrive On Green	0.12	0.12	0.04	0.68	0.53	0.53
Sat Flow, veh/h	3072	2480	2306	5233	5191	1158
Grp Volume(v), veh/h	83	68	27	2153	2448	61
Grp Sat Flow(s),veh/h/ln	1536	1240	1153	1689	1675	1158
Q Serve(g_s), s	1.3	1.3	0.6	12.7	23.9	1.4
Cycle Q Clear(g_c), s	1.3	1.3	0.6	12.7	23.9	1.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	362	292	100	3426	2641	609
V/C Ratio(X)	0.23	0.23	0.27	0.63	0.93	0.10
Avail Cap(c_a), veh/h	1450	1171	1088	3426	2846	656
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.2	21.2	24.5	4.8	11.6	6.3
Incr Delay (d2), s/veh	0.1	0.1	0.5	0.3	5.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.9	0.1	1.3	6.4	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.3	21.3	25.1	5.1	17.1	6.3
LnGrp LOS	C	C	C	A	B	A
Approach Vol, veh/h	151			2180	2509	
Approach Delay, s/veh	21.3			5.4	16.9	
Approach LOS	C			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		42.0		10.9	8.0	34.0
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		14.7		3.3	2.6	25.9
Green Ext Time (p_c), s		2.9		0.0	0.0	2.0

Intersection Summary

HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 40
Timing Plan: PM Peak






















Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	122	766	1445	124	548	1982
v/c Ratio	0.12	1.04	0.77	0.06	0.65	0.96
Control Delay	25.1	61.7	27.3	2.3	38.3	29.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	61.7	27.3	2.3	38.3	29.2
Queue Length 50th (ft)	26	~298	251	4	103	496
Queue Length 95th (ft)	50	#542	329	14	139	#681
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	976	736	1967	2007	1135	2326
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	1.04	0.73	0.06	0.48	0.85

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 40
 Timing Plan: PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  	 	  	 
Traffic Volume (veh/h)	112	705	1329	114	504	1823
Future Volume (veh/h)	112	705	1329	114	504	1823
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1826	1841	1870	1826
Adj Flow Rate, veh/h	122	766	1445	124	548	1982
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	5	4	2	5
Cap, veh/h	1035	475	1900	1868	733	2015
Arrive On Green	0.30	0.30	0.38	0.38	0.15	0.58
Sat Flow, veh/h	3456	1585	5149	2745	5023	3561
Grp Volume(v), veh/h	122	766	1445	124	548	1982
Grp Sat Flow(s),veh/h/ln	1728	1585	1662	1373	1674	1735
Q Serve(g_s), s	2.1	25.0	21.1	1.3	8.7	46.6
Cycle Q Clear(g_c), s	2.1	25.0	21.1	1.3	8.7	46.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1035	475	1900	1868	733	2015
V/C Ratio(X)	0.12	1.61	0.76	0.07	0.75	0.98
Avail Cap(c_a), veh/h	1035	475	2089	1973	1203	2015
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.2	29.3	22.5	4.5	34.2	17.1
Incr Delay (d2), s/veh	0.1	286.0	1.7	0.0	1.6	16.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	46.6	7.5	0.3	3.4	18.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.3	315.3	24.2	4.5	35.7	33.4
LnGrp LOS	C	F	C	A	D	C
Approach Vol, veh/h	888		1569			2530
Approach Delay, s/veh	274.9		22.7			33.9
Approach LOS	F		C			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	16.7	37.3			54.0	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	10.7	23.1			48.6	27.0
Green Ext Time (p_c), s	1.4	8.7			0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			73.3			
HCM 6th LOS			E			

Queues
12: Isabel Ave & Airway Blvd

Cumulative plus SMP 40
Timing Plan: PM Peak



























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	16	153	368	46	84	357	220	2260	41	337	2142
v/c Ratio	0.06	0.48	0.56	0.17	0.17	0.45	0.88	1.10	0.06	0.80	1.11
Control Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	82.8	0.2	60.5	86.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	82.8	0.2	60.5	86.6
Queue Length 50th (ft)	9	97	89	27	39	31	146	~657	0	113	~621
Queue Length 95th (ft)	35	157	170	76	93	118	#388	#1067	0	#257	#1021
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	274	449	656	269	564	796	251	2058	689	440	1938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.34	0.56	0.17	0.15	0.45	0.88	1.10	0.06	0.77	1.11

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Cumulative plus SMP 40
 Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	141	339	42	77	328	202	2079	38	310	1959	12
Future Volume (veh/h)	15	141	339	42	77	328	202	2079	38	310	1959	12
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		1.00	1.00		1.00	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	1796	1737	1870	1870	1870	1870	1870	1841	1781	1826	1811	1811
Adj Flow Rate, veh/h	16	153	368	46	84	357	220	2260	41	337	2129	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	11	2	2	2	2	2	4	8	5	6	6
Cap, veh/h	96	367	538	184	483	594	229	1861	559	393	1816	11
Arrive On Green	0.06	0.21	0.21	0.10	0.26	0.26	0.13	0.37	0.37	0.12	0.36	0.36
Sat Flow, veh/h	1711	1737	1583	1781	1870	1585	1781	5025	1510	3374	5071	31
Grp Volume(v), veh/h	16	153	368	46	84	357	220	2260	41	337	1384	758
Grp Sat Flow(s),veh/h/ln	1711	1737	1583	1781	1870	1585	1781	1675	1510	1687	1648	1806
Q Serve(g_s), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Cycle Q Clear(g_c), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	96	367	538	184	483	594	229	1861	559	393	1181	647
V/C Ratio(X)	0.17	0.42	0.68	0.25	0.17	0.60	0.96	1.21	0.07	0.86	1.17	1.17
Avail Cap(c_a), veh/h	251	367	538	245	483	594	229	1861	559	403	1181	647
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	48.9	37.1	30.9	44.9	31.3	27.5	47.2	34.3	22.2	47.2	34.9	34.9
Incr Delay (d2), s/veh	0.3	0.3	3.0	0.3	0.1	1.2	47.9	101.6	0.0	15.5	86.6	93.4
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	0.4	3.4	8.4	1.1	1.7	7.4	8.8	32.8	0.7	5.2	28.8	32.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.2	37.4	33.9	45.2	31.4	28.7	95.1	135.9	22.2	62.8	121.5	128.3
LnGrp LOS	D	D	C	D	C	C	F	F	C	E	F	F
Approach Vol, veh/h		537			487			2521			2479	
Approach Delay, s/veh		35.3			30.7			130.5			115.6	
Approach LOS		D			C			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	46.1	16.3	28.8	19.0	44.8	11.1	33.9				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	12.7	42.3	4.6	23.8	15.4	41.0	3.0	21.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	107.8
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	25	13	38	20	10	75
Future Vol, veh/h	25	13	38	20	10	75
Conflicting Peds, #/hr	0	1	1	0	4	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	8	42	35	30	31
Mvmt Flow	27	14	41	22	11	82

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	42	0	143 35
Stage 1	-	-	-	-	35 -
Stage 2	-	-	-	-	108 -
Critical Hdwy	-	-	4.52	-	6.7 6.51
Critical Hdwy Stg 1	-	-	-	-	5.7 -
Critical Hdwy Stg 2	-	-	-	-	5.7 -
Follow-up Hdwy	-	-	2.578	-	3.77 3.579
Pot Cap-1 Maneuver	-	-	1345	-	788 961
Stage 1	-	-	-	-	920 -
Stage 2	-	-	-	-	851 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1344	-	760 960
Mov Cap-2 Maneuver	-	-	-	-	760 -
Stage 1	-	-	-	-	919 -
Stage 2	-	-	-	-	821 -

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	931	-	-	1344	-
HCM Lane V/C Ratio	0.099	-	-	0.031	-
HCM Control Delay (s)	9.3	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative plus SMP 40
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	97	1	18	47	25	5	7	59	16	3	4
Future Vol, veh/h	4	97	1	18	47	25	5	7	59	16	3	4
Conflicting Peds, #/hr	1	0	0	0	0	1	19	0	9	9	0	19
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	24	2	6	43	64	60	2	15	2	2	2
Mvmt Flow	4	99	1	20	51	27	5	8	64	17	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	79	0	0	100	0	0	235	227	109	259	214	85
Stage 1	-	-	-	-	-	-	108	108	-	106	106	-
Stage 2	-	-	-	-	-	-	127	119	-	153	108	-
Critical Hdwy	4.12	-	-	4.16	-	-	7.7	6.52	6.35	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.254	-	-	4.04	4.018	3.435	3.518	4.018	3.318
Pot Cap-1 Maneuver	1519	-	-	1468	-	-	613	672	910	694	684	974
Stage 1	-	-	-	-	-	-	774	806	-	900	807	-
Stage 2	-	-	-	-	-	-	755	797	-	849	806	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1518	-	-	1468	-	-	589	660	902	625	672	955
Mov Cap-2 Maneuver	-	-	-	-	-	-	589	660	-	625	672	-
Stage 1	-	-	-	-	-	-	772	804	-	896	795	-
Stage 2	-	-	-	-	-	-	725	785	-	772	804	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			1.5			9.7			10.6		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	840	1518	-	-	1468	-	-	671
HCM Lane V/C Ratio	0.092	0.003	-	-	0.013	-	-	0.037
HCM Control Delay (s)	9.7	7.4	0	-	7.5	0	-	10.6
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Queues

Cumulative plus SMP 40

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Timing Plan: PM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	177	178	873	1172	1466	842
v/c Ratio	0.42	0.42	0.75	1.32	0.66	0.64
Control Delay	27.1	27.0	22.2	172.5	10.5	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	27.0	22.2	172.5	10.5	3.0
Queue Length 50th (ft)	67	67	176	~688	206	0
Queue Length 95th (ft)	144	144	246	#1079	267	36
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	459	461	1419	891	2597	1385
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.39	0.62	1.32	0.56	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.



















95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative plus SMP 40

Timing Plan: PM Peak

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	320	6	803	0	1078	0	0	1349	775	
Future Volume (vph)	0	0	0	320	6	803	0	1078	0	0	1349	775	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1681	1689	2787		1863			3539	1583	
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1681	1689	2787		1863			3539	1583	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	348	7	873	0	1172	0	0	1466	842	
RTOR Reduction (vph)	0	0	0	0	0	27	0	0	0	0	0	312	
Lane Group Flow (vph)	0	0	0	177	178	846	0	1172	0	0	1466	530	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				18.7	18.7	29.8		35.2			46.3	46.3	
Effective Green, g (s)				18.7	18.7	29.8		35.2			46.3	46.3	
Actuated g/C Ratio				0.25	0.25	0.41		0.48			0.63	0.63	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				427	429	1129		892			2229	997	
v/s Ratio Prot								c0.63			0.41		
v/s Ratio Perm				0.11	0.11	c0.30						0.33	
v/c Ratio				0.41	0.41	0.75		1.31			0.66	0.53	
Uniform Delay, d1				22.8	22.8	18.7		19.1			8.6	7.6	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	2.4		149.2			0.5	0.3	
Delay (s)				23.1	23.1	21.1		168.4			9.1	7.8	
Level of Service				C	C	C		F			A	A	
Approach Delay (s)		0.0			21.7			168.4			8.7		
Approach LOS		A			C			F			A		
Intersection Summary													
HCM 2000 Control Delay			51.8		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio			1.12										
Actuated Cycle Length (s)			73.5		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			92.2%		ICU Level of Service					F			
Analysis Period (min)			15										

c Critical Lane Group

Queues

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 40

Timing Plan: PM Peak

























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	576	521	1217	584	1025
v/c Ratio	0.64	0.62	0.65	0.34	0.55
Control Delay	18.9	14.4	8.9	1.2	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	14.4	8.9	1.2	7.7
Queue Length 50th (ft)	59	39	85	0	66
Queue Length 95th (ft)	146	117	184	17	145
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2305	1922	3140	2478	3140
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.27	0.39	0.24	0.33

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 40
 Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					 	 		 	
Traffic Volume (vph)	530	0	479	0	0	0	0	1168	561	0	943	0
Future Volume (vph)	530	0	479	0	0	0	0	1168	561	0	943	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.95	0.88		0.95	
Frbp, ped/bikes	1.00		1.00					1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2787					3539	2719		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2787					3539	2719		3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	576	0	521	0	0	0	0	1217	584	0	1025	0
RTOR Reduction (vph)	0	0	113	0	0	0	0	0	270	0	0	0
Lane Group Flow (vph)	576	0	408	0	0	0	0	1217	314	0	1025	0
Confl. Peds. (#/hr)									4			
Confl. Bikes (#/hr)									1			
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	11.0		11.0					22.1	22.1		22.1	
Effective Green, g (s)	11.0		11.0					22.1	22.1		22.1	
Actuated g/C Ratio	0.27		0.27					0.54	0.54		0.54	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	918		745					1902	1462		1902	
v/s Ratio Prot								c0.34			0.29	
v/s Ratio Perm	c0.17		0.15						0.12			
v/c Ratio	0.63		0.55					0.64	0.21		0.54	
Uniform Delay, d1	13.2		12.9					6.7	5.0		6.2	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	1.0		0.4					0.5	0.0		0.1	
Delay (s)	14.2		13.4					7.2	5.0		6.3	
Level of Service	B		B					A	A		A	
Approach Delay (s)		13.8			0.0			6.5			6.3	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.5									A
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			41.1								8.0	
Intersection Capacity Utilization			67.7%									C
Analysis Period (min)			15									

c Critical Lane Group

Queues

Cumulative plus SMP 39 & 40

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	208	85	7	312	500	4	89	3	500	142	458
v/c Ratio	0.33	0.06	0.03	0.38	0.31	0.02	0.21	0.01	0.50	0.19	0.29
Control Delay	33.7	17.8	40.7	26.0	1.9	41.0	28.0	0.0	28.0	14.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	17.8	40.7	26.0	1.9	41.0	28.0	0.0	28.0	14.9	0.5
Queue Length 50th (ft)	25	9	1	51	0	1	10	0	57	16	0
Queue Length 95th (ft)	78	43	10	141	30	7	32	0	156	54	0
Internal Link Dist (ft)		745		868			221			816	
Turn Bay Length (ft)	400		350			110		110	600		420
Base Capacity (vph)	1707	2161	767	1858	2571	622	1517	506	3689	1832	1599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.04	0.01	0.17	0.19	0.01	0.06	0.01	0.14	0.08	0.29

Intersection Summary

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↗	↔↔	↑↑	↗↗	↔↔	↑↑↑	↗	↔↔↔	↑↑	↗
Traffic Volume (veh/h)	191	78	0	6	287	460	4	82	3	460	131	421
Future Volume (veh/h)	191	78	0	6	287	460	4	82	3	460	131	421
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		1.00	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	1870	1870	1870	1648	1870	1826	1530	522	418	1767	685	1885
Adj Flow Rate, veh/h	208	85	0	7	312	500	4	89	3	500	142	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	17	2	5	25	93	100	9	82	1
Cap, veh/h	470	1190	531	28	890	1126	12	154	38	789	351	
Arrive On Green	0.09	0.33	0.00	0.01	0.25	0.25	0.00	0.11	0.11	0.17	0.27	0.00
Sat Flow, veh/h	5023	3554	1585	3045	3554	2688	2826	1424	353	4745	1301	1598
Grp Volume(v), veh/h	208	85	0	7	312	500	4	89	3	500	142	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1585	1522	1777	1344	1413	475	353	1582	651	1598
Q Serve(g_s), s	2.0	0.8	0.0	0.1	3.6	6.7	0.1	3.0	0.4	5.0	4.5	0.0
Cycle Q Clear(g_c), s	2.0	0.8	0.0	0.1	3.6	6.7	0.1	3.0	0.4	5.0	4.5	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	470	1190	531	28	890	1126	12	154	38	789	351	
V/C Ratio(X)	0.44	0.07	0.00	0.25	0.35	0.44	0.33	0.58	0.08	0.63	0.40	
Avail Cap(c_a), veh/h	1988	2510	1120	904	2158	2086	727	930	231	4694	1820	
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	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.7	11.5	0.0	24.9	15.6	10.6	25.1	21.5	20.3	19.6	15.1	0.0
Incr Delay (d2), s/veh	0.2	0.0	0.0	1.7	0.2	0.3	5.7	2.6	0.6	0.6	0.6	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.3	0.0	0.0	1.2	1.5	0.0	0.3	0.0	1.6	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.9	11.5	0.0	26.5	15.8	10.8	30.7	24.0	20.9	20.3	15.7	0.0
LnGrp LOS	C	B	A	C	B	B	C	C	C	C	B	
Approach Vol, veh/h		293			819			96			642	A
Approach Delay, s/veh		18.9			12.9			24.2			19.3	
Approach LOS		B			B			C			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	18.0	12.4	11.5	4.5	22.2	4.2	19.6				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	30.7	50.0	33.0	15.0	35.7	13.0	* 71				
Max Q Clear Time (g_c+I1), s	4.0	8.7	7.0	5.0	2.1	2.8	2.1	6.5				
Green Ext Time (p_c), s	0.3	3.9	1.4	0.4	0.0	0.4	0.0	0.8				

Intersection Summary

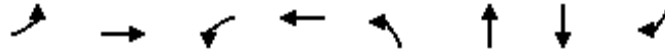
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 User approved changes to right turn type.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	73	454	17	851	8	8	14	14
v/c Ratio	0.05	0.13	0.03	0.23	0.01	0.01	0.02	0.01
Control Delay	26.3	11.0	33.1	15.9	21.6	17.6	31.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	11.0	33.1	15.9	21.6	17.6	31.6	0.0
Queue Length 50th (ft)	4	0	2	30	1	1	2	0
Queue Length 95th (ft)	47	117	34	172	15	13	29	0
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	2453	3968	1054	5026	1013	1009	988	1772
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.11	0.02	0.17	0.01	0.01	0.01	0.01

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↓		↖	↑↑↑		↖	↕			↕	↖↗
Traffic Volume (vph)	71	439	1	16	767	16	10	1	4	9	4	13
Future Volume (vph)	71	439	1	16	767	16	10	1	4	9	4	13
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	1.00		1.00	0.93			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3367	4705		1703	6326		1559	1551			1595	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3367	4705		1703	6326		1559	1551			1595	2787
Peak-hour factor, PHF	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	453	1	17	834	17	11	1	4	10	4	14
RTOR Reduction (vph)	0	0	0	0	2	0	0	4	0	0	0	13
Lane Group Flow (vph)	73	454	0	17	849	0	8	4	0	0	14	1
Confl. Peds. (#/hr)			3			3			3			
Confl. Bikes (#/hr)						3						
Heavy Vehicles (%)	4%	10%	100%	6%	3%	2%	10%	2%	2%	11%	25%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	6.3	26.3		0.8	20.8		4.8	4.8			2.6	2.6
Effective Green, g (s)	6.3	26.3		0.8	20.8		4.8	4.8			2.6	2.6
Actuated g/C Ratio	0.12	0.51		0.02	0.40		0.09	0.09			0.05	0.05
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	409	2388		26	2540		144	143			80	139
v/s Ratio Prot	c0.02	0.10		c0.01	c0.13		c0.01	0.00			c0.01	0.00
v/s Ratio Perm												
v/c Ratio	0.18	0.19		0.65	0.33		0.06	0.03			0.17	0.01
Uniform Delay, d1	20.4	6.9		25.4	10.7		21.4	21.4			23.6	23.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.2	0.0		37.0	0.0		0.1	0.1			0.4	0.0
Delay (s)	20.6	7.0		62.3	10.7		21.6	21.4			24.0	23.4
Level of Service	C	A		E	B		C	C			C	C
Approach Delay (s)		8.8			11.8			21.5			23.7	
Approach LOS		A			B			C			C	

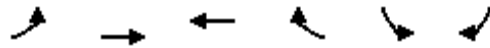
Intersection Summary		
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.26	B
Actuated Cycle Length (s)	51.8	Sum of lost time (s)
Intersection Capacity Utilization	45.2%	17.3
Analysis Period (min)	15	ICU Level of Service
		A
c	Critical Lane Group	

Queues

Cumulative plus SMP 39 & 40

3: W Jack London Blvd & Livermore Outlets Dr

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	73	422	834	48	11	45
v/c Ratio	0.06	0.17	0.38	0.05	0.02	0.04
Control Delay	17.0	3.3	11.0	4.3	18.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	3.3	11.0	4.3	18.1	7.5
Queue Length 50th (ft)	9	23	109	0	3	0
Queue Length 95th (ft)	24	37	159	16	14	11
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	2355	3252	3206	1433	1113	1769
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.13	0.26	0.03	0.01	0.03

Intersection Summary

HCM 6th Signalized Intersection Summary
 3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↑↑	↖↗	↑	↘	↖↗
Traffic Volume (veh/h)	67	388	767	44	10	41
Future Volume (veh/h)	67	388	767	44	10	41
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1737	1856	1870	1870	1870
Adj Flow Rate, veh/h	73	422	834	48	11	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	11	3	2	2	2
Cap, veh/h	500	2040	1272	558	213	334
Arrive On Green	0.14	0.62	0.36	0.36	0.12	0.12
Sat Flow, veh/h	3456	3387	3618	1548	1781	2790
Grp Volume(v), veh/h	73	422	834	48	11	45
Grp Sat Flow(s),veh/h/ln	1728	1650	1763	1548	1781	1395
Q Serve(g_s), s	0.7	2.0	7.0	0.7	0.2	0.5
Cycle Q Clear(g_c), s	0.7	2.0	7.0	0.7	0.2	0.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	500	2040	1272	558	213	334
V/C Ratio(X)	0.15	0.21	0.66	0.09	0.05	0.13
Avail Cap(c_a), veh/h	2437	3724	4475	1965	1005	1574
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.2	3.0	9.5	7.5	13.8	14.0
Incr Delay (d2), s/veh	0.1	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.1	1.5	0.1	0.1	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	13.3	3.0	9.7	7.5	13.9	14.0
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		495	882		56	
Approach Delay, s/veh		4.5	9.6		14.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	9.1	18.1			27.2	8.2
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	2.7	9.0			4.0	2.5
Green Ext Time (p_c), s	0.1	3.8			1.7	0.1

Intersection Summary

HCM 6th Ctrl Delay	8.0
HCM 6th LOS	A

Notes

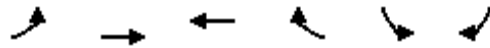
User approved pedestrian interval to be less than phase max green.

Queues

Cumulative plus SMP 39 & 40

4: W Jack London Blvd & Wolf House Dr

Timing Plan: AM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	4	429	842	22	32	38
v/c Ratio	0.01	0.19	0.37	0.02	0.04	0.06
Control Delay	14.8	4.5	7.8	6.3	13.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.8	4.5	7.8	6.3	13.9	7.3
Queue Length 50th (ft)	1	24	54	1	4	0
Queue Length 95th (ft)	8	37	159	13	29	20
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1555	3252	3354	1478	1272	1149
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.13	0.25	0.01	0.03	0.03

Intersection Summary

HCM 6th Signalized Intersection Summary

4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↷
Traffic Volume (veh/h)	4	395	775	20	29	35
Future Volume (veh/h)	4	395	775	20	29	35
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.98	1.00	1.00
Parking Bus, Adj	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	1870	1737	1856	1870	1870	1870
Adj Flow Rate, veh/h	4	429	842	22	32	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	11	3	2	2	2
Cap, veh/h	19	1769	1372	602	264	235
Arrive On Green	0.01	0.54	0.39	0.39	0.15	0.15
Sat Flow, veh/h	1781	3387	3618	1547	1781	1585
Grp Volume(v), veh/h	4	429	842	22	32	38
Grp Sat Flow(s),veh/h/ln	1781	1650	1763	1547	1781	1585
Q Serve(g_s), s	0.1	2.0	5.6	0.3	0.5	0.6
Cycle Q Clear(g_c), s	0.1	2.0	5.6	0.3	0.5	0.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	19	1769	1372	602	264	235
V/C Ratio(X)	0.21	0.24	0.61	0.04	0.12	0.16
Avail Cap(c_a), veh/h	1815	5044	5389	2364	1210	1077
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.4	3.6	7.2	5.6	10.9	10.9
Incr Delay (d2), s/veh	3.8	0.0	0.2	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.8	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	18.2	3.7	7.4	5.6	11.0	11.1
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		433	864		70	
Approach Delay, s/veh		3.8	7.3		11.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	4.3	16.8			21.1	8.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.1	7.6			4.0	2.6
Green Ext Time (p_c), s	0.0	3.8			1.7	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.4
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕↗		↵	↕↗			↕↗			↕↗	
Traffic Vol, veh/h	3	312	99	134	767	0	30	0	43	0	0	1
Future Vol, veh/h	3	312	99	134	767	0	30	0	43	0	0	1
Conflicting Peds, #/hr	0	0	0	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	180	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	33	9	17	16	2	2	17	2	19	2	2	100
Mvmt Flow	3	339	108	146	834	0	33	0	47	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	834	0	0	447	0	0	1108	1525	224	1302	1579	417
Stage 1	-	-	-	-	-	-	399	399	-	1126	1126	-
Stage 2	-	-	-	-	-	-	709	1126	-	176	453	-
Critical Hdwy	4.76	-	-	4.42	-	-	7.84	6.54	7.28	7.54	6.54	8.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.84	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.84	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.53	-	-	2.36	-	-	3.67	4.02	3.49	3.52	4.02	4.3
Pot Cap-1 Maneuver	624	-	-	1017	-	-	147	117	730	118	108	379
Stage 1	-	-	-	-	-	-	559	601	-	218	278	-
Stage 2	-	-	-	-	-	-	358	278	-	809	568	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	624	-	-	1017	-	-	130	100	730	98	92	379
Mov Cap-2 Maneuver	-	-	-	-	-	-	130	100	-	98	92	-
Stage 1	-	-	-	-	-	-	556	598	-	217	238	-
Stage 2	-	-	-	-	-	-	306	238	-	754	565	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.4			25.7			14.5		
HCM LOS							D			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	252	624	-	-	1017	-	-	379
HCM Lane V/C Ratio	0.315	0.005	-	-	0.143	-	-	0.003
HCM Control Delay (s)	25.7	10.8	-	-	9.1	-	-	14.5
HCM Lane LOS	D	B	-	-	A	-	-	B
HCM 95th %tile Q(veh)	1.3	0	-	-	0.5	-	-	0

HCM 6th TWSC
6: SMP 39 East Dwy/Airport Dwy & W Jack London Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak

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	3	254	100	136	878	1	33	0	43	4	0	0
Future Vol, veh/h	3	254	100	136	878	1	33	0	43	4	0	0
Conflicting Peds, #/hr	0	0	0	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	300	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	7	18	16	4	100	18	2	14	25	2	2
Mvmt Flow	3	276	109	148	954	1	36	0	47	4	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	955	0	0	385	0	0	1110	1588	193	1395	1642	478
Stage 1	-	-	-	-	-	-	337	337	-	1251	1251	-
Stage 2	-	-	-	-	-	-	773	1251	-	144	391	-
Critical Hdwy	4.14	-	-	4.42	-	-	7.86	6.54	7.18	8	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.86	5.54	-	7	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.86	5.54	-	7	5.54	-
Follow-up Hdwy	2.22	-	-	2.36	-	-	3.68	4.02	3.44	3.75	4.02	3.32
Pot Cap-1 Maneuver	715	-	-	1076	-	-	145	107	780	82	99	534
Stage 1	-	-	-	-	-	-	608	640	-	151	242	-
Stage 2	-	-	-	-	-	-	324	242	-	781	606	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	715	-	-	1076	-	-	129	92	780	69	85	534
Mov Cap-2 Maneuver	-	-	-	-	-	-	129	92	-	69	85	-
Stage 1	-	-	-	-	-	-	606	637	-	150	209	-
Stage 2	-	-	-	-	-	-	279	209	-	731	604	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.2			27.1			60.7		
HCM LOS							D			F		

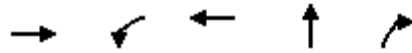
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	244	715	-	-	1076	-	-	69
HCM Lane V/C Ratio	0.339	0.005	-	-	0.137	-	-	0.063
HCM Control Delay (s)	27.1	10.1	-	-	8.9	-	-	60.7
HCM Lane LOS	D	B	-	-	A	-	-	F
HCM 95th %tile Q(veh)	1.4	0	-	-	0.5	-	-	0.2

Queues

Cumulative plus SMP 39 & 40

7: Discovery Dr & W Jack London Blvd

Timing Plan: AM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	326	25	1077	25	14
v/c Ratio	0.12	0.05	0.38	0.04	0.03
Control Delay	4.6	15.3	3.4	14.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.6	15.3	3.4	14.5	0.1
Queue Length 50th (ft)	0	2	0	1	0
Queue Length 95th (ft)	52	25	102	24	0
Internal Link Dist (ft)	419		723	1798	
Turn Bay Length (ft)		200			335
Base Capacity (vph)	2882	1312	3438	1169	819
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.11	0.02	0.31	0.02	0.02

Intersection Summary

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	274	26	23	991	0	23	0	13	0	0	0
Future Volume (veh/h)	0	274	26	23	991	0	23	0	13	0	0	0
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		1.00	1.00		1.00	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	0	1781	1781	1604	1826	0	1870	1870	1100	1870	1870	1870
Adj Flow Rate, veh/h	0	298	28	25	1077	0	25	0	14	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	8	8	20	5	0	2	2	54	2	2	2
Cap, veh/h	0	1019	95	78	1868	0	152	0	80	0	8	0
Arrive On Green	0.00	0.33	0.33	0.05	0.54	0.00	0.09	0.00	0.09	0.00	0.00	0.00
Sat Flow, veh/h	0	3218	292	1527	3561	0	1781	0	932	0	1870	0
Grp Volume(v), veh/h	0	160	166	25	1077	0	25	0	14	0	0	0
Grp Sat Flow(s),veh/h/ln	0	1692	1728	1527	1735	0	1781	0	932	0	1870	0
Q Serve(g_s), s	0.0	1.7	1.8	0.4	5.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	1.7	1.8	0.4	5.1	0.0	0.3	0.0	0.3	0.0	0.0	0.0
Prop In Lane	0.00		0.17	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	0	551	563	78	1868	0	152	0	80	0	8	0
V/C Ratio(X)	0.00	0.29	0.29	0.32	0.58	0.00	0.16	0.00	0.18	0.00	0.00	0.00
Avail Cap(c_a), veh/h	0	2052	2096	1852	4207	0	1440	0	754	0	907	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	6.2	6.2	11.3	3.8	0.0	10.5	0.0	10.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.2	0.9	0.2	0.0	0.2	0.0	0.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	6.4	6.4	12.2	4.0	0.0	10.7	0.0	10.9	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		326			1102			39				0
Approach Delay, s/veh		6.4			4.2			10.8				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.3	13.4		0.0		18.6		6.1				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	3.8		0.0		7.1		2.3				
Green Ext Time (p_c), s	0.0	1.3		0.0		6.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	3	320	73	1077	13	60
v/c Ratio	0.01	0.17	0.18	0.43	0.04	0.15
Control Delay	18.7	9.3	17.1	6.2	17.9	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	9.3	17.1	6.2	17.9	0.8
Queue Length 50th (ft)	1	30	13	64	2	0
Queue Length 95th (ft)	7	54	55	182	17	1
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	818	2873	880	3263	853	781
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.11	0.08	0.33	0.02	0.08
Intersection Summary						

HCM 6th Signalized Intersection Summary

8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↶	↷		↷	
Traffic Volume (veh/h)	3	284	10	67	991	0	12	0	55	0	0	0
Future Volume (veh/h)	3	284	10	67	991	0	12	0	55	0	0	0
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		1.00	1.00		1.00	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	1870	1752	1752	1322	1826	1826	1870	1870	981	1870	1870	1870
Adj Flow Rate, veh/h	3	309	11	73	1077	0	13	0	60	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	10	10	39	5	5	2	2	62	2	2	2
Cap, veh/h	10	1211	43	148	1671	0	209	0	98	0	6	0
Arrive On Green	0.01	0.37	0.37	0.12	0.48	0.00	0.12	0.00	0.12	0.00	0.00	0.00
Sat Flow, veh/h	1781	3276	116	1259	3561	0	1781	0	831	0	1870	0
Grp Volume(v), veh/h	3	157	163	73	1077	0	13	0	60	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1664	1728	1259	1735	0	1781	0	831	0	1870	0
Q Serve(g_s), s	0.1	2.2	2.2	1.8	7.9	0.0	0.2	0.0	2.3	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	2.2	2.2	1.8	7.9	0.0	0.2	0.0	2.3	0.0	0.0	0.0
Prop In Lane	1.00		0.07	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	10	615	639	148	1671	0	209	0	98	0	6	0
V/C Ratio(X)	0.29	0.25	0.26	0.49	0.64	0.00	0.06	0.00	0.61	0.00	0.00	0.00
Avail Cap(c_a), veh/h	635	1731	1797	748	3607	0	1323	0	618	0	667	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	16.7	7.4	7.4	13.9	6.6	0.0	13.2	0.0	14.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	5.7	0.2	0.2	0.9	0.3	0.0	0.0	0.0	2.3	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.4	0.4	0.4	1.1	0.0	0.1	0.0	0.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.4	7.5	7.5	14.9	6.9	0.0	13.2	0.0	16.4	0.0	0.0	0.0
LnGrp LOS	C	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		323			1150			73				0
Approach Delay, s/veh		7.7			7.4			15.9				0.0
Approach LOS		A			A			B				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	17.7		0.0	4.2	21.5		8.0				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.8	4.2		0.0	2.1	9.9		4.3				
Green Ext Time (p_c), s	0.1	1.3		0.0	0.0	6.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	7.8
HCM 6th LOS	A

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	116	155	105	229	515	502	350	1863	211	287	1922	279
v/c Ratio	0.53	0.16	0.22	0.68	0.96	0.78	0.94	0.96	0.29	0.95	1.05	0.46
Control Delay	85.6	46.2	4.0	86.5	88.6	44.5	106.8	61.9	12.8	116.5	85.1	23.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.6	46.2	4.0	86.5	88.6	44.5	106.8	61.9	12.8	116.5	85.1	23.2
Queue Length 50th (ft)	65	68	0	131	569	406	204	750	47	169	-872	120
Queue Length 95th (ft)	108	102	27	187	730	548	#325	#946	120	#288	#1049	228
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	220	1140	526	403	656	647	384	1938	727	302	1831	609
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.14	0.20	0.57	0.79	0.78	0.91	0.96	0.29	0.95	1.05	0.46

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	107	143	97	211	474	462	322	1714	194	264	1768	257
Future Volume (veh/h)	107	143	97	211	474	462	322	1714	194	264	1768	257
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		0.99	1.00		1.00	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	1307	1856	1633	1870	1870	1870	1796	1752	1870	1870	1767	1633
Adj Flow Rate, veh/h	116	155	105	229	515	502	350	1863	211	287	1922	279
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	40	3	18	2	2	2	7	10	2	2	9	18
Cap, veh/h	211	1042	404	323	565	611	385	1915	634	303	1795	515
Arrive On Green	0.09	0.30	0.30	0.09	0.30	0.30	0.12	0.40	0.40	0.09	0.37	0.37
Sat Flow, veh/h	2415	3526	1365	3456	1870	1565	3319	4782	1584	3456	4823	1384
Grp Volume(v), veh/h	116	155	105	229	515	502	350	1863	211	287	1922	279
Grp Sat Flow(s),veh/h/ln	1208	1763	1365	1728	1870	1565	1659	1594	1584	1728	1608	1384
Q Serve(g_s), s	7.9	5.5	10.0	11.0	45.4	49.3	17.8	65.5	15.8	14.1	63.7	27.1
Cycle Q Clear(g_c), s	7.9	5.5	10.0	11.0	45.4	49.3	17.8	65.5	15.8	14.1	63.7	27.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	211	1042	404	323	565	611	385	1915	634	303	1795	515
V/C Ratio(X)	0.55	0.15	0.26	0.71	0.91	0.82	0.91	0.97	0.33	0.95	1.07	0.54
Avail Cap(c_a), veh/h	212	1042	404	404	656	688	388	1957	648	303	1795	515
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	74.9	44.4	46.0	75.3	57.5	46.9	74.7	50.4	35.5	77.7	53.7	42.2
Incr Delay (d2), s/veh	1.7	0.0	0.1	2.7	14.6	6.3	24.2	14.2	0.1	37.4	43.1	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	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.4	3.4	5.0	23.3	19.9	8.8	27.6	6.1	7.8	32.2	9.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.6	44.4	46.1	78.0	72.2	53.2	99.0	64.6	35.6	115.1	96.8	42.9
LnGrp LOS	E	D	D	E	E	D	F	E	D	F	F	D
Approach Vol, veh/h		376			1246			2424			2488	
Approach Delay, s/veh		54.8			65.6			67.0			92.8	
Approach LOS		D			E			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	74.3	20.7	56.4	24.5	69.5	19.6	57.4				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	16.1	67.5	13.0	12.0	19.8	65.7	9.9	51.3				
Green Ext Time (p_c), s	0.0	1.0	0.0	0.1	0.0	0.0	0.0	0.3				

Intersection Summary

HCM 6th Ctrl Delay	75.9
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	55	45	43	2359	2150	110
v/c Ratio	0.17	0.16	0.11	0.65	0.67	0.12
Control Delay	24.8	10.4	24.2	5.8	11.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	10.4	24.2	5.8	11.0	4.2
Queue Length 50th (ft)	7	0	6	140	118	4
Queue Length 95th (ft)	24	14	20	184	#367	29
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1192	892	1361	4769	3225	896
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.03	0.49	0.67	0.12

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39 & 40
 Timing Plan: AM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↖↗	↖↗	↑↑↑	↑↑↑	↖
Traffic Volume (veh/h)	51	41	40	2170	1978	101
Future Volume (veh/h)	51	41	40	2170	1978	101
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1470	1248	1707	1781	1781	1544
Adj Flow Rate, veh/h	55	45	43	2359	2150	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	29	44	13	8	8	24
Cap, veh/h	288	198	200	3268	2395	645
Arrive On Green	0.11	0.11	0.06	0.67	0.49	0.49
Sat Flow, veh/h	2716	1861	3155	5024	5024	1309
Grp Volume(v), veh/h	55	45	43	2359	2150	110
Grp Sat Flow(s),veh/h/ln	1358	931	1577	1621	1621	1309
Q Serve(g_s), s	0.9	1.1	0.6	15.2	19.7	2.3
Cycle Q Clear(g_c), s	0.9	1.1	0.6	15.2	19.7	2.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	288	198	200	3268	2395	645
V/C Ratio(X)	0.19	0.23	0.22	0.72	0.90	0.17
Avail Cap(c_a), veh/h	1383	948	1606	3268	2971	800
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	20.0	20.1	21.8	5.1	11.3	6.9
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.7	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.2	1.3	4.7	0.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.1	20.3	22.0	5.8	14.4	6.9
LnGrp LOS	C	C	C	A	B	A
Approach Vol, veh/h	100			2402	2260	
Approach Delay, s/veh	20.2			6.1	14.0	
Approach LOS	C			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		39.2		9.9	8.8	30.4
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		17.2		3.1	2.6	21.7
Green Ext Time (p_c), s		3.2		0.0	0.0	2.4

Intersection Summary

HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	112	572	1809	212	676	1522
v/c Ratio	0.16	0.90	0.91	0.11	0.72	0.69
Control Delay	27.4	28.9	33.3	4.1	37.4	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.4	28.9	33.3	4.1	37.4	11.9
Queue Length 50th (ft)	25	92	346	16	124	256
Queue Length 95th (ft)	47	#293	#523	30	173	386
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	989	738	1995	2109	1139	2339
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.78	0.91	0.10	0.59	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↔↔↔	↔↔	↔↔↔	↔↔
Traffic Volume (veh/h)	103	526	1664	195	622	1400
Future Volume (veh/h)	103	526	1664	195	622	1400
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1811	1826	1767	1811	1796	1752
Adj Flow Rate, veh/h	112	572	1809	212	676	1522
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	6	5	9	6	7	10
Cap, veh/h	929	430	1875	1800	833	2035
Arrive On Green	0.28	0.28	0.39	0.39	0.17	0.61
Sat Flow, veh/h	3346	1547	4982	2701	4824	3416
Grp Volume(v), veh/h	112	572	1809	212	676	1522
Grp Sat Flow(s),veh/h/ln	1673	1547	1608	1351	1608	1664
Q Serve(g_s), s	2.3	25.0	33.0	2.6	12.1	29.5
Cycle Q Clear(g_c), s	2.3	25.0	33.0	2.6	12.1	29.5
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	929	430	1875	1800	833	2035
V/C Ratio(X)	0.12	1.33	0.97	0.12	0.81	0.75
Avail Cap(c_a), veh/h	929	430	1875	1800	1072	2035
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	24.3	32.5	26.9	5.4	35.8	12.5
Incr Delay (d2), s/veh	0.1	164.4	13.5	0.0	3.8	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	28.5	13.5	0.6	4.7	8.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.4	196.9	40.5	5.5	39.6	14.2
LnGrp LOS	C	F	D	A	D	B
Approach Vol, veh/h	684		2021			2198
Approach Delay, s/veh	168.7		36.8			22.0
Approach LOS	F		D			C
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	20.0	40.5			60.5	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	14.1	35.0			31.5	27.0
Green Ext Time (p_c), s	1.4	0.0			3.0	0.0

Intersection Summary

HCM 6th Ctrl Delay	48.6
HCM 6th LOS	D

Notes

User approved ignoring U-Turning movement.

Queues
12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak



























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	7	101	201	87	118	187	253	2068	35	315	2343
v/c Ratio	0.03	0.37	0.34	0.36	0.22	0.25	1.07	1.10	0.05	0.80	1.31
Control Delay	45.0	42.5	10.5	49.9	29.2	3.5	124.0	87.0	0.1	63.3	172.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.0	42.5	10.5	49.9	29.2	3.5	124.0	87.0	0.1	63.3	172.9
Queue Length 50th (ft)	4	63	33	53	55	0	~188	~586	0	105	~743
Queue Length 95th (ft)	21	110	81	127	124	43	#459	#971	0	#235	#1169
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	276	387	600	243	578	757	236	1875	704	418	1790
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.26	0.34	0.36	0.20	0.25	1.07	1.10	0.05	0.75	1.31

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39 & 40
Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	93	185	80	109	172	233	1903	32	290	2131	25
Future Volume (veh/h)	6	93	185	80	109	172	233	1903	32	290	2131	25
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		1.00	1.00		1.00	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	1870	1544	1870	1781	1841	1663	1841	1752	1870	1811	1752	1752
Adj Flow Rate, veh/h	7	101	201	87	118	187	253	2068	35	315	2316	27
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	24	2	8	4	16	4	10	2	6	10	10
Cap, veh/h	50	211	434	228	447	500	240	1942	643	375	1857	22
Arrive On Green	0.03	0.14	0.14	0.13	0.24	0.24	0.14	0.41	0.41	0.11	0.38	0.38
Sat Flow, veh/h	1781	1544	1585	1697	1841	1409	1753	4782	1585	3346	4873	57
Grp Volume(v), veh/h	7	101	201	87	118	187	253	2068	35	315	1514	829
Grp Sat Flow(s),veh/h/ln	1781	1544	1585	1697	1841	1409	1753	1594	1585	1673	1594	1741
Q Serve(g_s), s	0.4	6.2	10.8	4.8	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Cycle Q Clear(g_c), s	0.4	6.2	10.8	4.8	5.3	10.1	14.0	41.5	1.4	9.4	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	50	211	434	228	447	500	240	1942	643	375	1215	664
V/C Ratio(X)	0.14	0.48	0.46	0.38	0.26	0.37	1.05	1.07	0.05	0.84	1.25	1.25
Avail Cap(c_a), veh/h	279	347	573	249	447	500	240	1942	643	425	1215	664
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	48.5	40.8	30.9	40.4	31.3	24.6	44.2	30.4	18.5	44.5	31.7	31.7
Incr Delay (d2), s/veh	0.5	0.6	0.3	0.4	0.1	0.2	73.3	40.3	0.0	11.5	117.8	124.3
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	0.2	2.3	4.0	2.0	2.3	3.3	10.7	21.8	0.5	4.4	33.7	38.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.0	41.4	31.2	40.8	31.5	24.7	117.5	70.7	18.5	56.0	149.5	155.9
LnGrp LOS	D	D	C	D	C	C	F	F	B	E	F	F
Approach Vol, veh/h		309			392			2356			2658	
Approach Delay, s/veh		34.9			30.3			75.0			140.4	
Approach LOS		C			C			E			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	16.5	47.3	18.7	19.8	19.0	44.8	7.9	30.6				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	11.4	43.5	6.8	12.8	16.0	41.0	2.4	12.1				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	100.2
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	5.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	29	8	56	17	7	44
Future Vol, veh/h	29	8	56	17	7	44
Conflicting Peds, #/hr	0	4	4	0	6	3
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	38	27	24	14	64
Mvmt Flow	32	9	61	18	8	48

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	45	0	187
Stage 1	-	-	-	-	41
Stage 2	-	-	-	-	146
Critical Hdwy	-	-	4.37	-	6.54
Critical Hdwy Stg 1	-	-	-	-	5.54
Critical Hdwy Stg 2	-	-	-	-	5.54
Follow-up Hdwy	-	-	2.443	-	3.626
Pot Cap-1 Maneuver	-	-	1417	-	776
Stage 1	-	-	-	-	952
Stage 2	-	-	-	-	853
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1412	-	734
Mov Cap-2 Maneuver	-	-	-	-	734
Stage 1	-	-	-	-	948
Stage 2	-	-	-	-	811

Approach	EB	WB	NB
HCM Control Delay, s	0	5.9	9.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	848	-	-	1412	-
HCM Lane V/C Ratio	0.065	-	-	0.043	-
HCM Control Delay (s)	9.5	-	-	7.7	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative plus SMP 39 & 40
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	59	12	56	61	17	10	0	30	6	0	4
Future Vol, veh/h	6	59	12	56	61	17	10	0	30	6	0	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	15	15	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	17	47	8	20	30	35	33	2	30	2	2	2
Mvmt Flow	7	64	13	61	66	18	11	0	33	7	0	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	84	0	0	77	0	0	284	291	86	313	288	75
Stage 1	-	-	-	-	-	-	85	85	-	197	197	-
Stage 2	-	-	-	-	-	-	199	206	-	116	91	-
Critical Hdwy	4.27	-	-	4.3	-	-	7.43	6.52	6.5	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.43	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.353	-	-	2.38	-	-	3.797	4.018	3.57	3.518	4.018	3.318
Pot Cap-1 Maneuver	1423	-	-	1415	-	-	611	619	901	640	622	986
Stage 1	-	-	-	-	-	-	852	824	-	805	738	-
Stage 2	-	-	-	-	-	-	737	731	-	889	820	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1423	-	-	1415	-	-	585	588	888	584	591	986
Mov Cap-2 Maneuver	-	-	-	-	-	-	585	588	-	584	591	-
Stage 1	-	-	-	-	-	-	848	820	-	801	705	-
Stage 2	-	-	-	-	-	-	701	698	-	840	816	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			3.2			9.8			10.2		
HCM LOS							A			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	786	1423	-	-	1415	-	-	698
HCM Lane V/C Ratio	0.055	0.005	-	-	0.043	-	-	0.016
HCM Control Delay (s)	9.8	7.5	0	-	7.7	0	-	10.2
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0

Queues

Cumulative plus SMP 39 & 40

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Timing Plan: AM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	133	134	737	973	842	822
v/c Ratio	0.35	0.34	0.70	1.03	0.37	0.63
Control Delay	24.5	24.4	20.1	57.0	7.0	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.5	24.4	20.1	57.0	7.0	3.1
Queue Length 50th (ft)	48	49	128	~464	82	0
Queue Length 95th (ft)	101	100	190	#750	124	38
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	466	475	1414	949	2766	1401
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.28	0.52	1.03	0.30	0.59

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative plus SMP 39 & 40

Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↖	↖	↖↖		↑			↑↑	↖	
Traffic Volume (vph)	0	0	0	220	28	685	0	895	0	0	775	756	
Future Volume (vph)	0	0	0	220	28	685	0	895	0	0	775	756	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8	
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00	
Frbp, ped/bikes				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	
Frt				1.00	1.00	0.85		1.00			1.00	0.85	
Flt Protected				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (prot)				1603	1634	2707		1863			3539	1564	
Flt Permitted				0.95	0.96	1.00		1.00			1.00	1.00	
Satd. Flow (perm)				1603	1634	2707		1863			3539	1564	
Peak-hour factor, PHF	0.92	0.92	0.92	0.93	0.93	0.93	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	237	30	737	0	973	0	0	842	822	
RTOR Reduction (vph)	0	0	0	0	0	56	0	0	0	0	0	298	
Lane Group Flow (vph)	0	0	0	133	134	681	0	973	0	0	842	524	
Confl. Peds. (#/hr)									1			1	
Heavy Vehicles (%)	2%	2%	2%	7%	4%	5%	2%	2%	2%	2%	2%	2%	
Turn Type				Perm	NA	custom		NA			NA	Perm	
Protected Phases					8			2			6		
Permitted Phases				8		8 1						6	
Actuated Green, G (s)				16.5	16.5	25.3		35.2			44.0	44.0	
Effective Green, g (s)				16.5	16.5	25.3		35.2			44.0	44.0	
Actuated g/C Ratio				0.24	0.24	0.37		0.51			0.64	0.64	
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8	
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2	
Lane Grp Cap (vph)				383	390	992		950			2256	997	
v/s Ratio Prot								c0.52			0.24		
v/s Ratio Perm				0.08	0.08	c0.25						0.34	
v/c Ratio				0.35	0.34	0.69		1.02			0.37	0.53	
Uniform Delay, d1				21.8	21.8	18.5		16.9			5.9	6.8	
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2				0.2	0.2	1.6		35.5			0.0	0.2	
Delay (s)				22.0	22.0	20.1		52.4			6.0	7.0	
Level of Service				C	C	C		D			A	A	
Approach Delay (s)		0.0			20.6			52.4			6.5		
Approach LOS		A			C			D			A		
Intersection Summary													
HCM 2000 Control Delay			22.7		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.94										
Actuated Cycle Length (s)			69.0		Sum of lost time (s)					12.2			
Intersection Capacity Utilization			78.4%		ICU Level of Service					D			
Analysis Period (min)			15										

c Critical Lane Group

Queues

Cumulative plus SMP 39 & 40

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Timing Plan: AM Peak

























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	670	539	627	143	562
v/c Ratio	0.64	0.53	0.50	0.12	0.40
Control Delay	11.6	3.5	8.1	2.0	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	3.5	8.1	2.0	7.2
Queue Length 50th (ft)	36	2	28	0	24
Queue Length 95th (ft)	78	23	67	9	57
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	3204	2106	3139	2656	3505
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.26	0.20	0.05	0.16
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 39 & 40

Timing Plan: AM Peak

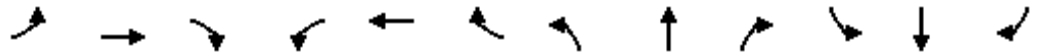
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					 	 		 	
Traffic Volume (vph)	616	0	496	0	0	0	0	602	137	0	517	0
Future Volume (vph)	616	0	496	0	0	0	0	602	137	0	517	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.95	0.88		0.95	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2221					3139	2656		3505	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2221					3139	2656		3505	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	670	0	539	0	0	0	0	627	143	0	562	0
RTOR Reduction (vph)	0	0	346	0	0	0	0	0	85	0	0	0
Lane Group Flow (vph)	670	0	193	0	0	0	0	627	58	0	562	0
Heavy Vehicles (%)	2%	2%	28%	2%	2%	2%	2%	15%	7%	2%	3%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	8.3		8.3					11.0	11.0		11.0	
Effective Green, g (s)	8.3		8.3					11.0	11.0		11.0	
Actuated g/C Ratio	0.30		0.30					0.40	0.40		0.40	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	1043		675					1264	1070		1412	
v/s Ratio Prot								c0.20			0.16	
v/s Ratio Perm	c0.20		0.09						0.02			
v/c Ratio	0.64		0.29					0.50	0.05		0.40	
Uniform Delay, d1	8.2		7.2					6.1	5.0		5.8	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	1.0		0.1					0.1	0.0		0.1	
Delay (s)	9.2		7.3					6.2	5.0		5.9	
Level of Service	A		A					A	A		A	
Approach Delay (s)		8.4			0.0			6.0			5.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.1					HCM 2000 Level of Service			A	
HCM 2000 Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			27.3					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			81.1%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

Cumulative plus SMP 39 & 40

1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	754	522	13	21	306	1189	14	45	16	1086	30	507
v/c Ratio	0.71	0.35	0.02	0.11	0.45	0.65	0.08	0.09	0.06	0.69	0.02	0.32
Control Delay	43.2	26.4	0.1	54.6	41.2	6.3	55.2	43.0	0.4	32.7	15.6	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	26.4	0.1	54.6	41.2	6.3	55.2	43.0	0.4	32.7	15.6	0.5
Queue Length 50th (ft)	151	101	0	6	84	57	4	9	0	202	5	0
Queue Length 95th (ft)	#362	288	0	24	192	200	19	24	0	351	15	0
Internal Link Dist (ft)		745			868			221			816	
Turn Bay Length (ft)	400		305	350			110		110	600		420
Base Capacity (vph)	1079	1471	716	557	773	2276	482	1365	524	2672	2079	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.35	0.02	0.04	0.40	0.52	0.03	0.03	0.03	0.41	0.01	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 1: El Charro Rd & Stoneridge Dr/W Jack London Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔↔	↑↑	↗	↔↔	↑↑	↗↗	↔↔	↑↑↑	↗	↔↔↔	↑↑	↗
Traffic Volume (veh/h)	709	491	12	20	294	1141	13	41	15	999	28	466
Future Volume (veh/h)	709	491	12	20	294	1141	13	41	15	999	28	466
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		0.99	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	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1856	1870	1796	1796	1856	1589	1870
Adj Flow Rate, veh/h	754	522	13	21	306	1189	14	45	16	1086	30	0
Peak Hour Factor	0.94	0.94	0.94	0.96	0.96	0.96	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	3	2	7	7	3	21	2
Cap, veh/h	913	1434	636	80	871	1416	46	328	100	1345	976	
Arrive On Green	0.18	0.40	0.40	0.02	0.25	0.25	0.01	0.07	0.07	0.27	0.32	0.00
Sat Flow, veh/h	5023	3554	1577	3456	3554	2732	3456	4904	1495	4983	3019	1585
Grp Volume(v), veh/h	754	522	13	21	306	1189	14	45	16	1086	30	0
Grp Sat Flow(s),veh/h/ln	1674	1777	1577	1728	1777	1366	1728	1635	1495	1661	1509	1585
Q Serve(g_s), s	11.8	8.4	0.4	0.5	5.8	20.0	0.3	0.7	0.8	16.6	0.6	0.0
Cycle Q Clear(g_c), s	11.8	8.4	0.4	0.5	5.8	20.0	0.3	0.7	0.8	16.6	0.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	913	1434	636	80	871	1416	46	328	100	1345	976	
V/C Ratio(X)	0.83	0.36	0.02	0.26	0.35	0.84	0.30	0.14	0.16	0.81	0.03	
Avail Cap(c_a), veh/h	1231	1434	636	635	871	1416	550	1502	458	3053	976	
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	0.00
Uniform Delay (d), s/veh	32.2	17.0	14.6	39.2	25.5	17.0	39.9	35.9	35.9	27.8	18.9	0.0
Incr Delay (d2), s/veh	2.6	0.2	0.0	0.6	0.2	4.7	1.4	0.1	0.5	0.9	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	4.7	3.1	0.1	0.2	2.3	9.0	0.1	0.3	0.3	6.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.8	17.2	14.7	39.8	25.7	21.7	41.3	36.0	36.5	28.7	18.9	0.0
LnGrp LOS	C	B	B	D	C	C	D	D	D	C	B	
Approach Vol, veh/h		1289			1516			75			1116	A
Approach Delay, s/veh		27.4			22.7			37.1			28.4	
Approach LOS		C			C			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.8	25.3	26.0	11.5	5.9	38.2	5.1	32.4				
Change Period (Y+Rc), s	4.0	5.3	4.0	6.0	4.0	5.3	4.0	* 6				
Max Green Setting (Gmax), s	20.0	20.0	50.0	25.0	15.0	25.0	13.0	* 20				
Max Q Clear Time (g_c+I1), s	13.8	22.0	18.6	2.8	2.5	10.4	2.3	2.6				
Green Ext Time (p_c), s	1.0	0.0	3.4	0.2	0.0	2.8	0.0	0.1				

Intersection Summary

HCM 6th Ctrl Delay	26.1
HCM 6th LOS	C

Notes

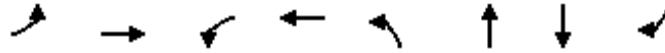
User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

User approved changes to right turn type.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Queues
2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	504	1069	42	741	136	131	107	693
v/c Ratio	0.66	0.55	0.20	0.59	0.43	0.41	0.36	0.67
Control Delay	36.8	23.1	46.1	32.7	38.0	32.4	41.4	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	23.1	46.1	32.7	38.0	32.4	41.4	7.0
Queue Length 50th (ft)	102	146	17	82	57	46	42	0
Queue Length 95th (ft)	274	320	76	196	165	143	148	59
Internal Link Dist (ft)		868		631		350	224	
Turn Bay Length (ft)	220		150					
Base Capacity (vph)	1325	3234	455	3144	474	471	465	1232
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.33	0.09	0.24	0.29	0.28	0.23	0.56
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

2: Shops Dwy/Outlets Dwy & W Jack London Blvd

Cumulative plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↓		↖	↑↑↑		↖	↕			↕	↖↗
Traffic Volume (vph)	484	998	28	39	612	70	189	22	48	60	45	679
Future Volume (vph)	484	998	28	39	612	70	189	22	48	60	45	679
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Lane Util. Factor	0.97	0.91		1.00	0.86		0.95	0.95			1.00	0.88
Frbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	1.00		1.00	0.98		1.00	0.94			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	3433	5014		1770	6085		1681	1621			1811	2787
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	3433	5014		1770	6085		1681	1621			1811	2787
Peak-hour factor, PHF	0.96	0.96	0.96	0.92	0.92	0.92	0.97	0.97	0.97	0.98	0.98	0.98
Adj. Flow (vph)	504	1040	29	42	665	76	195	23	49	61	46	693
RTOR Reduction (vph)	0	2	0	0	18	0	0	16	0	0	0	579
Lane Group Flow (vph)	504	1067	0	42	723	0	136	115	0	0	107	114
Confl. Peds. (#/hr)							1		12			
Confl. Bikes (#/hr)							3		1			1
Heavy Vehicles (%)	2%	3%	4%	2%	6%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA		Prot	NA		Split	NA		Split	NA	Prot
Protected Phases	1	6		5	2		3	3		4	4	4
Permitted Phases												
Actuated Green, G (s)	18.8	32.9		5.2	19.3		15.8	15.8			14.0	14.0
Effective Green, g (s)	18.8	32.9		5.2	19.3		15.8	15.8			14.0	14.0
Actuated g/C Ratio	0.22	0.39		0.06	0.23		0.19	0.19			0.16	0.16
Clearance Time (s)	4.0	5.3		4.0	5.3		4.0	4.0			4.0	4.0
Vehicle Extension (s)	2.5	2.0		2.0	2.0		2.5	2.5			2.0	2.0
Lane Grp Cap (vph)	757	1936		108	1378		311	300			297	457
v/s Ratio Prot	c0.15	c0.21		0.02	0.12		c0.08	0.07			c0.06	0.04
v/s Ratio Perm												
v/c Ratio	0.67	0.55		0.39	0.52		0.44	0.38			0.36	0.25
Uniform Delay, d1	30.3	20.4		38.5	28.9		30.8	30.4			31.6	31.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.0	0.2		0.8	0.2		0.7	0.6			0.3	0.1
Delay (s)	32.3	20.6		39.3	29.1		31.5	31.0			31.9	31.1
Level of Service	C	C		D	C		C	C			C	C
Approach Delay (s)		24.3			29.6			31.3			31.2	
Approach LOS		C			C			C			C	

Intersection Summary

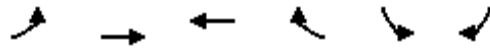
HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	85.2	Sum of lost time (s)	17.3
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

Cumulative plus SMP 39 & 40

3: W Jack London Blvd & Livermore Outlets Dr

Timing Plan: PM Peak

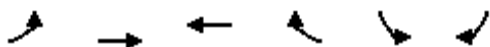


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	145	1044	595	54	57	177
v/c Ratio	0.19	0.52	0.52	0.10	0.14	0.23
Control Delay	19.3	6.7	14.6	3.9	20.1	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	6.7	14.6	3.9	20.1	5.5
Queue Length 50th (ft)	15	72	72	0	12	0
Queue Length 95th (ft)	50	99	105	15	50	26
Internal Link Dist (ft)		631	581		534	
Turn Bay Length (ft)	320			625	180	
Base Capacity (vph)	1941	3539	3121	1444	800	1357
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.29	0.19	0.04	0.07	0.13

Intersection Summary

HCM 6th Signalized Intersection Summary
 3: W Jack London Blvd & Livermore Outlets Dr

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖↗	↕	↕	↖	↗	↖↗
Traffic Volume (veh/h)	139	1002	577	52	54	166
Future Volume (veh/h)	139	1002	577	52	54	166
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1796	1870	1870	1870
Adj Flow Rate, veh/h	145	1044	595	54	57	177
Peak Hour Factor	0.96	0.96	0.97	0.97	0.94	0.94
Percent Heavy Veh, %	2	2	7	2	2	2
Cap, veh/h	669	1985	923	416	394	618
Arrive On Green	0.19	0.56	0.27	0.27	0.22	0.22
Sat Flow, veh/h	3456	3647	3503	1538	1781	2790
Grp Volume(v), veh/h	145	1044	595	54	57	177
Grp Sat Flow(s),veh/h/ln	1728	1777	1706	1538	1781	1395
Q Serve(g_s), s	1.5	7.8	6.5	1.1	1.1	2.2
Cycle Q Clear(g_c), s	1.5	7.8	6.5	1.1	1.1	2.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	669	1985	923	416	394	618
V/C Ratio(X)	0.22	0.53	0.64	0.13	0.14	0.29
Avail Cap(c_a), veh/h	2044	3363	3634	1638	843	1320
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	14.3	5.8	13.6	11.7	13.2	13.7
Incr Delay (d2), s/veh	0.1	0.1	0.3	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.2	1.8	0.3	0.4	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.5	5.9	13.9	11.7	13.3	13.8
LnGrp LOS	B	A	B	B	B	B
Approach Vol, veh/h		1189	649		234	
Approach Delay, s/veh		7.0	13.7		13.7	
Approach LOS		A	B		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	12.2	16.7			28.9	13.4
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	25.0	45.0			40.0	20.0
Max Q Clear Time (g_c+I1), s	3.5	8.5			9.8	4.2
Green Ext Time (p_c), s	0.3	2.6			4.9	0.4

Intersection Summary

HCM 6th Ctrl Delay	9.8
HCM 6th LOS	A

Notes

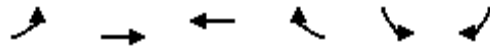
User approved pedestrian interval to be less than phase max green.
 User approved ignoring U-Turning movement.

Queues

Cumulative plus SMP 39 & 40

4: W Jack London Blvd & Wolf House Dr

Timing Plan: PM Peak



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	20	1070	638	18	25	41
v/c Ratio	0.03	0.44	0.29	0.02	0.03	0.06
Control Delay	18.9	7.6	9.5	8.2	12.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	7.6	9.5	8.2	12.7	5.7
Queue Length 50th (ft)	3	74	38	1	3	0
Queue Length 95th (ft)	27	221	175	15	23	19
Internal Link Dist (ft)		165	1872		437	
Turn Bay Length (ft)	375			75		
Base Capacity (vph)	1445	3539	3113	1419	1205	1101
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.30	0.20	0.01	0.02	0.04

Intersection Summary

HCM 6th Signalized Intersection Summary
4: W Jack London Blvd & Wolf House Dr

Cumulative plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↗↗	↖	↙	↘
Traffic Volume (veh/h)	19	1038	593	17	23	38
Future Volume (veh/h)	19	1038	593	17	23	38
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	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	1870	1870	1796	1870	1841	1856
Adj Flow Rate, veh/h	20	1070	638	18	25	41
Peak Hour Factor	0.97	0.97	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	2	2	7	2	4	3
Cap, veh/h	91	1910	1190	537	249	224
Arrive On Green	0.05	0.54	0.35	0.35	0.14	0.14
Sat Flow, veh/h	1781	3647	3503	1542	1753	1572
Grp Volume(v), veh/h	20	1070	638	18	25	41
Grp Sat Flow(s),veh/h/ln	1781	1777	1706	1542	1753	1572
Q Serve(g_s), s	0.3	5.8	4.3	0.2	0.4	0.7
Cycle Q Clear(g_c), s	0.3	5.8	4.3	0.2	0.4	0.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	91	1910	1190	537	249	224
V/C Ratio(X)	0.22	0.56	0.54	0.03	0.10	0.18
Avail Cap(c_a), veh/h	1840	5507	5289	2389	1207	1083
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	13.2	4.4	7.6	6.2	10.8	11.0
Incr Delay (d2), s/veh	0.9	0.1	0.1	0.0	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	0.7	0.0	0.1	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.1	4.5	7.7	6.2	10.9	11.1
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		1090	656		66	
Approach Delay, s/veh		4.7	7.7		11.0	
Approach LOS		A	A		B	
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	5.5	15.4			20.9	8.1
Change Period (Y+Rc), s	4.0	5.3			5.3	4.0
Max Green Setting (Gmax), s	30.0	45.0			45.0	20.0
Max Q Clear Time (g_c+I1), s	2.3	6.3			7.8	2.7
Green Ext Time (p_c), s	0.0	2.7			5.1	0.1

Intersection Summary

HCM 6th Ctrl Delay	6.0
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

Intersection

Int Delay, s/veh 69

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕		↵	↕			↕			↕	
Traffic Vol, veh/h	0	1025	45	57	521	0	97	0	134	0	0	0
Future Vol, veh/h	0	1025	45	57	521	0	97	0	134	0	0	0
Conflicting Peds, #/hr	0	0	0	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	180	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	94	94	94	92	92	92	92	92	92
Heavy Vehicles, %	2	2	18	16	5	2	18	2	16	2	2	2
Mvmt Flow	0	1114	49	61	554	0	105	0	146	0	0	0

Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	554	0	0	1163
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.14	-	-	4.42
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.22	-	-	2.36
Pot Cap-1 Maneuver	1012	-	-	523
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	1012	-	-	523
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.3	\$ 554.6	0
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	123	1012	-	-	523	-	-	-
HCM Lane V/C Ratio	2.041	-	-	-	0.116	-	-	-
HCM Control Delay (s)	\$ 554.6	0	-	-	12.8	-	-	0
HCM Lane LOS	F	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	20.6	0	-	-	0.4	-	-	-

Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th TWSC
 6: SMP 39 East Dwy/Airport Dwy & W Jack London Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	94.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕		↖	↕			↕			↕	
Traffic Vol, veh/h	3	1102	44	63	486	0	101	0	133	0	0	1
Future Vol, veh/h	3	1102	44	63	486	0	101	0	133	0	0	1
Conflicting Peds, #/hr	0	0	0	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	300	-	-	180	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	3	18	16	3	2	18	2	15	2	2	2
Mvmt Flow	3	1198	48	68	528	0	110	0	145	0	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	528	0	0	1246	0	0	1628	1892	623	1269	1916	264
Stage 1	-	-	-	-	-	-	1228	1228	-	664	664	-
Stage 2	-	-	-	-	-	-	400	664	-	605	1252	-
Critical Hdwy	4.14	-	-	4.42	-	-	7.86	6.54	7.2	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.86	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.86	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.36	-	-	3.68	4.02	3.45	3.52	4.02	3.32
Pot Cap-1 Maneuver	1035	-	-	483	-	-	~ 57	69	399	125	67	734
Stage 1	-	-	-	-	-	-	165	249	-	416	456	-
Stage 2	-	-	-	-	-	-	556	456	-	451	242	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1035	-	-	483	-	-	~ 51	59	399	71	57	734
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 51	59	-	71	57	-
Stage 1	-	-	-	-	-	-	165	248	-	415	392	-
Stage 2	-	-	-	-	-	-	477	392	-	287	241	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.6	\$ 778.6	9.9
HCM LOS			F	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	101	1035	-	-	483	-	-	734
HCM Lane V/C Ratio	2.518	0.003	-	-	0.142	-	-	0.001
HCM Control Delay (s)	\$ 778.6	8.5	-	-	13.7	-	-	9.9
HCM Lane LOS	F	A	-	-	B	-	-	A
HCM 95th %tile Q(veh)	23.3	0	-	-	0.5	-	-	0

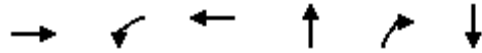
Notes
 -: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Queues

Cumulative plus SMP 39 & 40

7: Discovery Dr & W Jack London Blvd

Timing Plan: PM Peak



Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	1346	13	549	27	18	14
v/c Ratio	0.49	0.04	0.19	0.07	0.06	0.04
Control Delay	8.7	22.3	3.3	21.2	0.3	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	22.3	3.3	21.2	0.3	0.2
Queue Length 50th (ft)	0	2	0	4	0	0
Queue Length 95th (ft)	#429	20	77	32	0	0
Internal Link Dist (ft)	419		723	1798		182
Turn Bay Length (ft)		200			335	
Base Capacity (vph)	2724	1110	3376	848	602	574
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.01	0.16	0.03	0.03	0.02

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 7: Discovery Dr & W Jack London Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑		↖	↑↑			↑	↗		↕	
Traffic Volume (veh/h)	0	1214	24	12	505	0	25	0	17	10	0	3
Future Volume (veh/h)	0	1214	24	12	505	0	25	0	17	10	0	3
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		1.00	1.00		1.00	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		No		No
Adj Sat Flow, veh/h/ln	0	1796	1796	1648	1826	0	1870	1870	1292	1870	1870	1870
Adj Flow Rate, veh/h	0	1320	26	13	549	0	27	0	18	11	0	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	7	7	17	5	0	2	2	41	2	2	2
Cap, veh/h	0	1677	33	42	2094	0	152	0	94	29	0	8
Arrive On Green	0.00	0.49	0.49	0.03	0.60	0.00	0.09	0.00	0.09	0.02	0.00	0.02
Sat Flow, veh/h	0	3511	67	1570	3561	0	1781	0	1095	1363	0	372
Grp Volume(v), veh/h	0	658	688	13	549	0	27	0	18	14	0	0
Grp Sat Flow(s),veh/h/ln	0	1706	1782	1570	1735	0	1781	0	1095	1735	0	0
Q Serve(g_s), s	0.0	14.7	14.7	0.4	3.4	0.0	0.6	0.0	0.7	0.4	0.0	0.0
Cycle Q Clear(g_c), s	0.0	14.7	14.7	0.4	3.4	0.0	0.6	0.0	0.7	0.4	0.0	0.0
Prop In Lane	0.00		0.04	1.00		0.00	1.00		1.00	0.79		0.21
Lane Grp Cap(c), veh/h	0	836	873	42	2094	0	152	0	94	37	0	0
V/C Ratio(X)	0.00	0.79	0.79	0.31	0.26	0.00	0.18	0.00	0.19	0.38	0.00	0.00
Avail Cap(c_a), veh/h	0	1114	1163	1024	2264	0	775	0	477	453	0	0
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)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	9.7	9.7	22.0	4.3	0.0	19.5	0.0	19.5	22.2	0.0	0.0
Incr Delay (d2), s/veh	0.0	2.4	2.3	1.6	0.0	0.0	0.2	0.0	0.4	2.3	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	3.7	3.9	0.1	0.5	0.0	0.3	0.0	0.2	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	12.1	12.1	23.5	4.3	0.0	19.7	0.0	19.9	24.5	0.0	0.0
LnGrp LOS	A	B	B	C	A	A	B	A	B	C	A	A
Approach Vol, veh/h		1346			562			45				14
Approach Delay, s/veh		12.1			4.8			19.8				24.5
Approach LOS		B			A			B				C
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	5.2	27.8		5.0		33.1		7.9				
Change Period (Y+Rc), s	4.0	5.3		4.0		5.3		4.0				
Max Green Setting (Gmax), s	30.0	30.0		12.0		30.0		20.0				
Max Q Clear Time (g_c+I1), s	2.4	16.7		2.4		5.4		2.7				
Green Ext Time (p_c), s	0.0	5.8		0.0		2.8		0.1				

Intersection Summary

HCM 6th Ctrl Delay	10.3
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- User approved ignoring U-Turning movement.

Queues
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR
Lane Group Flow (vph)	4	1366	28	557	8	87
v/c Ratio	0.02	0.58	0.18	0.22	0.03	0.31
Control Delay	25.5	9.0	27.2	4.4	24.6	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	9.0	27.2	4.4	24.6	4.7
Queue Length 50th (ft)	1	93	8	27	2	0
Queue Length 95th (ft)	10	272	32	79	14	14
Internal Link Dist (ft)		723		1056	639	
Turn Bay Length (ft)	165		295			320
Base Capacity (vph)	399	2359	390	2777	832	588
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.58	0.07	0.20	0.01	0.15
Intersection Summary						

HCM 6th Signalized Intersection Summary
8: Voyager St & W Jack London Blvd

Cumulative plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↖	↗		↕	
Traffic Volume (veh/h)	4	1244	13	26	512	0	7	0	80	0	0	0
Future Volume (veh/h)	4	1244	13	26	512	0	7	0	80	0	0	0
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		1.00	1.00		1.00	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	1870	1841	1841	803	1826	1826	1870	1870	1189	1870	1870	1870
Adj Flow Rate, veh/h	4	1352	14	28	557	0	8	0	87	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	4	4	74	5	5	2	2	48	2	2	2
Cap, veh/h	14	1817	19	40	1936	0	225	0	127	0	4	0
Arrive On Green	0.01	0.51	0.51	0.05	0.56	0.00	0.13	0.00	0.13	0.00	0.00	0.00
Sat Flow, veh/h	1781	3545	37	765	3561	0	1781	0	1007	0	1870	0
Grp Volume(v), veh/h	4	667	699	28	557	0	8	0	87	0	0	0
Grp Sat Flow(s),veh/h/ln	1781	1749	1833	765	1735	0	1781	0	1007	0	1870	0
Q Serve(g_s), s	0.1	12.9	13.0	1.6	3.6	0.0	0.2	0.0	3.6	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.1	12.9	13.0	1.6	3.6	0.0	0.2	0.0	3.6	0.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.00	1.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	14	896	940	40	1936	0	225	0	127	0	4	0
V/C Ratio(X)	0.30	0.74	0.74	0.69	0.29	0.00	0.04	0.00	0.69	0.00	0.00	0.00
Avail Cap(c_a), veh/h	496	1419	1488	355	2816	0	1033	0	584	0	520	0
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	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	21.3	8.3	8.3	20.1	5.0	0.0	16.5	0.0	18.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.4	0.9	0.9	7.6	0.1	0.0	0.0	0.0	2.4	0.0	0.0	0.0
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	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.7	2.8	0.3	0.6	0.0	0.1	0.0	0.8	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.7	9.2	9.2	27.7	5.1	0.0	16.6	0.0	20.5	0.0	0.0	0.0
LnGrp LOS	C	A	A	C	A	A	B	A	C	A	A	A
Approach Vol, veh/h		1370			585			95				0
Approach Delay, s/veh		9.2			6.2			20.1				0.0
Approach LOS		A			A			C				
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.3	27.4		0.0	4.3	29.4		9.4				
Change Period (Y+Rc), s	4.0	5.3		4.0	4.0	5.3		4.0				
Max Green Setting (Gmax), s	20.0	35.0		12.0	12.0	35.0		25.0				
Max Q Clear Time (g_c+I1), s	3.6	15.0		0.0	2.1	5.6		5.6				
Green Ext Time (p_c), s	0.0	7.1		0.0	0.0	2.9		0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
User approved ignoring U-Turning movement.

Queues
9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39 & 40

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	251	750	376	183	302	439	139	1851	215	412	2068	140
v/c Ratio	0.78	1.10	0.85	0.46	0.82	0.72	0.42	0.87	0.28	1.09	0.97	0.21
Control Delay	77.6	115.4	44.1	63.5	70.7	39.6	65.3	42.5	10.0	129.2	51.8	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.6	115.4	44.1	63.5	70.7	39.6	65.3	42.5	10.0	129.2	51.8	5.9
Queue Length 50th (ft)	109	-381	160	76	250	272	58	538	35	-200	641	5
Queue Length 95th (ft)	#232	484	319	142	398	458	114	733	104	#409	#911	51
Internal Link Dist (ft)		1056			946			2204			2529	
Turn Bay Length (ft)	190		450	185			290		335	240		250
Base Capacity (vph)	323	1427	711	503	811	606	475	2560	884	377	2390	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.53	0.53	0.36	0.37	0.72	0.29	0.72	0.24	1.09	0.87	0.19

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 9: Isabel Ave & W Jack London Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗	↔↔	↑	↗	↔↔	↑↑↑	↗	↔↔	↑↑↑	↗
Traffic Volume (veh/h)	231	690	346	168	278	404	133	1777	206	379	1903	129
Future Volume (veh/h)	231	690	346	168	278	404	133	1777	206	379	1903	129
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		1.00	1.00		1.00	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	1618	1870	1781	1870	1856	1870	1781	1841	1870	1870	1826	1618
Adj Flow Rate, veh/h	251	750	376	183	302	439	139	1851	215	412	2068	140
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Percent Heavy Veh, %	19	2	8	2	3	2	8	4	2	2	5	19
Cap, veh/h	311	896	380	384	481	576	319	1944	613	360	1965	541
Arrive On Green	0.10	0.25	0.25	0.11	0.26	0.26	0.10	0.39	0.39	0.10	0.39	0.39
Sat Flow, veh/h	2990	3554	1508	3456	1856	1585	3291	5025	1585	3456	4985	1372
Grp Volume(v), veh/h	251	750	376	183	302	439	139	1851	215	412	2068	140
Grp Sat Flow(s),veh/h/ln	1495	1777	1508	1728	1856	1585	1646	1675	1585	1728	1662	1372
Q Serve(g_s), s	11.8	28.8	35.8	7.2	20.8	35.1	5.7	51.5	13.9	15.0	56.8	9.9
Cycle Q Clear(g_c), s	11.8	28.8	35.8	7.2	20.8	35.1	5.7	51.5	13.9	15.0	56.8	9.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	311	896	380	384	481	576	319	1944	613	360	1965	541
V/C Ratio(X)	0.81	0.84	0.99	0.48	0.63	0.76	0.44	0.95	0.35	1.15	1.05	0.26
Avail Cap(c_a), veh/h	311	896	380	480	773	825	457	2442	770	360	1965	541
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	63.1	51.1	53.7	60.1	47.2	40.4	61.4	42.9	31.3	64.5	43.6	29.4
Incr Delay (d2), s/veh	13.4	6.6	43.0	0.3	0.5	1.4	0.3	7.5	0.1	93.0	35.7	0.1
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	5.0	13.4	17.7	3.1	9.5	13.5	2.4	21.6	5.2	11.1	28.8	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	76.5	57.7	96.6	60.5	47.7	41.8	61.7	50.4	31.4	157.5	79.3	29.5
LnGrp LOS	E	E	F	E	D	D	E	D	C	F	F	C
Approach Vol, veh/h		1377			924			2205			2620	
Approach Delay, s/veh		71.7			47.4			49.3			89.0	
Approach LOS		E			D			D			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.7	61.5	20.7	42.1	18.6	62.6	19.7	43.1				
Change Period (Y+Rc), s	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8	* 4.7	5.8				
Max Green Setting (Gmax), s	* 15	70.0	* 20	15.0	* 20	55.0	* 15	60.0				
Max Q Clear Time (g_c+I1), s	17.0	53.5	9.2	37.8	7.7	58.8	13.8	37.1				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	68.0
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	83	68	27	2194	2540	61
v/c Ratio	0.21	0.18	0.08	0.60	0.75	0.07
Control Delay	22.5	8.5	21.6	5.6	11.3	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	8.5	21.6	5.6	11.3	4.0
Queue Length 50th (ft)	10	0	3	119	158	3
Queue Length 95th (ft)	32	17	14	153	#472	21
Internal Link Dist (ft)	707			3132	2204	
Turn Bay Length (ft)	160	290	255			200
Base Capacity (vph)	1441	1205	1161	4988	3389	825
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.06	0.02	0.44	0.75	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 10: Isabel Ave & Discovery Dr

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶↶	↷↷	↶↶	↑↑↑	↑↑↑	↷
Traffic Volume (veh/h)	76	63	25	2040	2337	56
Future Volume (veh/h)	76	63	25	2040	2337	56
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	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	1663	1663	1248	1841	1826	1366
Adj Flow Rate, veh/h	83	68	27	2194	2540	61
Peak Hour Factor	0.92	0.92	0.93	0.93	0.92	0.92
Percent Heavy Veh, %	16	16	44	4	5	36
Cap, veh/h	354	286	99	3441	2677	622
Arrive On Green	0.12	0.12	0.04	0.68	0.54	0.54
Sat Flow, veh/h	3072	2480	2306	5191	5149	1158
Grp Volume(v), veh/h	83	68	27	2194	2540	61
Grp Sat Flow(s),veh/h/ln	1536	1240	1153	1675	1662	1158
Q Serve(g_s), s	1.3	1.4	0.6	13.3	26.2	1.4
Cycle Q Clear(g_c), s	1.3	1.4	0.6	13.3	26.2	1.4
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	354	286	99	3441	2677	622
V/C Ratio(X)	0.23	0.24	0.27	0.64	0.95	0.10
Avail Cap(c_a), veh/h	1409	1137	1057	3441	2743	637
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	21.9	21.9	25.3	4.8	11.9	6.2
Incr Delay (d2), s/veh	0.1	0.2	0.5	0.3	8.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.2	1.4	7.6	0.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.1	22.1	25.8	5.1	19.9	6.2
LnGrp LOS	C	C	C	A	B	A
Approach Vol, veh/h	151			2221	2601	
Approach Delay, s/veh	22.1			5.4	19.6	
Approach LOS	C			A	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		43.5		11.0	8.0	35.5
Change Period (Y+Rc), s		6.2		* 4.7	5.7	6.2
Max Green Setting (Gmax), s		30.0		* 25	25.0	30.0
Max Q Clear Time (g_c+I1), s		15.3		3.4	2.6	28.2
Green Ext Time (p_c), s		2.9		0.0	0.0	1.1

Intersection Summary

HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Queues
11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	122	790	1462	124	603	2018
v/c Ratio	0.13	1.08	0.79	0.06	0.68	0.97
Control Delay	25.7	75.6	28.5	2.9	38.7	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	75.6	28.5	2.9	38.7	32.1
Queue Length 50th (ft)	26	~333	262	6	115	525
Queue Length 95th (ft)	51	#583	343	17	152	#764
Internal Link Dist (ft)	846		630			3132
Turn Bay Length (ft)				435	295	
Base Capacity (vph)	959	730	1915	1982	1116	2266
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	1.08	0.76	0.06	0.54	0.89

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 11: Isabel Ave & Stanley Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔	↔	↑↑↑	↔↔	↔↔↔	↑↑
Traffic Volume (veh/h)	112	727	1345	114	555	1857
Future Volume (veh/h)	112	727	1345	114	555	1857
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	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	1870	1870	1811	1841	1870	1811
Adj Flow Rate, veh/h	122	790	1462	124	603	2018
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	6	4	2	6
Cap, veh/h	1015	466	1877	1849	785	2026
Arrive On Green	0.29	0.29	0.38	0.38	0.16	0.59
Sat Flow, veh/h	3456	1585	5107	2745	5023	3532
Grp Volume(v), veh/h	122	790	1462	124	603	2018
Grp Sat Flow(s),veh/h/ln	1728	1585	1648	1373	1674	1721
Q Serve(g_s), s	2.2	25.0	22.2	1.3	9.8	49.6
Cycle Q Clear(g_c), s	2.2	25.0	22.2	1.3	9.8	49.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	1015	466	1877	1849	785	2026
V/C Ratio(X)	0.12	1.70	0.78	0.07	0.77	1.00
Avail Cap(c_a), veh/h	1015	466	2033	1935	1180	2026
HCM Platoon Ratio	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
Uniform Delay (d), s/veh	22.0	30.1	23.3	4.8	34.4	17.4
Incr Delay (d2), s/veh	0.1	322.7	2.0	0.0	1.7	19.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	50.7	7.9	0.3	3.8	19.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.1	352.8	25.3	4.8	36.2	36.4
LnGrp LOS	C	F	C	A	D	D
Approach Vol, veh/h	912		1586			2621
Approach Delay, s/veh	308.6		23.7			36.4
Approach LOS	F		C			D
Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	17.8	37.8			55.6	29.5
Change Period (Y+Rc), s	4.5	5.5			5.5	4.5
Max Green Setting (Gmax), s	20.0	35.0			35.0	25.0
Max Q Clear Time (g_c+I1), s	11.8	24.2			51.6	27.0
Green Ext Time (p_c), s	1.5	8.1			0.0	0.0
Intersection Summary						
HCM 6th Ctrl Delay			80.9			
HCM 6th LOS			F			

Queues
12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39 & 40
Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	16	153	368	46	84	357	220	2373	41	337	2193
v/c Ratio	0.06	0.48	0.56	0.17	0.17	0.45	0.88	1.16	0.06	0.80	1.13
Control Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	109.2	0.2	60.5	96.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.8	43.1	14.8	45.6	29.2	7.1	78.1	109.2	0.2	60.5	96.8
Queue Length 50th (ft)	9	97	89	27	39	31	146	~719	0	113	~648
Queue Length 95th (ft)	35	157	170	76	93	118	#388	#1144	0	#257	#1054
Internal Link Dist (ft)		834			970			2529			1403
Turn Bay Length (ft)	95		105	130		130	325		325	490	
Base Capacity (vph)	274	449	656	269	564	796	251	2039	689	440	1938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.34	0.56	0.17	0.15	0.45	0.88	1.16	0.06	0.77	1.13

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM 6th Signalized Intersection Summary
 12: Isabel Ave & Airway Blvd

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗	↖	↑	↗	↖	↑↑↑	↗	↖↗	↑↑↑	↖↗
Traffic Volume (veh/h)	15	141	339	42	77	328	202	2183	38	310	2006	12
Future Volume (veh/h)	15	141	339	42	77	328	202	2183	38	310	2006	12
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		1.00	1.00		1.00	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	1796	1737	1870	1870	1870	1870	1870	1826	1781	1826	1811	1811
Adj Flow Rate, veh/h	16	153	368	46	84	357	220	2373	41	337	2180	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	7	11	2	2	2	2	2	5	8	5	6	6
Cap, veh/h	96	367	538	184	483	594	229	1846	559	393	1817	11
Arrive On Green	0.06	0.21	0.21	0.10	0.26	0.26	0.13	0.37	0.37	0.12	0.36	0.36
Sat Flow, veh/h	1711	1737	1583	1781	1870	1585	1781	4985	1510	3374	5072	30
Grp Volume(v), veh/h	16	153	368	46	84	357	220	2373	41	337	1416	777
Grp Sat Flow(s),veh/h/ln	1711	1737	1583	1781	1870	1585	1781	1662	1510	1687	1648	1806
Q Serve(g_s), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Cycle Q Clear(g_c), s	1.0	8.3	21.8	2.6	3.8	19.8	13.4	40.3	1.9	10.7	39.0	39.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	96	367	538	184	483	594	229	1846	559	393	1181	647
V/C Ratio(X)	0.17	0.42	0.68	0.25	0.17	0.60	0.96	1.29	0.07	0.86	1.20	1.20
Avail Cap(c_a), veh/h	251	367	538	245	483	594	229	1846	559	403	1181	647
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	48.9	37.1	30.9	44.9	31.3	27.5	47.2	34.3	22.2	47.2	34.9	34.9
Incr Delay (d2), s/veh	0.3	0.3	3.0	0.3	0.1	1.2	47.9	132.7	0.0	15.5	98.2	104.6
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	0.4	3.4	8.4	1.1	1.7	7.4	8.8	37.8	0.7	5.2	30.7	34.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	49.2	37.4	33.9	45.2	31.4	28.7	95.1	166.9	22.2	62.8	133.1	139.5
LnGrp LOS	D	D	C	D	C	C	F	F	C	E	F	F
Approach Vol, veh/h		537			487			2634			2530	
Approach Delay, s/veh		35.3			30.7			158.7			125.7	
Approach LOS		D			C			F			F	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	17.7	46.1	16.3	28.8	19.0	44.8	11.1	33.9				
Change Period (Y+Rc), s	5.0	5.8	5.0	5.8	5.0	5.8	5.0	* 5.8				
Max Green Setting (Gmax), s	13.0	39.0	15.0	23.0	14.0	39.0	16.0	* 21				
Max Q Clear Time (g_c+I1), s	12.7	42.3	4.6	23.8	15.4	41.0	3.0	21.8				
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				

Intersection Summary

HCM 6th Ctrl Delay	124.4
HCM 6th LOS	F

Notes

- User approved pedestrian interval to be less than phase max green.
- * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	T		T		T	
Traffic Vol, veh/h	25	13	38	20	10	75
Future Vol, veh/h	25	13	38	20	10	75
Conflicting Peds, #/hr	0	1	1	0	4	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	8	42	35	30	31
Mvmt Flow	27	14	41	22	11	82

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	42	0	143 35
Stage 1	-	-	-	-	35 -
Stage 2	-	-	-	-	108 -
Critical Hdwy	-	-	4.52	-	6.7 6.51
Critical Hdwy Stg 1	-	-	-	-	5.7 -
Critical Hdwy Stg 2	-	-	-	-	5.7 -
Follow-up Hdwy	-	-	2.578	-	3.77 3.579
Pot Cap-1 Maneuver	-	-	1345	-	788 961
Stage 1	-	-	-	-	920 -
Stage 2	-	-	-	-	851 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1344	-	760 960
Mov Cap-2 Maneuver	-	-	-	-	760 -
Stage 1	-	-	-	-	919 -
Stage 2	-	-	-	-	821 -

Approach	EB	WB	NB
HCM Control Delay, s	0	5.1	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	931	-	-	1344	-
HCM Lane V/C Ratio	0.099	-	-	0.031	-
HCM Control Delay (s)	9.3	-	-	7.8	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

HCM 6th TWSC
 14: Challenger St/Driveway & Discovery Dr

Cumulative plus SMP 39 & 40
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	3.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	97	1	18	47	25	5	7	59	16	3	4
Future Vol, veh/h	4	97	1	18	47	25	5	7	59	16	3	4
Conflicting Peds, #/hr	1	0	0	0	0	1	19	0	9	9	0	19
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	24	2	6	43	64	60	2	15	2	2	2
Mvmt Flow	4	99	1	20	51	27	5	8	64	17	3	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	79	0	0	100	0	0	235	227	109	259	214	85
Stage 1	-	-	-	-	-	-	108	108	-	106	106	-
Stage 2	-	-	-	-	-	-	127	119	-	153	108	-
Critical Hdwy	4.12	-	-	4.16	-	-	7.7	6.52	6.35	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.7	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.7	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.254	-	-	4.04	4.018	3.435	3.518	4.018	3.318
Pot Cap-1 Maneuver	1519	-	-	1468	-	-	613	672	910	694	684	974
Stage 1	-	-	-	-	-	-	774	806	-	900	807	-
Stage 2	-	-	-	-	-	-	755	797	-	849	806	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1518	-	-	1468	-	-	589	660	902	625	672	955
Mov Cap-2 Maneuver	-	-	-	-	-	-	589	660	-	625	672	-
Stage 1	-	-	-	-	-	-	772	804	-	896	795	-
Stage 2	-	-	-	-	-	-	725	785	-	772	804	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			1.5			9.7			10.6		
HCM LOS							A			B		

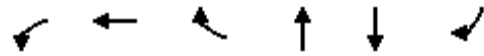
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	840	1518	-	-	1468	-	-	671
HCM Lane V/C Ratio	0.092	0.003	-	-	0.013	-	-	0.037
HCM Control Delay (s)	9.7	7.4	0	-	7.5	0	-	10.6
HCM Lane LOS	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.1

Queues

Cumulative plus SMP 39 & 40

15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Timing Plan: PM Peak



Lane Group	WBL	WBT	WBR	NBT	SBT	SBR
Lane Group Flow (vph)	177	178	873	1214	1485	842
v/c Ratio	0.41	0.41	0.76	1.36	0.67	0.64
Control Delay	27.1	27.1	22.4	193.6	10.7	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	27.1	22.4	193.6	10.7	3.0
Queue Length 50th (ft)	67	67	178	~729	211	0
Queue Length 95th (ft)	144	144	248	#1127	273	36
Internal Link Dist (ft)		550		213	802	
Turn Bay Length (ft)	135		115			190
Base Capacity (vph)	459	460	1415	890	2593	1385
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.39	0.62	1.36	0.57	0.61

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 15: El Charro Rd & I-580 WB On Ramp/I-580 WB Off Ramp

Cumulative plus SMP 39 & 40

Timing Plan: PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↙	↖	↗		↑			↕	↘
Traffic Volume (vph)	0	0	0	320	6	803	0	1117	0	0	1366	775
Future Volume (vph)	0	0	0	320	6	803	0	1117	0	0	1366	775
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				3.7	3.7	3.7		4.8			4.8	4.8
Lane Util. Factor				0.95	0.95	0.88		1.00			0.95	1.00
Frt				1.00	1.00	0.85		1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00		1.00			1.00	1.00
Satd. Flow (prot)				1681	1689	2787		1863			3539	1583
Flt Permitted				0.95	0.95	1.00		1.00			1.00	1.00
Satd. Flow (perm)				1681	1689	2787		1863			3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	348	7	873	0	1214	0	0	1485	842
RTOR Reduction (vph)	0	0	0	0	0	24	0	0	0	0	0	311
Lane Group Flow (vph)	0	0	0	177	178	849	0	1214	0	0	1485	531
Turn Type				Perm	NA	custom		NA			NA	Perm
Protected Phases					8			2			6	
Permitted Phases				8		8 1						6
Actuated Green, G (s)				18.7	18.7	29.9		35.2			46.4	46.4
Effective Green, g (s)				18.7	18.7	29.9		35.2			46.4	46.4
Actuated g/C Ratio				0.25	0.25	0.41		0.48			0.63	0.63
Clearance Time (s)				3.7	3.7			4.8			4.8	4.8
Vehicle Extension (s)				0.2	0.2			0.2			0.2	0.2
Lane Grp Cap (vph)				427	429	1132		891			2231	997
v/s Ratio Prot								c0.65			0.42	
v/s Ratio Perm				0.11	0.11	c0.30						0.34
v/c Ratio				0.41	0.41	0.75		1.36			0.67	0.53
Uniform Delay, d1				22.9	22.9	18.7		19.2			8.7	7.6
Progression Factor				1.00	1.00	1.00		1.00			1.00	1.00
Incremental Delay, d2				0.2	0.2	2.5		170.4			0.6	0.3
Delay (s)				23.1	23.1	21.2		189.6			9.2	7.8
Level of Service				C	C	C		F			A	A
Approach Delay (s)		0.0			21.7			189.6			8.7	
Approach LOS		A			C			F			A	

Intersection Summary

HCM 2000 Control Delay	58.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	73.6	Sum of lost time (s)	12.2
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Queues

Cumulative plus SMP 39 & 40

16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Timing Plan: PM Peak

























Lane Group	EBL	EBR	NBT	NBR	SBT
Lane Group Flow (vph)	576	586	1395	584	1043
v/c Ratio	0.66	0.73	0.71	0.33	0.52
Control Delay	21.2	19.3	10.2	1.2	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	19.3	10.2	1.2	7.8
Queue Length 50th (ft)	72	60	120	0	76
Queue Length 95th (ft)	151	145	253	19	163
Internal Link Dist (ft)			816		292
Turn Bay Length (ft)	270	290			
Base Capacity (vph)	2005	1642	2880	2338	2908
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.36	0.48	0.25	0.36

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 16: El Charro Rd & I-580 EB Off Ramp/I-580 EB On Ramp

Cumulative plus SMP 39 & 40

Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 		 					 	 		 	
Traffic Volume (vph)	530	0	539	0	0	0	0	1339	561	0	960	0
Future Volume (vph)	530	0	539	0	0	0	0	1339	561	0	960	0
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0					4.0	4.0		4.0	
Lane Util. Factor	0.97		0.88					0.95	0.88		0.95	
Frpb, ped/bikes	1.00		1.00					1.00	0.98		1.00	
Flpb, ped/bikes	1.00		1.00					1.00	1.00		1.00	
Frt	1.00		0.85					1.00	0.85		1.00	
Flt Protected	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (prot)	3433		2707					3505	2720		3539	
Flt Permitted	0.95		1.00					1.00	1.00		1.00	
Satd. Flow (perm)	3433		2707					3505	2720		3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96	0.92	0.92	0.92
Adj. Flow (vph)	576	0	586	0	0	0	0	1395	584	0	1043	0
RTOR Reduction (vph)	0	0	109	0	0	0	0	0	249	0	0	0
Lane Group Flow (vph)	576	0	477	0	0	0	0	1395	335	0	1043	0
Confl. Peds. (#/hr)									4			
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%	2%	3%	2%	2%	2%	2%
Turn Type	Perm		Perm					NA	Perm		NA	
Protected Phases								2			6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	12.4		12.4					27.4	27.4		27.4	
Effective Green, g (s)	12.4		12.4					27.4	27.4		27.4	
Actuated g/C Ratio	0.26		0.26					0.57	0.57		0.57	
Clearance Time (s)	4.0		4.0					4.0	4.0		4.0	
Vehicle Extension (s)	0.2		0.2					0.2	0.2		0.2	
Lane Grp Cap (vph)	890		702					2009	1559		2028	
v/s Ratio Prot								c0.40			0.29	
v/s Ratio Perm	0.17		c0.18						0.12			
v/c Ratio	0.65		0.68					0.69	0.21		0.51	
Uniform Delay, d1	15.8		15.9					7.2	5.0		6.2	
Progression Factor	1.00		1.00					1.00	1.00		1.00	
Incremental Delay, d2	1.2		2.1					0.9	0.0		0.1	
Delay (s)	17.0		18.0					8.1	5.0		6.3	
Level of Service	B		B					A	A		A	
Approach Delay (s)		17.5			0.0			7.2			6.3	
Approach LOS		B			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			9.8								HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			47.8								Sum of lost time (s)	8.0
Intersection Capacity Utilization			68.6%								ICU Level of Service	C
Analysis Period (min)			15									
c	Critical Lane Group											

Appendix H – CA MUTCD Peak Hour Signal Warrants

MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	Yes
---	-----

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*

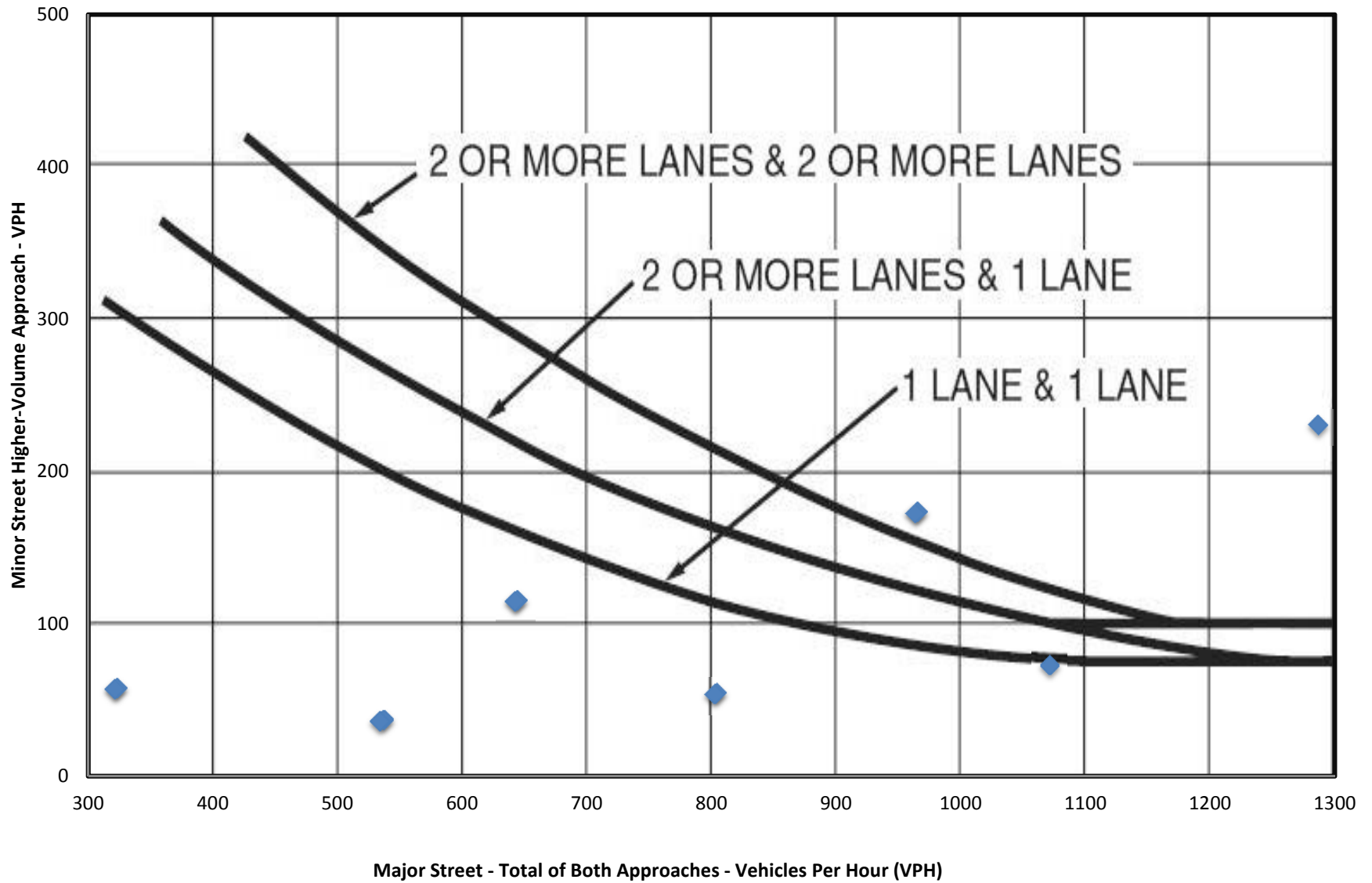
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	Yes
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	Yes
<i>*If applicable, attach all supporting calculations and documentation.</i>	

Total Number of Unique Hours Met On Figure 4C-4
2

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	269	19	
6:30 AM	537	37	
6:45 AM	804	55	
7:00 AM	1071	73	Met
7:15 AM	802	54	
7:30 AM	534	36	
7:45 AM	267	18	
8:00 AM	0	0	
8:15 AM	0	0	
8:30 AM	0	0	
8:45 AM	0	0	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
11:15 AM	0	0	
11:30 AM	0	0	
11:45 AM	0	0	
12:00 PM	0	0	
12:15 PM	0	0	
12:30 PM	0	0	
12:45 PM	0	0	
1:00 PM	0	0	
1:15 PM	0	0	
1:30 PM	0	0	
1:45 PM	0	0	
2:00 PM	0	0	
2:15 PM	0	0	
2:30 PM	0	0	
2:45 PM	0	0	
3:00 PM	0	0	
3:15 PM	323	58	
3:30 PM	644	116	
3:45 PM	965	174	Met
4:00 PM	1286	231	Met
4:15 PM	963	173	Met
4:30 PM	642	115	
4:45 PM	321	57	
5:00 PM	0	0	
5:15 PM	0	0	
5:30 PM	0	0	
5:45 PM	0	0	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD Figure 4C-4. Warrant 3, Peak Hour (70% Factor)



MUTCD WARRANT 3, PEAK HOUR

Number of Lanes for Moving Traffic on Each Approach	
Major Street:	1 Lane
Minor Street:	1 Lane

Built-up Isolated Community With Less Than 10,000 Population or Above 40 MPH on Major Street?	Yes
---	-----

Is this signal warrant being applied for an unusual case, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time?	Yes
---	-----

Indicate whether all three of the following conditions for the same 1 hour (any four consecutive 15-minute periods) of an average day are present*

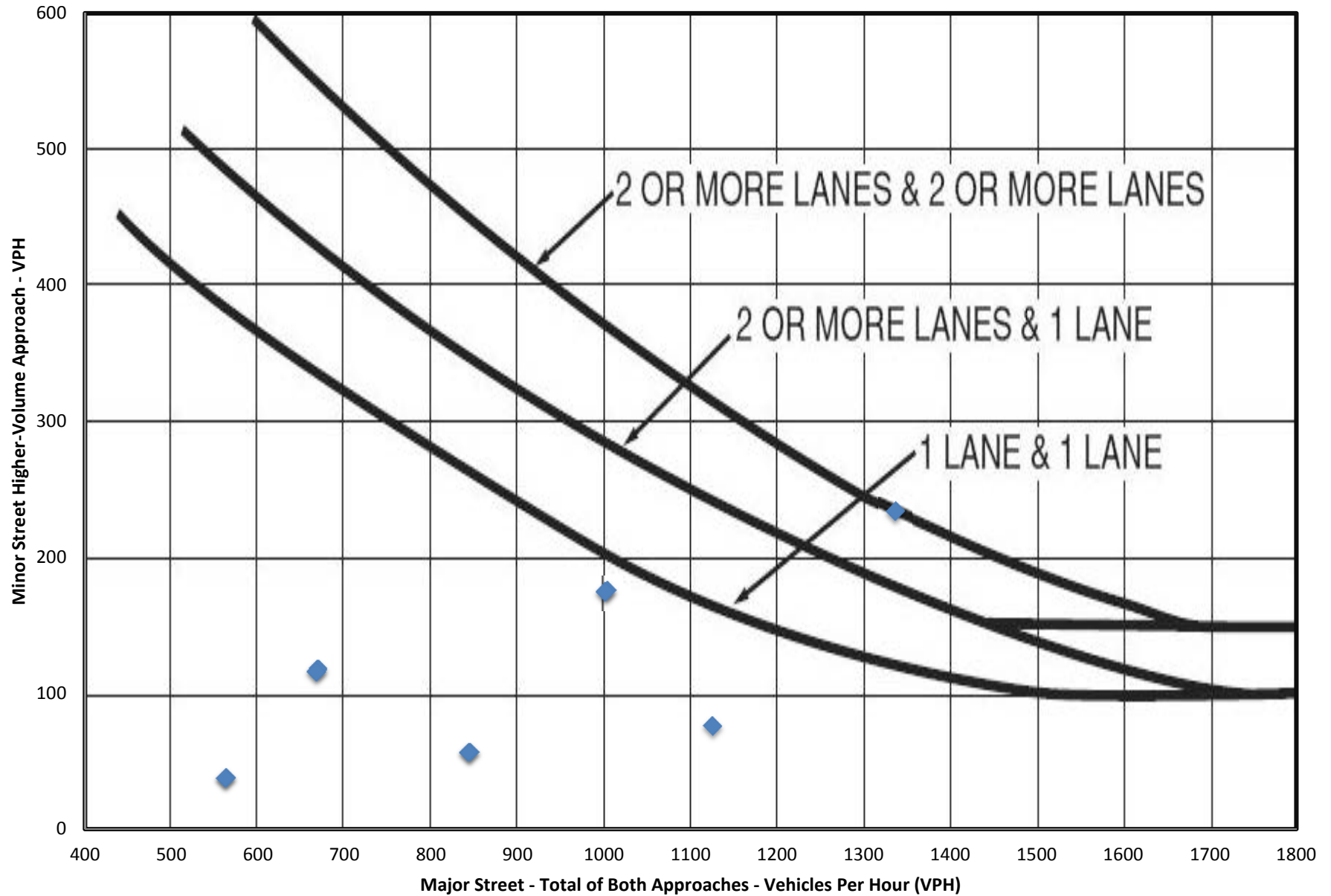
Does the total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equal or exceed 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach?	N/A
Does the volume on the same minor-street approach (one direction only) equal or exceed 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes?	No
Does the total entering volume serviced during the hour equal or exceed 650 vehicles per hour for intersection with three approaches or 800 vehicles per hour for intersections with four or more approaches?	Yes
<i>*If applicable, attach all supporting calculations and documentation.</i>	

Total Number of Unique Hours Met On Figure 4C-4
2

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
12:00 AM	0	0	
12:15 AM	0	0	
12:30 AM	0	0	
12:45 AM	0	0	
1:00 AM	0	0	
1:15 AM	0	0	
1:30 AM	0	0	
1:45 AM	0	0	
2:00 AM	0	0	
2:15 AM	0	0	
2:30 AM	0	0	
2:45 AM	0	0	
3:00 AM	0	0	
3:15 AM	0	0	
3:30 AM	0	0	
3:45 AM	0	0	
4:00 AM	0	0	
4:15 AM	0	0	
4:30 AM	0	0	
4:45 AM	0	0	
5:00 AM	0	0	
5:15 AM	0	0	
5:30 AM	0	0	
5:45 AM	0	0	
6:00 AM	0	0	
6:15 AM	282	19	
6:30 AM	563	38	
6:45 AM	844	57	
7:00 AM	1125	76	Met
7:15 AM	843	57	
7:30 AM	562	38	
7:45 AM	281	19	
8:00 AM	0	0	
8:15 AM	0	0	
8:30 AM	0	0	
8:45 AM	0	0	

Hourly Vehicular Volume			
Hour Interval	Major Street Combined	Highest Minor Street Approach	Hour Met?
Beginning At	Vehicles Per Hour (VPH)	Vehicles Per Hour (VPH)	
9:00 AM	0	0	
9:15 AM	0	0	
9:30 AM	0	0	
9:45 AM	0	0	
10:00 AM	0	0	
10:15 AM	0	0	
10:30 AM	0	0	
10:45 AM	0	0	
11:00 AM	0	0	
11:15 AM	0	0	
11:30 AM	0	0	
11:45 AM	0	0	
12:00 PM	0	0	
12:15 PM	0	0	
12:30 PM	0	0	
12:45 PM	0	0	
1:00 PM	0	0	
1:15 PM	0	0	
1:30 PM	0	0	
1:45 PM	0	0	
2:00 PM	0	0	
2:15 PM	0	0	
2:30 PM	0	0	
2:45 PM	0	0	
3:00 PM	0	0	
3:15 PM	335	59	
3:30 PM	669	118	
3:45 PM	1003	176	Met
4:00 PM	1336	234	Met
4:15 PM	1001	175	Met
4:30 PM	667	116	
4:45 PM	333	58	
5:00 PM	0	0	
5:15 PM	0	0	
5:30 PM	0	0	
5:45 PM	0	0	
6:00 PM	0	0	
6:15 PM	0	0	
6:30 PM	0	0	
6:45 PM	0	0	
7:00 PM	0	0	
7:15 PM	0	0	
7:30 PM	0	0	
7:45 PM	0	0	
8:00 PM	0	0	
8:15 PM	0	0	
8:30 PM	0	0	
8:45 PM	0	0	
9:00 PM	0	0	
9:15 PM	0	0	
9:30 PM	0	0	
9:45 PM	0	0	
10:00 PM	0	0	
10:15 PM	0	0	
10:30 PM	0	0	
10:45 PM	0	0	
11:00 PM	0	0	

MUTCD Figure 4C-3. Warrant 3, Peak Hour



Appendix I – Summary of Recommended Improvement Measures

Appendix I: Summary of Recommended Improvement Measures

#	Intersection	Control	Methodology	Peak Hour ¹	Background plus SMP 39 Mitigations			Background plus SMP 40 Mitigations	Background plus SMP 39 & 40 Mitigations			Cumulative plus SMP 39 Mitigations			Cumulative plus SMP 40 Mitigations			Cumulative plus SMP 39 & 40 Mitigations		
					Improvements	Delay ²	LOS ³		Improvements	Delay ²	LOS ³	Improvements	Delay ²	LOS ³	Improvements	Delay ²	LOS ³	Improvements	Delay ²	LOS ³
5	W Jack London Blvd/Ambassador Dwy	One-Way Stop	HCM 6	AM	Addition of WBL pocket,	11.3	B	None needed	Addition of WBL pocket,	12.5	B	None needed	-	-	None needed	-	-	Signalize intersection	10.3	B
				PM	Signalize intersection	29.8	C		Signalize intersection	27.1	C		-	-		Signalize intersection (Cycle = 65 s)	16.6	B		
6	W Jack London Blvd/Airport Dwy	One-Way Stop	HCM 6	AM	Addition of WBL pocket,	11.2	B	None needed	Addition of WBL pocket,	11.2	B	Signalize intersection	10.5	B	None needed	-	-	Signalize intersection	10.4	B
				PM	Signalize intersection	46.5	D		Signalize intersection	41.8	D		16.9	B		Signalize intersection (Cycle = 65 s)	18.9	B		
9	W Jack London Blvd/Isabel Ave	Signal	HCM 6	AM	None needed	-	-	None needed	None needed	-	-	Signal timing improvements (Cycle= 165s)	64.6	E	None needed	-	-	Signal timing improvements	66.7	E
				PM	-	-	-		-	63.7	E		Signal timing improvements (Cycle= 165s)	64.7		E				
11	Isabel Ave/Stanley Blvd	Signal	HCM 6	AM	None needed	-	-	None needed	None needed	-	-	Addition of WBR pocket, Signal timing improvements (Cycle= 80s)	24.3	C	None needed	-	-	Addition of WBR pocket, Signal timing improvements	27.3	C
				PM	-	-	-		-	38.9	D		Signal timing improvements (Cycle= 80s)	34.3		C				
12	Isabel Ave/Airway Blvd	Signal	HCM 6	AM	None needed	-	-	None needed	None needed	-	-	Signal timing improvements (Cycle= 180s)	52.1	D	Signal timing improvements (Cycle= 180s)	45.5	D	Signal timing improvements	49.1	D
				PM	-	-	-		-	68.3	E		Signal timing improvements (Cycle= 180s)	63.5		E				
15	El Charro Rd/I-580 WB Ramps	Signal	HCM 2000	AM	None needed	-	-	None needed	None needed	-	-	Signal timing improvements (Cycle= 110s)	12.3	B	None needed	-	-	Signal timing improvements	16.7	B
				PM	-	-	-		-	34.4	C		Signal timing improvements (Cycle= 110s)	33.6		C				

Notes:

Bold indicates unacceptable intersection operations.

¹AM – morning peak hour, PM – evening peak hour

²Average intersection delay expressed in seconds per vehicle for signalized intersections and all-way stop controlled intersections. Worst movement delay expressed in seconds per vehicle for side street stop controlled intersections

³LOS = Level of Service